Head and Neck Specimens

DEFINITIONS AND GENERAL COMMENTS:

All specimens, even of the same type, are unique, and this is particularly true for Head and Neck specimens. Thus, while this outline is meant to provide a guide to grossing the common head and neck specimens at UAB, it is not all inclusive and will not capture every scenario. Thus, careful assessment of each specimen with some modifications of what follows below may be needed on a case by case basis. When in doubt always consult with a PA, Chief/Senior Resident and/or the Head and Neck Pathologist on service.

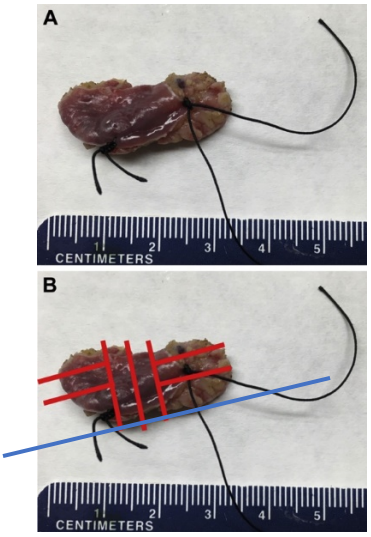
Specimen-derived margin: A margin taken directly from the main specimen-either a shave or radial.

Tumor bed margin: A piece of tissue taken from the *operative bed* after the main specimen has been resected. This entire piece of tissue may represent the margin, or it could also be specifically oriented-check specimen label/requisition for any further orientation.

Margin status as determined from specimen-derived margins has been shown to better predict local recurrence as compared to tumor bed margins (*Surgical Pathology Clinics.* 2017; 10: 1-14**). At UAB, both methods are employed.**

Note to grosser: However, even if a surgeon submits tumor bed margins separately, the grosser must still sample the *specimen* margins.

Figure 1: Shave vs radial (perpendicular) margin: Figure adapted from *Surgical Pathology Clinics.* 2017; 10: 1-14):



Red lines: radial section (perpendicular) of margin

Blue line: Shave of margin

Comparison of shave and radial margins (Table 1 from Chiosea SI. Intraoperative Margin Assessment in Early Oral Squamous Cell Carcinoma. *Surgical Pathology Clinics.* 2017; 10: 1-14.

Margin Type	Advantages	Disadvantages
Radial	Allows measurement of the exact distance between the tumor and margin. Fewer frozen vs permanent sampling issues. Easier to interpret (representative tumor is available for direct comparison with other atypical foci). Smaller area to be scrutinized by microscopic examination: margin is limited to inked or cauterized area.	Smaller area of the margin is examined microscopically.
Shave	Greater margin area is examined microscopically.	Precludes microscopic measurement of the distance between the tumor and margin.

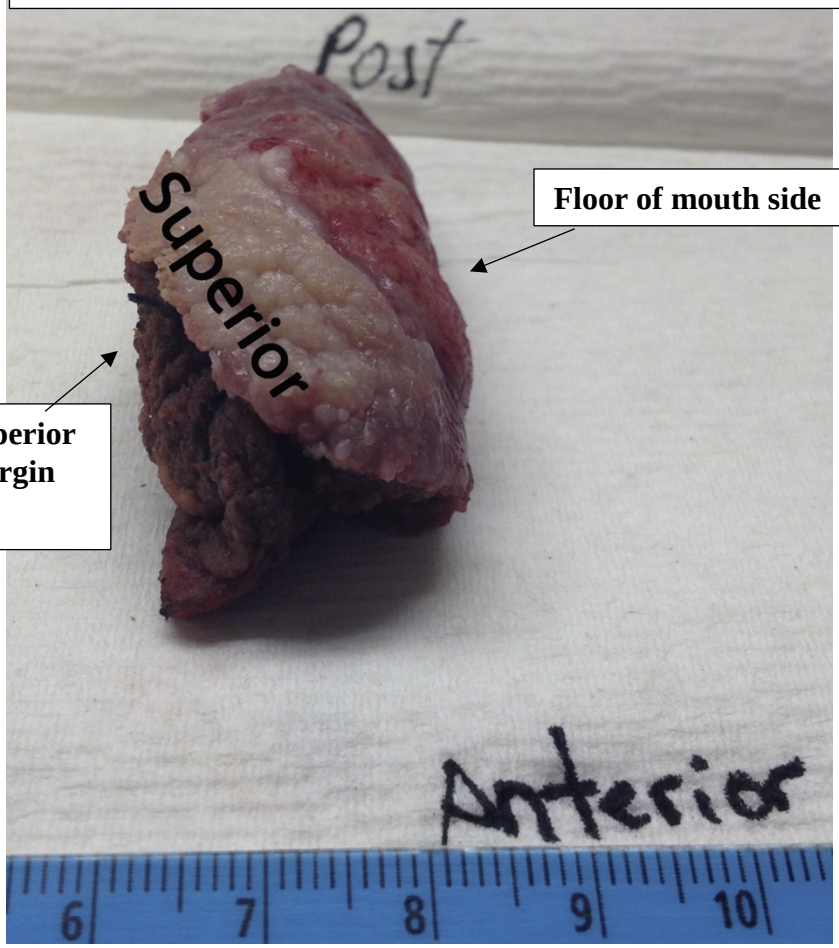
PARTIAL GLOSSECTOMY WITHOUT PORTION OF MANDIBLE

Approach:

1. Make note of and describe if both mobile, tip and/or nonmobile/tongue base are present
2. Assess for presence of floor of mouth tissue, sublingual gland, any attached gingiva (possible retromolar trigone tissue, etc.) and/or attached tonsil and describe accordingly
3. Don't describe margins in terms of inferior or lateral, etc., but rather in terms of actual anatomic landmarks, for example, floor of mouth margin, gingival margin, deep tongue, or medial/superior tongue margin
4. *Always measure depth of invasion and include a section to document deepest extent of invasion as this is a critical staging element for oral cavity carcinomas*
5. If margin is far from tumor, can shave; if close, take a radial/perpendicular section
6. Document the size of the tumor and what structures does it involve, for example, does it involve floor of mouth, tongue base, tonsil, etc.
7. Margins include: 1) Floor of mouth; 2) Deep tongue (more along the underside of tongue); 3) superior/medial tongue; 4) posterior tongue (may include tongue base); and some cases may also include gingival/retromolar trigone and/or tonsillar/oropharynx margins if these structures are present.

8. Sections should include approximately 3 sections of tumor (which can be included in sections with margins but at least one should include deepest extent of tumor) as well as samplings of each margin.
9. *NOTE: For oral cavity carcinoma, UAB Head and Neck surgeons consider negative margins to be >5.0 mm to tumor. Keep this in mind while assessing, describing, and selecting best areas for sections to demonstrate margins for oral cavity specimens.*

Figure 2: Hemiglossectomy specimen (left side in this case)- Figure from: *Surgical Pathology Clinics.* 2017; 10: 1-14



Sample Gross Description:
The specimen consists of a (right/left) lateral tongue (___x___x___cm) with portions of floor of mouth (___x__x___cm) (also describe if any gingiva and/or retromolar trigone tissue, etc. is included). There is a ___x____cm (ulcerated, fungating, etc.) lesion (or mass) on the _____(describe location: lateral tongue; lateral tongue and floor of mouth, etc). It invades _____mm/cm deep and involves _____(or state that no definitive invasion is seen if that is indeed the case). The gross tumor extends to _____mm to floor of mouth (or gingiva), ___mm to superior/medial tongue margin, ___mm to deep tongue margin, _____mm to posterior tongue and ___mm to anterior tongue margin (note: if the mobile tongue tip is included then there is no anterior tongue margin). The specimen is inked as follows: Floor of mouth margin (or gingiva): Green; Superior/medial tongue margin: Blue; Deep tongue margin: Black; Posterior tongue margin: Red; Anterior tongue margin (if present): pick another color.

PARTIAL GLOSSECTOMY WITH PORTION OF MANDIBLE

Approach

1. Same as 'PARTIAL GLOSSECTOMY WITHOUT PORTION OF MANDIBLE', however, now describe the portion of mandible present and its size.
2. Describe if the portion of mandible present is a marginal or segmental mandibulectomy (see below).
3. Margins are same as above for 'PARTIAL GLOSSECTOMY WITHOUT PORTION OF MANDIBLE', except now there is no floor of mouth margin because the mandible was resected (unless there is some floor of mouth tissue located posteriorly), with addition of 1) buccal gingival margin, and 2) the two bone margins. If a marginal mandibulectomy was performed then there will also be an inferior bone margin (see below).
4. Must also now include a statement describing if the tumor appears to be grossly involving the mandible bone and **a section must be taken of bone in relation to tumor** (bone involvement would make this a T4) in addition to bone margins.

Sample Gross Description:
The specimen consists of a (right/left) lateral tongue (___x___x___cm) with portions of floor of mouth (___x__x___cm) (also describe if any gingiva and/or retromolar trigone tissue, etc. is included) and a __x__ x__cm segment of (right/left/marginal/segmental) mandible. There is a ___x____cm (ulcerated, fungating, etc.) lesion (or mass) on the _____(describe location: lateral tongue; lateral tongue and floor of mouth, floor of mouth, etc). It invades _____mm/cm deep and involves _____(or state that no definitive invasion is seen if that is indeed the case). The tumor grossly appears to erode into the mandible bone/The tumor does not grossly involve the mandible bone. The gross tumor extends to _____mm to the buccal gingival margin, ___mm to superior/medial tongue margin, ___mm to deep tongue margin, and _____mm to posterior tongue margin. The specimen is inked as follows: Gingival margin: Green;

Superior/medial tongue margin: Blue; Deep tongue margin: Black; Posterior tongue margin: Red.

Oral Cavity Staging System:

Primary Tumor (pT)

pTX: Primary tumor cannot be assessed
pTis Carcinoma *in situ*
pT1: Tumor ≤2 cm with depth of invasion (DOI) ≤5 mm
pT2: Tumor ≤2 cm with DOI >5 mm
or tumor >2 cm and ≤4 cm with DOI ≤10 mm
pT3: Tumor >2 cm and ≤4 cm with DOI >10 mm *or* tumor >4 cm with DOI ≤10 mm
pT4: Moderately advanced or very advanced local disease
pT4a: Moderately advanced local disease
Tumor >4 cm with DOI >10 mm *or* tumor invades adjacent structures only (eg, through cortical bone of the mandible or maxilla or involves the maxillary sinus or skin of the face)
pT4b: Very advanced local disease; Tumor invades masticator space, pterygoid plates, or skull base, and/or encases the internal carotid artery

Note: Superficial erosion alone of bone/tooth socket by gingival primary is not sufficient to classify a tumor as T4.

DOI is depth of invasion and not tumor thickness.

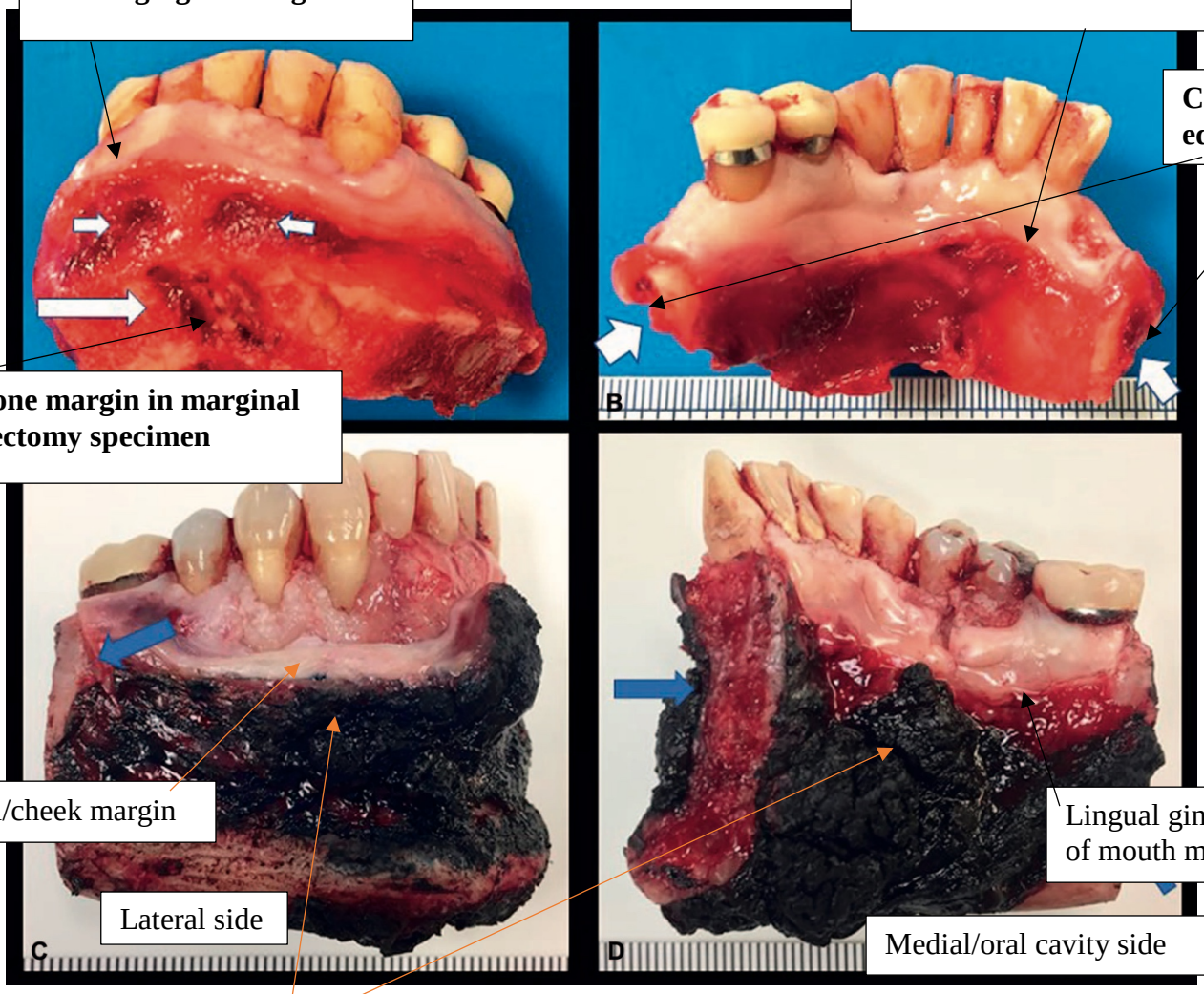
MANDIBULECTOMY SPECIMENS—MARGINAL (FIGURES A AND B) OR SEGMENTAL (FIGURES C AND D):

Approach

1. These are often done for ameloblastoma or small gingival squamous cell carcinomas
2. Document if it's a marginal (will have an inferior bone margin) or segmental (will have entire cortex of mandible segment removed)
3. Measure and describe the teeth and number present.
4. Describe the lesion (cystic, solid, etc.) and its location (on gingiva, tooth socket, entirely in bone, etc.). Give size of tumor and depth of invasion as appropriate.
5. Describe if it involves the bone.
6. Margins are the 1) lingual side gingiva and buccal side gingiva, 2) both cut ends of bone margin and 3) soft tissue medial and lateral to mandible (if present)—ink accordingly
7. If marginal mandibulectomy there will also be an inferior bone margin
8. Sections will always need to include bone margins and both gingival margins and also sections to include margins of soft tissue over lateral and medial mandible (if present).
9. For gingival tumor, take sections to include tumor in relation to gingival margins and relation to the bone. You may need to pull the teeth, fix and decalcify first to get a good section; a PA can help you with this.

10. Need section of tumor in relation to bone
11. For ameloblastoma, the same margins apply, but now take approximately 1 section per cm of intraosseous tumor cavity (often cystic as these cases typically had an enucleation procedure prior to the mandibulectomy).

Figure 3. Mandibulectomy: Marginal (A&B) vs segmental (C&D):
Figure from Muller S et al. Archives of Pathology and Lab Medicine. 2018.



MAJOR SALIVARY GLAND

Approach:

1. Record the weight and dimensions of the specimen.
2. Note if there is any nerve resected with the specimen.
3. Ink the external surfaces; **the deep surface is rough, friable, and often cauterized, while the superficial aspect is shiny with a thin membrane fascia overtop. Ink the deep and superficial margins differentially!** The deep margin is the margin the surgeons are most interested in, but they also care about the superficial margin, too. UAB surgeons are interested in deep vs superficial margin.
4. Serially section the specimen. If a lesion is identified record the following: number of lesions, size, color, consistency, cystic change, presence/absence of capsule, extension into surrounding tissue, relationship to inked edges of specimen
   NOTE: the tumor should be grossly categorized as:
   a. Encapsulated or well-circumscribed - often benign, but minimally invasive carcinomas and some metastases to intra-parotid lymph nodes may have this pattern
   b. Multilobulated - often a pattern of infiltration for low-grade malignancies; however, recurrent pleomorphic adenomas usually have this pattern too
   c. Infiltrative - almost always a malignancy
5. Identify and describe any calculi, dilated ducts, necrosis or hemorrhage.
6. Examine specimen for lymph nodes.

Serially section through the specimen perpendicular to the long axis – if a nodule is appreciated before cutting, be sure to cut so that the specimen edge closest to the tumor will be shown in a perpendicular cut and sample in a labeled block. If the lesion is small (≤ 2 cm) completely submit it with respect to the surrounding parenchyma. If > 2 cm, entirely submit the interface between the tumor and the surrounding tissues, including the inked edges. Also, submit additional sections documenting any tumor heterogeneity within the central portions of the mass. Submit all lymph nodes and at least 1 representative section of uninvolved gland.

Sample Gross Description:
Received (fresh, in formalin) is a (superficial lobe, deep lobe) of (parotid, submandibular, other) gland which weighs ___gms and measures ___x___x____cm. The surface (is, is not) involved by a grossly apparent lesion. The superficial surface

contains an apparent smooth fascial plane and is inked ____. The deep surface is more rough and friable (and cauterized) and is inked _____. [Describe any lesions seen, with size, number, color, consistency, cystic change, presence/absence of capsule, presence of hemorrhage, and relationship to the rest of the gland and inked edges of specimen] There is a (cystic, firm, soft) (white, tan, yellow, hemorrhagic) (encapsulated/well-circumscribed, multilobulated or infiltrative) lesion which measures ___x____x___ cm and (is completely surrounded by salivary gland tissue/abuts the [orientation, if possible] edge of the specimen). The lesion is __cm from the nearest edge of the specimen [designate which one if possible]. The uninvolved parenchyma is (yellow-tan and lobulated consistent with normal salivary gland, white firm and fibrotic consistent with sialadenitis). Examine the surrounding tissue for lymph nodes.

Salivary Gland Staging - Primary Tumor (pT)

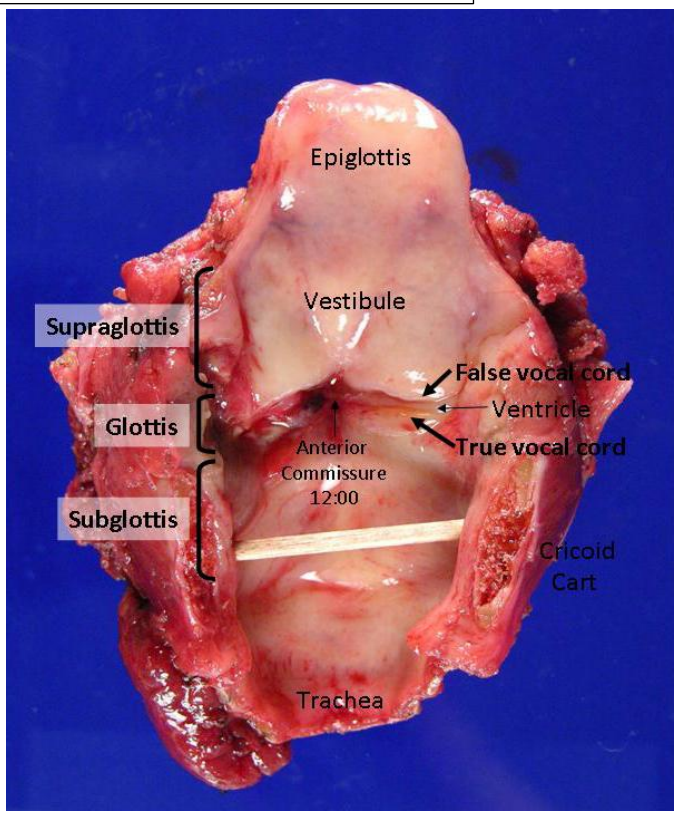
pTX: Cannot be assessed
pT0: No evidence of primary tumor
Tis: Carcinoma *in situ*
pT1: Tumor 2 cm or less in greatest dimension without extraparenchymal extension
pT2: Tumor more than 2 cm but not more than 4 cm in greatest dimension without extraparenchymal extension*
pT3: Tumor more than 4 cm and/or tumor having extraparenchymal extension*
pT4a: Moderately advanced disease. Tumor invades skin, mandible, ear canal, and/or facial nerve.
pT4b: Very advanced local disease. Tumor invades skull base and/or pterygoid plates and/or encases carotid artery

*Note: Extraparenchymal extension must be grossly identified (microscopic invasion is not sufficient), so it is importing for staging to comment on if tumor is involving other structures at the time of the gross examination.

LARYNGECTOMY:

1. Measure the overall specimen size
2. Document what anatomical structures are present (for example, hyoid bone, thyroid gland, lymph node dissections, etc) and measure them.
3. Ink the soft tissue and mucosal margins of resection.
4. Open the larynx longitudinally along the midline posterior cricoid cartilage
5. Identify the primary tumor site and mention if it is right, left, midline or bilateral
   a. Supraglottis: epiglottis, aryepiglottic folds, arytenoids, false vocal cords, ventricle
   b. Glottis: Anterior/posterior commissures, true vocal cords
   c. Subglottis: Inferior to vocal cords
6. Measure the tumor and distance to margins.
7. Photograph the specimen. You can take your margin sections fresh if you'd like. However, before taking sections of tumor and *full thickness* vocal cord sections always fix overnight. Use end of cotton swab stick to hold open trachea.

Figure 4- Laryngectomy



University of Chicago on-line grossing manual https://grosspathology-sites.uchicago.edu/page/laryngectomy

After Fixation:

1. Print the specimen photo and write where you took your sections
2. Section margins—unlike in oral cavity, in the larynx, a negative margin is typically considered negative if 1 mm or more from tumor.
    a. Perpendicular sections of tumor <0.5 cm from mucosal and soft tissue margins
    b. Shaves of all other mucosal margins
    c. Take en face tracheal ring margin
    d. Margins: 1) Base of tongue/preepiglottic; 2) hypopharyngeal (*note: the aryepiglottic folds are not typically margins, it's the hypopharynx mucosa out beyond the aryepiglottic folds that are the true margins*); 3) posterior cricoid; 5) anterior soft tissue; 6) Distal trachea
3. Section the larynx longitudinally and document the extent of the tumor (Does the tumor cross the midline? Does it grossly invade the thyroid cartilage? Does it invade extralaryngeal structures such as the thyroid, paraglottic space, preepiglottic space, or strap muscles? This is essential for staging)
4. Take full thickness sections of deepest tumor involvement
5. Take sections of tumor and underlying thyroid cartilage, underlying thyroid (if present) and any other extralaryngeal structure
6. Decalcify sections of cartilage if necessary (cartilage is usually heavily calcified)
7. Additional sections to submit:

a. Longitudinal sections of true and false vocal cords bilaterally to include thyroid cartilage and extralaryngeal tissue (See Figure 8)
b. Longitudinal section of epiglottis closest to tumor
c. Aryepiglottic folds if involved by tumor
d. Any other structure involved by tumor
e. Representative section of stoma, if present
f. Lymph nodes, if present

Figure 5

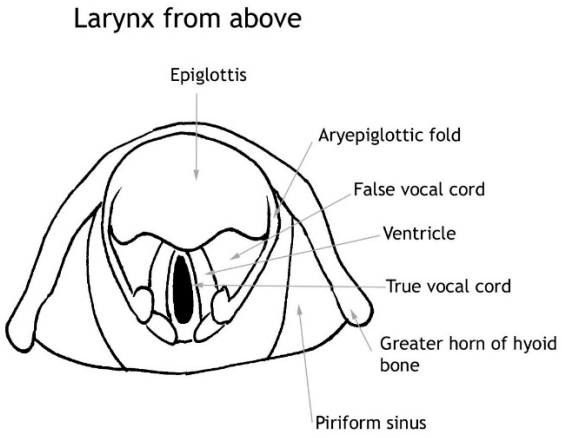
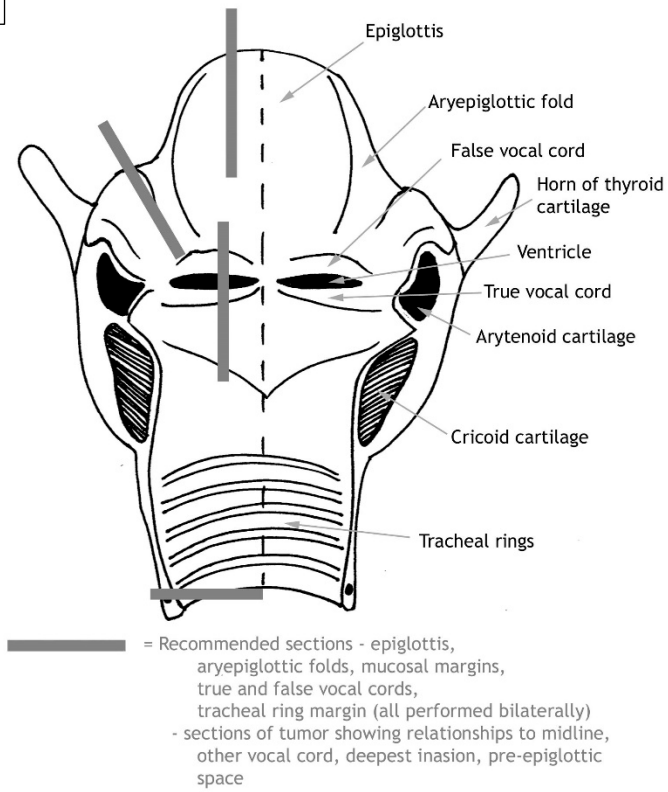
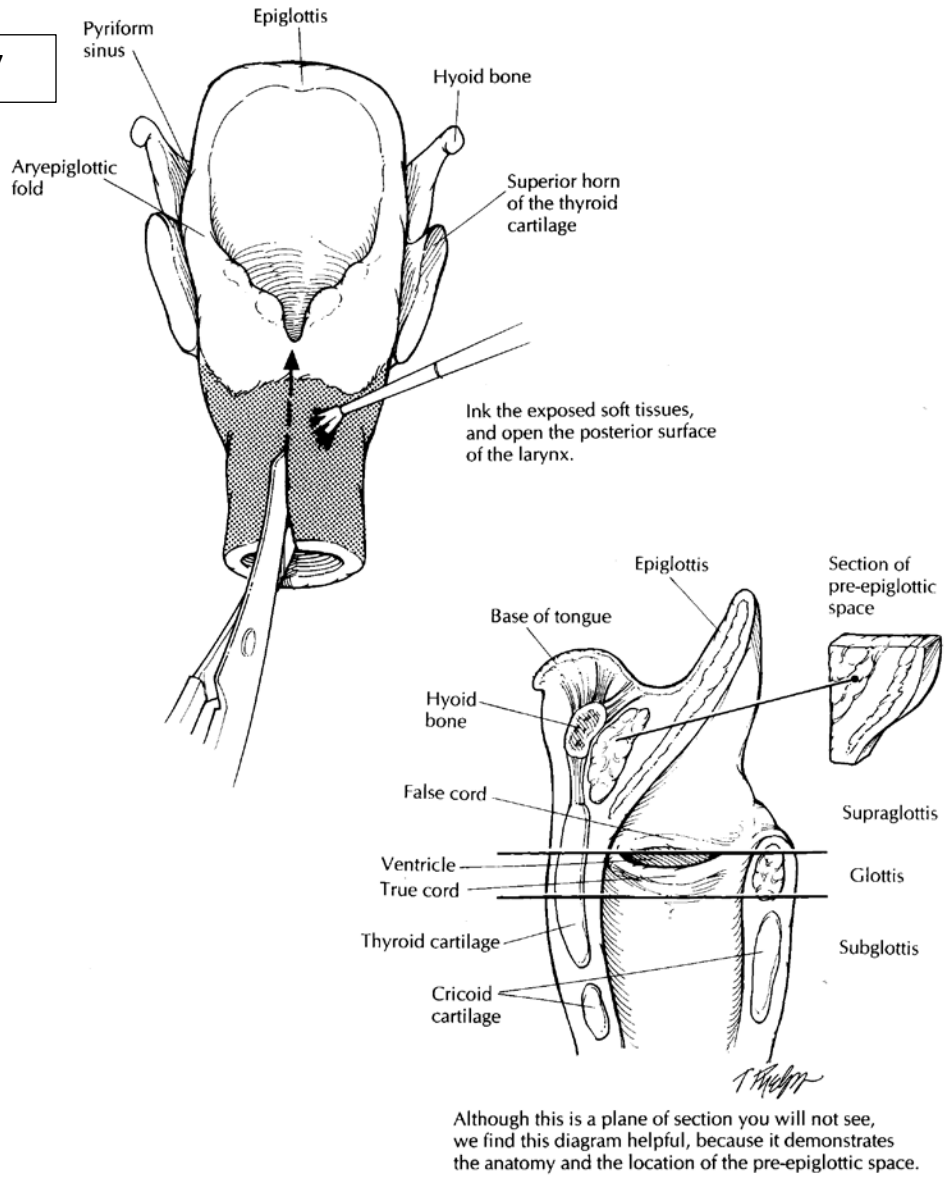


Figure 6



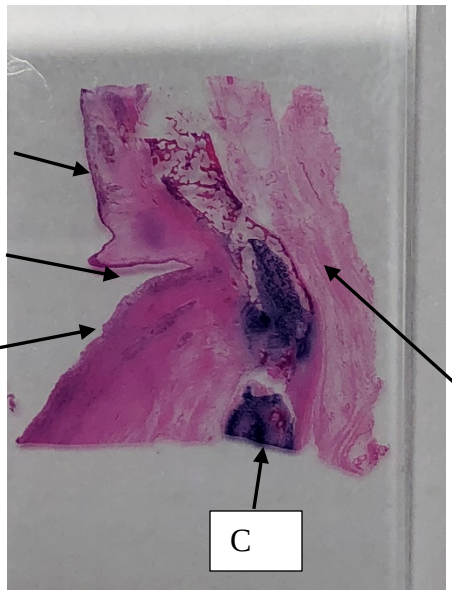
Source: Cleveland Clinic Grossing Manual

Figure 7



Source: Westra, W. Surgical Pathology Dissection:An Illustrated Guide, Second Edition, p. 40.

Figure 8—Vocal Cord Section



Vocal cord sections must look like this: must include true (TC) & false cord (FC), vestibule (V), thyroid cartilage (C)-even if ossified, and extralaryngeal tissue

Critical for Staging!

Larynx Staging System

Primary Tumor (pT)

pTX: Primary tumor cannot be assessed
pTis: Carcinoma in situ

For the Supraglottis

pT1: Tumor limited to one subsite of supraglottis *with normal vocal cord mobility*
pT2: Tumor invades mucosa of more than one adjacent subsite of supraglottis or glottis or region outside the supraglottis (eg, mucosa of base of tongue, vallecula, medial wall of pyriform sinus) *without fixation of the larynx*
pT3: Tumor limited to larynx *with vocal cord fixation* and/or invades any of the following: postcricoid area, preepiglottic space, paraglottic space, and/or inner cortex of thyroid cartilage
pT4 Moderately advanced or very advanced
pT4a: Moderately advanced local disease. Tumor invades through the outer cortex thyroid cartilage and/or invades tissues beyond the larynx (eg, trachea, soft tissues of neck including deep extrinsic muscle of tongue, strap muscles, thyroid, or esophagus)
pT4b: Very advanced local disease. Tumor invades prevertebral space, encases carotid artery, or invades mediastinal structures

For the Glottis

pT1: Tumor limited to the vocal cord(s) (may involve anterior or posterior commissure) *with normal mobility*
pT1a: Tumor limited to one vocal cord
pT1b: Tumor involves both vocal cords
pT2: Tumor extends to supraglottis and/or subglottis *and/or with impaired vocal cord mobility*

pT3: Tumor limited to the larynx *with vocal cord fixation* and/or invasion of paraglottic space and/or inner cortex of the thyroid cartilage
pT4: Moderately advanced or very advanced
pT4a: Moderately advanced local disease. Tumor invades through the outer cortex of the thyroid cartilage and/or invades tissues beyond the larynx (eg, trachea, cricoid cartilage, soft tissues of neck including deep extrinsic muscle of the tongue, strap muscles, thyroid, or esophagus)
pT4b: Very advanced local disease. Tumor invades prevertebral space, encases carotid artery, or invades mediastinal structures

For the Subglottis
pT1: Tumor limited to subglottis
pT2: Tumor extends to vocal cord(s) *with normal or impaired mobility*
pT3: Tumor limited to larynx *with vocal cord fixation* and/or invasion of paraglottic space and/or inner cortex of the thyroid cartilage
pT4: Moderately advanced or very advanced
pT4a: Moderately advanced local disease. Tumor invades cricoid or thyroid cartilage and/or invades tissues beyond the larynx (eg, trachea, soft tissues of neck including deep extrinsic muscles of the tongue, strap muscles, thyroid, or esophagus)
pT4b: Very advanced local disease. Tumor invades prevertebral space, encases carotid artery, or invades mediastinal structures

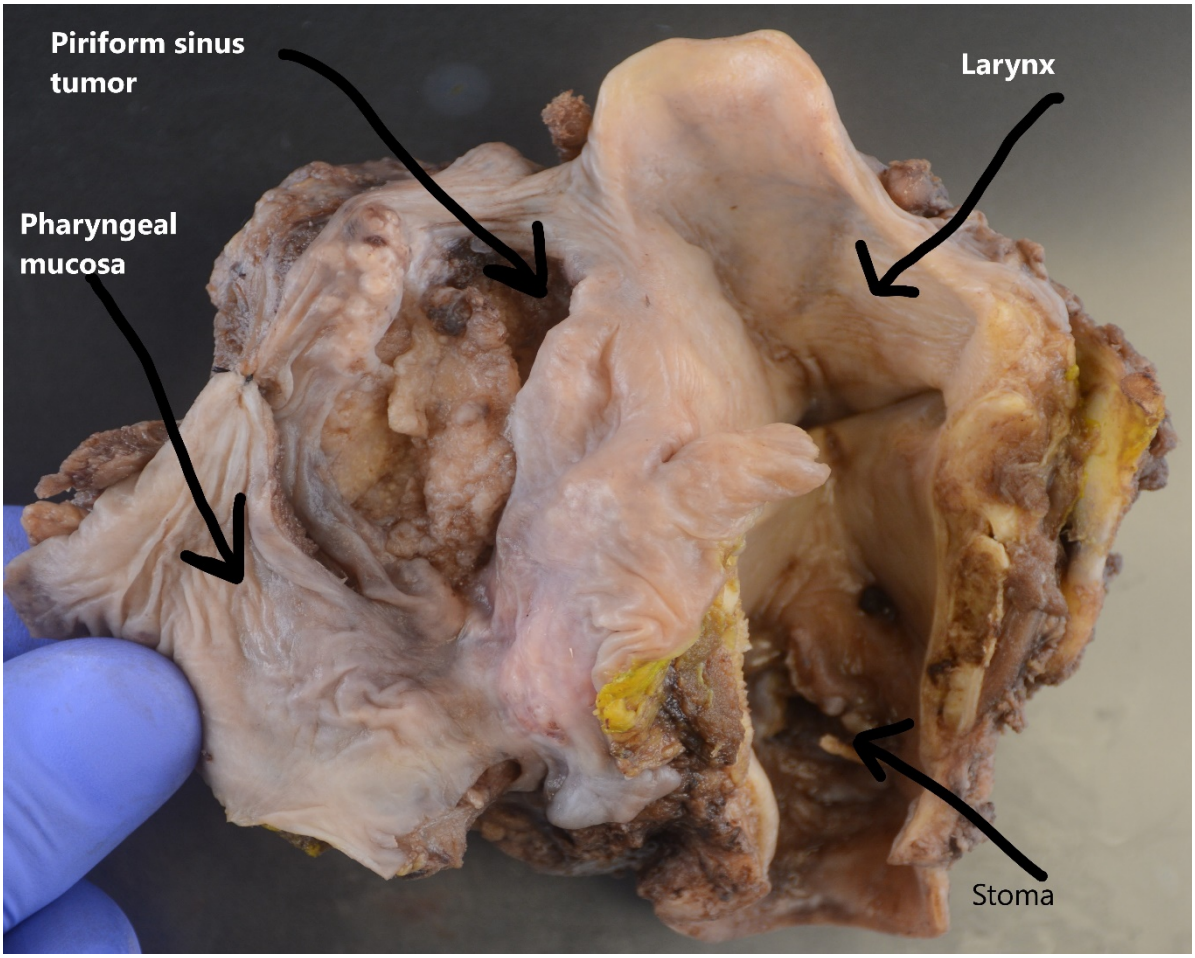
LARYNGOPHARYNGECTOMY:

1. Take gross photos, print a picture, and indicate where you took your sections on the photo
2. Document tumor size and location
3. Staging is different if tumor is in the hypopharynx (piriform sinus, posterior cricoid, and lateral/ posterior pharyngeal wall); see staging summary below
4. Document any invasion into cricoid cartilage, aryepiglottic fold, any other laryngeal structures and neck soft tissues
5. Esophagus portion may also be present—describe and sample appropriately
6. Submit standard laryngectomy sections but now you'll also be sampling more extensively the hypopharynx/pyriform sinus tumor present including its hypopharyngeal margins

Hypopharynx Staging System:
pT1: Tumor limited to one subsite of hypopharynx and/or 2 cm or less in greatest dimension
pT2: Tumor invades more than one subsite of hypopharynx or an adjacent site, or measures more than 2 cm but not more than 4 cm in greatest dimension without fixation of hemilarynx
pT3: Tumor measures more than 4 cm in greatest dimension or with fixation of hemilarynx or extension to esophagus

pT4a: Moderately advanced local disease. Tumor invades thyroid/cricoid cartilage, hyoid bone, thyroid gland, or central compartment soft tissue
pT4b: Very advanced local disease. Tumor invades prevertebral fascia, encases carotid

Figure 9-larygopharyngectomy specimen



THYROID

1. Review ultrasound and intraoperative reports to correlate with gross assessment.
2. Orient the specimen. The superior pole is thin and pointed, inferior pole rounded and bulbous, anterior surface convex, posterior surface concave and smooth throughout. When in doubt, ask attending or senior PA.
3. Weigh the thyroid and document.
4. Record overall measurement and measurement for each lobe and isthmus.
5. Examine external surface and document if the capsule is intact or disrupted
6. Examine external surface and correlate with intraoperative report to note the presence of attached structures such as skeletal strap muscle, large nerve or vascular structures and level VI lymph node contents.

   AJCC 8th Ed staging is now based on preoperative and intraoperative assessment of gross extrathyroidal extension (See staging below). As such our own pathologic examination needs to be correlated with these findings.

7. **Ink the anterior and posterior external surfaces two different colors**. For a total thyroidectomy, you may also want to ink the right and left surfaces different colors to help maintain your orientation. However, this is also not required as long as you state in your block summary which side is right vs left and you keep remainder of right and left lobes separate in the specimen container in case you need to go back to the specimen.
8. **For hemithyroidectomy specimens, ink the isthmic resection margin a different color,** ALWAYS: Even if thyroid is felt to be benign. ALWAYS sample the isthmus margin—radial section if close, shave if far away from mass.
9. If a dominant nodule is present, make one or two cuts through the nodule and place the entire specimen in formalin and allow it to fix for 30 minutes to an hour before sectioning the nodule. [This helps to stabilize the capsule and prevents stripping]. **Take thin sections to put in cassettes—thyroids need to be fixed well—error on the side of using a later processor run for thyroids.**
10. Serially section each lobe transversally (perpendicular to the long axis in the lateral lobes, sagittally in the isthmus)
11. Lay out all the sections consecutively and evaluate:
    a. Normal background thyroid is tan-red and homogenous while multinodular goiter may show diffusely nodular parenchyma with waxy colloid appearance
    b. Discrete lesions that look different from the standard colloid filled nodules of multinodular goiter.
    c. For each discrete lesion: document size, location, relationship to inked surface (resection margin) and attached structures.
    d. For encapsulated nodules, carefully evaluate the capsule, especially in its thickest portions for capsular invasion.
    e. If any extrathyroidal structures are present, submit entire lymph nodes and representative sections of other structures.
    f. Describe findings in right, left lobes and isthmus separately in gross description

Gross Finding	Sections
No discrete lesion (Graves disease, Hashimoto thyroiditis with no discrete lesion, completion thyroidectomy)	3 per lobe & 1 of isthmus (total 7 if total thyroid). Or entire lobe/thyroid, whichever is less, from superior to inferior.
Multiple nodules (multinodular goiter)	6 per lobe & 2 of isthmus (total 14 if total thyroid). Or the entire lobe, whichever is less, specifying in the description what sections contain the nodule/s.
Infiltrative lesion	Lesion 2 cm or less: submit entirely. Lesion greater than 2 cm: 1 section per cm, focusing on areas of heterogeneity and tumor-normal interface (make sure to demonstrate relationship of tumor to muscle, if present). Submit single representative section of background normal thyroid parenchyma from each lobe & isthmus.
Well-demarcated or encapsulated lesion	Submit lesion entirely. However, if more than 3 cm, submit entire capsule or tumor/normal thyroid interface—the *center* portion of a nodule >3 cm does not need to be entirely sampled as long as the capsule interface is entirely sampled Submit single representative section of background normal thyroid parenchyma from each lobe & isthmus.
History of MEN or family history of medullary carcinoma (prophylactic thyroidectomy)	Concentrate sampling in the mid to superior portion of the lobes, to look for C-cell hyperplasia These thyroids are often small and may be entirely submitted

Guidelines modified from Cleveland Clinic Gross Manual

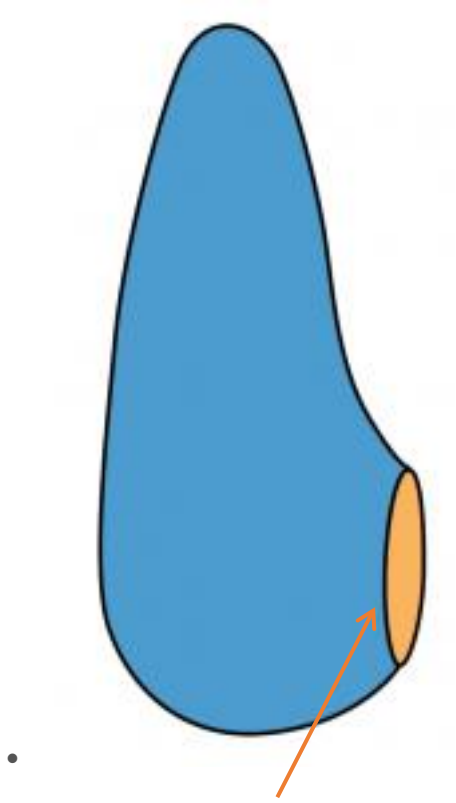


Figure 10: Isthmus margin in a hemithyroidectomy specimen

Thyroid Cancer Staging, AJCC 8th Ed

Primary tumor:

pTX: Cannot be assessed
pT0: No evidence of primary tumor
pT1: Tumor size 2 cm or less, limited to thyroid
pT1a: Tumor 1 cm or less in greatest dimension, limited to the thyroid
pT1b: Tumor > 1 cm but not > 2 cm in greatest dimension, limited to the thyroid
pT2: Tumor > 2 cm but not > 4cm in greatest dimension, limited to the thyroid
pT3: Tumor > 4 cm limited to the thyroid, or gross extrathyroidal extension invading only strap muscles.
pT3a: Tumor > 4 cm limited to thyroid.
pT3b: Gross extrathyroidal extension invading only strap muscles (sternohyoid, sternothyroid, thyrohyoid, or omohyoid muscles, See illustration below) from a tumor of any size.
pT4: Includes gross extrathyroidal extension.
pT4a: Gross extrathyroidal extension invading subcutaneous, soft tissues, larynx, trachea, esophagus, or recurrent laryngeal nerve from a tumor of any size.
pT4b: Gross extrathyroidal extension invading prevertebral fascia or encasing carotid artery or mediastinal vessels from a tumor of any size.

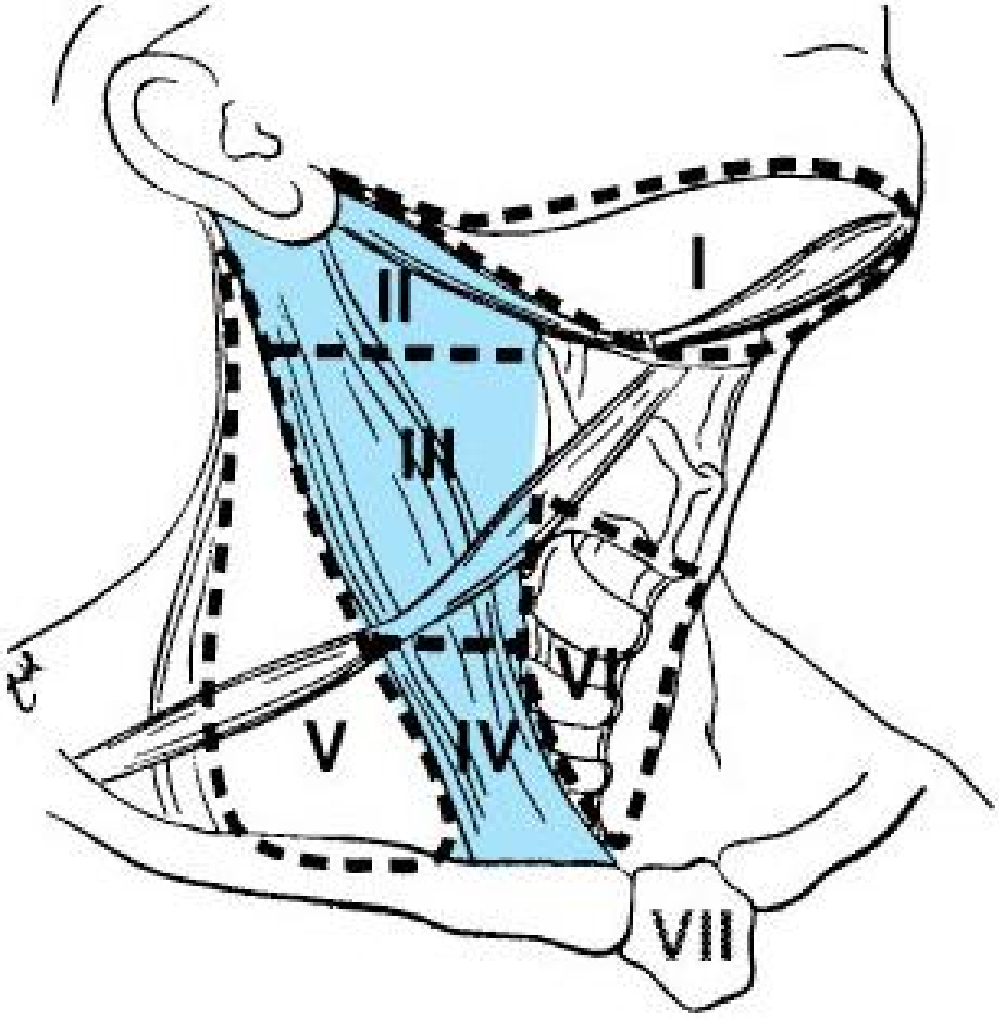
PARATHYROID

Most parathyroid specimens are evaluated by frozen section. It is important to document the dimensions (x3) and accurate weight in the gross description. Use the dimensions and weight provided at the time of frozen section, if available.

NECK DISSECTION

1. Record the specimen dimensions (x3).
2. If an intact specimen can be oriented, divide it into the appropriate levels.
3. For each neck level:
    a. Identify all lymph nodes and record range of greatest dimensions
    b. Entirely submit all grossly uninvolved lymph nodes
    c. Document if you submitted lymph nodes intact, bisected or serially sectioned.
    d. You may submit two bisected lymph nodes in one cassette, <u>but you must ink one lymph node before bisecting it.</u> Otherwise, it is impossible to distinguish the nodes microscopically
4. All grossly involved lymph nodes should be serial sectioned perpendicular to the long axis to allow for optimal assessment for extranodal extension. Document:
    a. Single lymph node metastasis or a mass of multiple matted lymph nodes
    b. Gross evidence of extranodal extension
    c. Size of lymph node and size of the metastatic focus
    d. Submit the entire lymph node, if possible—within reason. If grossly positive, no need to submit entire node.
    e. If the lymph node is larger than 3 cm and there is no apparent extranodal extension, submit the entire periphery of the node, this way extranodal extension can be assessed. This is important as the presence of extranodal extension will usually lead to post-operative chemotherapy
    f. Submitting one section is sufficient ONLY IF it can document the presence of matted lymph nodes and/or evidence of extranodal extension.
5. Identify any other structures such as salivary glands, sternocleidomastoid muscle, jugular vein, etc
    a. Document if tumor involves these structures
    b. Submit representative sections
    c. Only take 1 section of submandibular gland (will appear lobulated)—do not submit entire salivary gland!

Figure 11: Neck Levels



COMPLEX/COMPOSITE RESECTIONS

For example, orbital exenterations, maxillectomies, rhinectomies, ear/skin/mastoid resections, partial laryngectomies, etc.

Head and neck resection specimens are often complex and may be quite variable from case to case. Determining the orientation and relationship of separately submitted margins can be problematic. For such specimens, contact the head and neck pathologist on service for guidance in processing. However, regardless of whether a complex/composite specimen is labeled "Non-marginal" by the surgeon, or all of the margins have been submitted separately (either for frozen section or permanent evaluation), you **MUST** measure the distance from tumor to margin in all relevant directions (deep, lateral, medial, superior, posterior, anterior, inferior, etc). Also, you **MUST** provide **perpendicular sections of tumor to the nearest margins** (<u>at least</u> deep and nearest mucosal, more if several are <0.5 cm). These measurements and sections are used to determine whether postoperative radiation therapy is provided for "close" margins.

FUNGAL SINUSITIS SPECIMENS

1. Submit entire specimen—separate out soft tissue parts from bone parts and briefly fix the bony parts (may require brief decalcification)—however, if greater than 5 cassettes in a Part, check with pathologist assigned to ENT service before submitting more.
2. Mark as **STAT** so the slides come out next day, as fungal sinusitis is a medical emergency.

TONSILS

1. There are typically two types of tonsils at UAB.
   a. Routine (tonsillitis, obstructive sleep apnea [OSA], etc.
   b. Rule out neoplasm ("tonsillar asymmetry", "neck mass", etc.)/evaluation of a known neoplasm.

A. Routine approach:

1. Describe external surface and record dimensions (x3); maintain orientation (if any); apply ink to the external surfaces
2. Serially section along the longitudinal axis; look for peri-tonsillar abscess, tumor or diffuse effacement of architecture
   a. If lesion is absent, submit one representative section from each tonsil.
   b. If lesion is present, describe lesion and record dimensions (x3); entirely submit lesion (often this may be the entire specimen); if specimen is oriented, document the location for each of the sections.

B. Approach to rule out neoplasm/evaluation of a known neoplasm:

1. Describe external surface and record dimensions (x3); maintain orientation (if any); apply ink to the external surfaces as appropriate.
2. Serially section along the longitudinal axis; look for a tumor or diffuse effacement of architecture; sometimes it is easier to feel the lesion as an area of induration.
3. If lesion is absent, entirely submit the tonsil; if specimen is oriented, document the location for each of the sections so each margin is documented.
4. If a lesion is present, describe lesion and record dimensions (x3); entirely submit lesion (often this may be the entire specimen); if specimen is oriented, document the location for each of the sections so each margin is documented.

NOTE: While many of these neoplasms will be epithelial (i.e. squamous cell carcinoma), remember that lymphoma may be in the differential diagnosis for some cases. If lymphoma is suspected, discuss with lymphoma service and triage specimen(s) accordingly.

Sample Gross Description:

Received (fresh, in formalin) (is, are) (one, two, multiple) segment(s) of lobulated (firm, soft) tissue (measuring, aggregating to) ___x___x___cm. One surface is smooth, gray-white and the opposite surface is shaggy red-purple. (If oriented then ink accordingly) Multiple cross sections reveal tan-red homogeneous tissue. (If lesion is present, describe and record dimensions x3). The tonsil is entirely submitted in formalin in cassettes (block designations) - OR - The lesion is entirely submitted in formalin in cassettes (block designations).

DENTAL CYSTS

These specimens are sometimes received intact or in fragments. A tooth or teeth may also be received. Identify any tooth or teeth as above and document relationship to cyst. Please note where the cyst arises in relation to any attached tooth, i.e. does the cyst cover the crown of the tooth or does it appear to arise from the root.

Identification of any cyst lining mucosa/epithelium is of utmost importance. For intact cysts, carefully remove any associated tooth/teeth and section. Submit two to three sections per cassette to allow for optimal histologic embedding and sectioning—sections should be cut and placed in cassettes so the cyst lining will be able to be visualized histologically. Cysts 2 cm or less should be entirely submitted; for larger cysts consult the on-service head and neck pathologist.

UAB DEPARTMENT OF PATHOLOGY
GASTROINTESTINAL TRACT
OVERVIEW TABLE OF CONTENTS

I. GASTROINTESTINAL BIOPSIES

A. Mucosal biopsies:

1. Record exact number of fragments
    - If many, indicate more than 6 or multiple
    - If very scant tissue, indicate may not survive processing
2. Measure aggregate dimension and range of fragment sizes.
3. If there are multiple fragments and a fragment is significantly larger than the other ones. Record dimensions of largest tissue fragment (s) as well as the aggregate dimension. Submit larger fragments in separate cassettes; bisected if necessary.

4. Record color and consistency
    - Tan-white and soft - usual appearance of tissue
    - Yellow soft – adipose tissue
    - Red-friable- blood clot
    - Brown hard – usually foreign matter (e.g. seeds)
5. **Ideally submit 4-6 fragments per cassette. Never more than 6 and state how many fragments are in each cassette (can help us determine whether we are accurately seeing all the submitted fragments).**

6. Check the sides and lid of the container for small fragments that may be attached.
7. Small **specimens** are particularly susceptible to cross contamination from other specimens. The work area must be kept fastidiously clean and all dissecting tools cleaned between cases.
8. Small biopsy specimens should not be cut or inked.

SAMPLE DICTATION:
Received without fixative/in formalin, labeled with the patient's name, medical record number, and "colon", is a __ x __ x __ cm **aggregate of __ (provide exact number) tan soft tissue** fragments ranging from ___to ___ in greatest dimension. Submitted entirely in A1.

9. Polyps submitted in multiple small to medium size fragments should not be inked.
10. Ink should be used only for large intact polyps. See part C below.

SAMPLE DICTATION:
Received without fixative/in formalin, labeled with the patient's name, medical record number, and rectal polyp, is a __ x __ x __ cm aggregate of multiple tan-pink polypoid soft tissue fragments, ranging from ___ to ___ in greatest dimension. The largest fragment measures __ x __ x __ and is submitted in cassette #1 and the rest in cassettes #2-#5.

11. Additional aids to grossing biopsies: (Use the one that is available at UAB)

Nylon specimen bags can be used in the same manner as lens paper. Make sure the fragments are near the bottom of the bag. Fold two times and place in cassette.

Lens paper can be used for very small specimens. The paper must be thin enough for formalin to penetrate easily and not larger than 2" × 3" in size. Wet the paper with formalin. **Tissue**

sticks to dry paper causing fragmentation and artifacts. Place the specimen or specimens in the center of the paper. The tissue should not overlap. Fold the paper in thirds over the tissue. Fold over the ends. Overfolded specimens may be difficult to unfold for tissue embedding and underfolding may result in the paper opening during processing with loss of the specimen.

B. ENDOSCOPIC MUCOSAL RESECTION (EMR):

EMR is a procedure performed for large, usually flat, mucosal based lesions located in the esophagus, stomach or colon (large colonic adenomas). Most specimens are labeled by the nurse/clinicians as EMR or Hot snare, and consist of a large (usually 2-4 cm in greatest dimension).

If the specimen consists of a large and intact fragment of mucosa, ink the base (If you are not sure, in the tow surfaces in different colors) of the specimen, describe the mucosal surface (ulcer, raised lesion etc.) (See Figure 1), and serially section as shown below. Submit 1-2 pieces per cassette from one end of the specimen to the other.

If the specimen is received in multiple fragments, try your best to identify and ink the non-mucosal side and submit entirely with 1-2 fragments per cassette.

PLEASE PHOTOGRAPH ESD SPECIMEN BEFORE AND AFTER SECTIONING AS SHOWN IN FIGURES BELOW.

SAMPLE DICTATION:

Received fresh/fixed in formalin, labeled with the patient's name, medical record number, and designated as EMR is a __ x ___cm x __ cm mucosa-covered soft tissue fragment. The proximal aspect of the specimen is designated by a black suture. The mucosal surface shows a ___ cm area of ulcer that is located __cm from the proximal margin. The deep aspect (base) of the specimen is inked black and the specimen is serially sectioned from the proximal end to non-suture end and entirely submitted as follows:
Cassette #1: Proximal end
Cassette #2 - #4 – Entire specimen from proximal to opposite (non-suture) end.
Cassette #5: Opposite (non-suture) end.

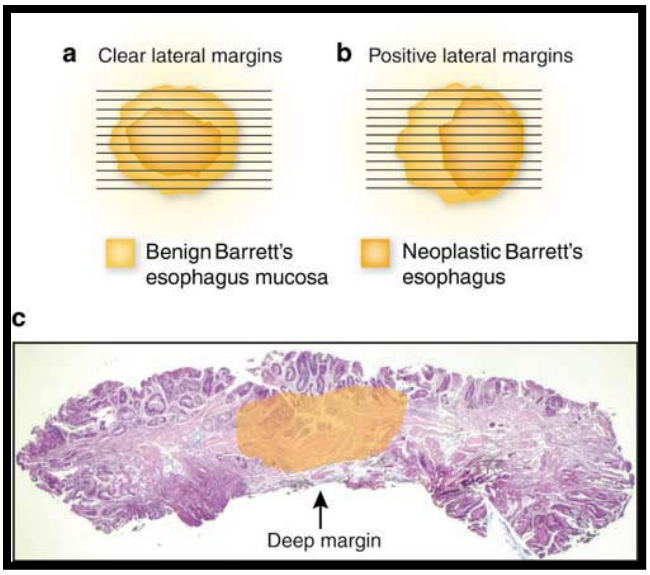


Figure 1

Figure 2

Figure 3

C. Colon polyps

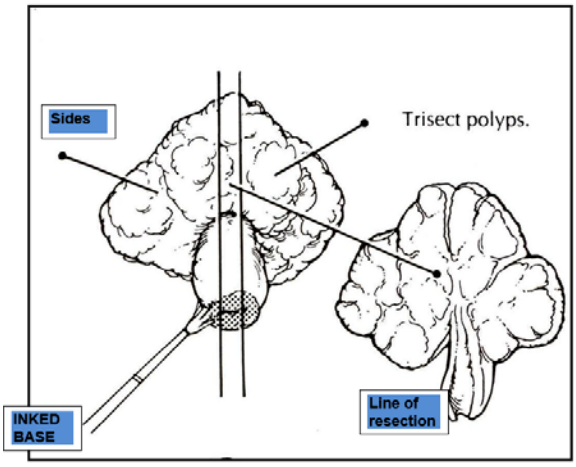
Small or large polyps removed during colonoscopy as “Hot” polypectomies refer to removal of polyps with a cauterizing wire that allows identification of the surgical margin by the presence of cautery/thermal artifact. Therefore inking the polyp base is not needed except for large polyps (see below).

Describe size, color, surface configuration (polypoid or villiform), and the base of the polyp either sessile or with a stalk (include length and width).

Small polyps: Bisect the polyp along the vertical plane of the stalk to reveal the surgical margin, and submit both halves in one cassette.
Large polyps: Ink the polyp base. Trisect the polyp, with the middle section containing the entire length of the head and stalk of the polyp. This section needs to be intact and well-oriented to assess the deep margin (inked polyp base) in polyps containing invasive carcinoma. If the head of the polyp is too wide to fit in a cassette, trim the sides away from the stalk and submit them in separate cassettes. Submit **the mid section of the stalk first** in a designated cassette. See figure 4. If the polyp is sessile then serially section the specimen and submit on edge, similar to EMR. See figure 1 (EMR)

SAMPLE DICTATION:
1. Single piece:
Received without fixative/in formalin, labeled with the patient’s name, medical record number, and “rectal polyp”, is a tan-brown polypoid soft tissue fragment with/without a stalk. The stalk measures __ cm in diameter and __ cm in length and the head measures __ x __ x __ cm. The resection margin is inked black. The specimen is serially sectioned and entirely submitted as follows:
Cassette #1-#2: Polyp with stalk and inked resection margin
Cassette #3- #4: Remainder of polyp head

2. Multiple pieces:
Received without fixative/in formalin, labeled with the patient’s name, medical record numbers, and rectal polyp, is a __x__x__cm aggregate of multiple tan-pink polypoid soft tissue fragments. The largest fragment measures __ x __ x __ cm and is submitted in cassette #1 and the rest in cassettes #2-#5.



D. Transanal DISC excisions

Submit entire specimen for histologic evaluation with designated margins- Treat oriented and not oriented specimens the same.

1. Specimen should be received pinned out on cardboard and oriented by the surgeon. If the specimen is not oriented and the edges are curled under, make an effort to uncurl the edges and straighten the edges as much as possible. Measure the specimen in three dimensions.
2. Ink deep margin.
3. Describe the lesion, measure the lesion in three dimensions, and measure the distance of the lesion to each peripheral/mucosal margin. If possible, measure the distance of deepest invasion to inked deep margin.
4. The margins are typically very close to the tumor, it is best to submit them as perpendicular margins. To do this, cut off the entire margin in one piece and serially section the piece Figure 5**(A).** It may be that the lesion is small enough that only two opposing margins have to be cut and serially sectioned, while the other two can be submitted as one piece containing tumor and opposing margins (see Figure below).

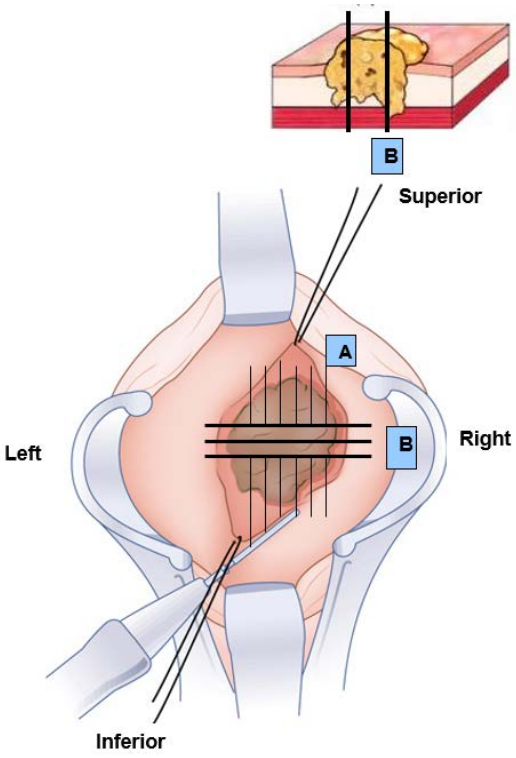


Figure 5: Transanal Disc Excision A. Perpendicular margins. B. Tumor and opposing margins

SAMPLE DICTATION

Received fresh and oriented by the surgeon is an oriented __ x __ x __ cm transanal excision . The right side is inked blue and left side black. A __ x __ cm polypoid, raised velvety tumor occupies the majority of the mucosal surface and is located 0.2 cm from the proximal and distal margins and 0.3 cm from the right, and left mucosal margins. On sectioning, the tumor invades through ___ into the ___ and the tumor is present ____ cm from the deep inked margin. The specimen is entirely submitted as follows (each cassette contains deep and designated lateral margins):

Cassette #1: Superior perpendicular margin, left side
Cassette #2: Superior perpendicular margin, center
Cassette #3: Superior perpendicular margin, right side
Cassette #4: Inferior perpendicular margin, left side
Cassette #5: Inferior perpendicular margin, center
Cassette #6: Inferior perpendicular margin, right side
Cassette #7: Tumor with right and left margins
Cassette #8: Tumor with right and left margins

II. GENERAL INFORMATION FOR LARGE SPECIMENS

1. Before grossing a tumor resection or complicated GI specimen, check the electronic medical record and read the operative note dictated by the surgeon and review any imaging studies that have been done. If the note is not available, you can check the abbreviated anesthesia note or brief operative note. This note usually contains the type of surgery performed and why.

2. **LYMPH NODES**

   In general, the yield of lymph nodes is highest in the fat present immediately along the wall of the organ (Figure 6). In bowel specimens, most lymph nodes are located in the mesenteric fat directly at the junction with the bowel wall. Thus, after taking all representative **sections of tumor** and **margins** as indicated per each organ grossing protocol as close to the bowel wall, dissect off the mesentery and do a careful nodal dissection. Mesenteric lymph nodes are soft, it is recommended that **you first section the fat at 2-3 mm intervals and visually look for lymph nodes**. Then **proceed to palpate or "squish the fat" with your fingertips to further examine for nodes.** If you start off with or only squish and don't look first, you may inadvertently destroy lymph nodes.

   a. Always keep in mind which portion of fat contains regional lymph nodes. Keep this portion apart from the fat containing non regional nodes (if applicable). This predominantly applies to extended right hemicolectomy and total colectomy specimens. See colon section for further details. **Submit all possible lymph nodes** even if grossly positive nodes are found. A minimum of 12 lymph nodes is required for colon cancer resections and a minimum of 15 lymph nodes is required per gastric cancer resections.

   b. Indicate how many possible lymph nodes are submitted in each cassette (e.g. five possible lymph nodes) and whether they are submitted intact (i.e. in toto) or whether they are bisected, trisected, etc.

c. Indicate if any nodes are bisected. It is advised to submit one bisected node per cassette unless you ink both halves of each node a single color (e.g. one bisected lymph node; or two bisected lymph nodes, one lymph node inked blue)

e. If lymph nodes are matted, try to separate individual nodes. If you are unable to split them manually, then bivalve the specimen and submit the entire specimen.

3. SPECIMEN PHOTOGRAPHS

In addition to taking photographs of ESD specimens and rectal cancers (TME specimens), please take pictures of any uncommon entities, complex resections, or cancer surgeries that may not have any visible tumor (i.e. treated esophagectomy specimens). For complex resections, it helps for you to discuss the case and location of the sections with the Staff signing out the case.

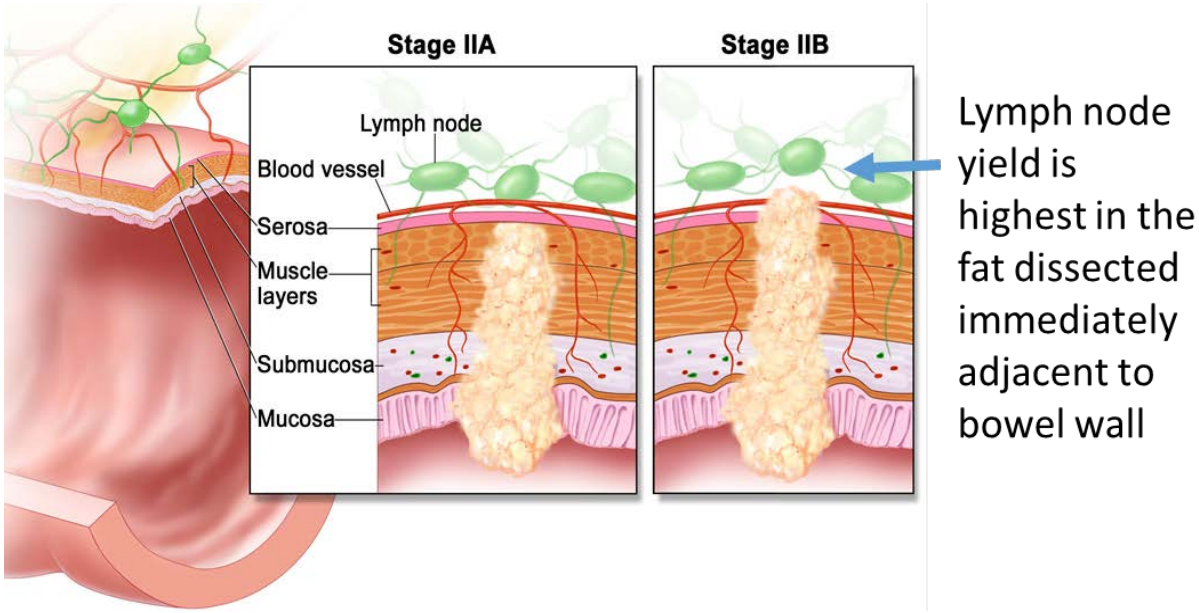
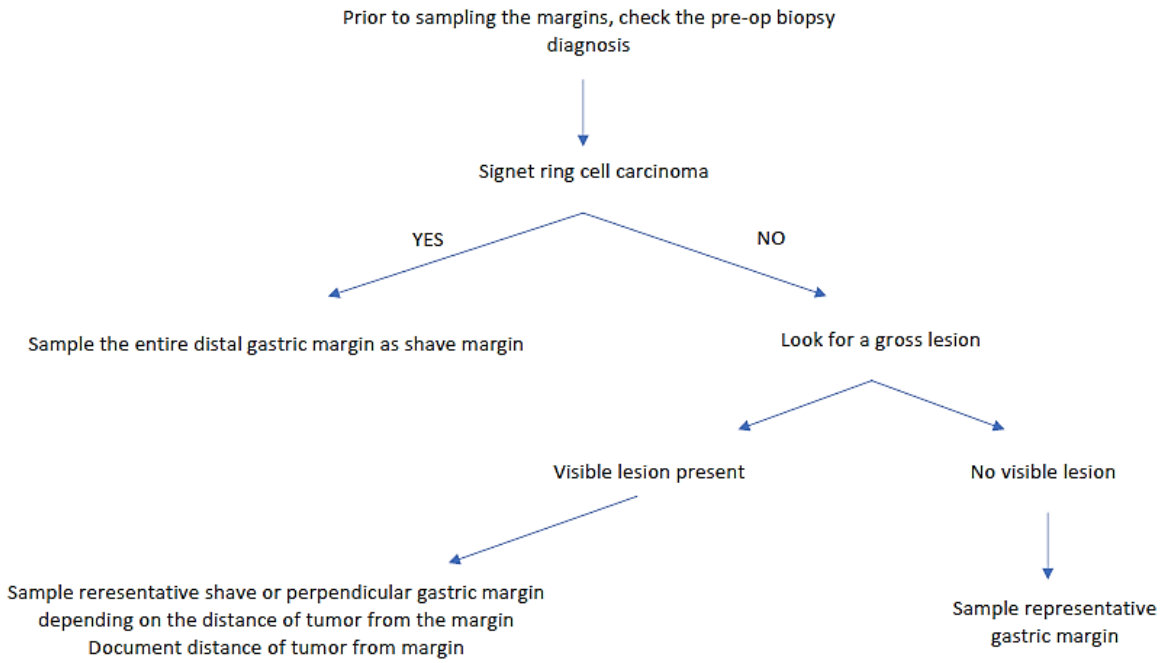


Figure 6

III. ESOPHAGUS

A. ESOPHAGECTOMY – Neoplastic: (Figure 7)

For frozen sections performed on gastroesophageal resections for esophageal/GEJ/proximal gastric cancers, please use following flow chart.



Gross examination and microscopic sections

1. Orient specimen. Tubular esophagus and cuff of stomach. Remove all stapled margins.
2. Measure tubular esophagus and cuff of stomach
3. Locate the lesion by carefully palpating the gastroesophageal junction with one finger in the lumen.
4. Ink the proximal and distal margins and adventitial tissue overlying tumor.

IMPORTANT
The esophagus does not have a serosa; rather the surface of the soft tissue investing the esophagus (adventitia) represents a true margin.
INK ADVENTITIAL MARGIN

5. Open the specimen longitudinally on the opposite side of the tumor.

IMPORTANT

Squamocolumnar junction (Z-line): Intersection between squamous esophageal mucosa (smooth/grayish white) and gastric mucosa (velvety pink).
Gastroesophageal junction (GEJ): Point at which the tubular esophagus meets the saccular stomach irrespective of the type of lining of the esophagus. Keep in mind that the GEJ does not always correlate with the squamocolumnar junction (SCJ). Rather the SCJ normally may occur within the distal 2-3cm of the esophagus.
Barrett's mucosa: Pale pink, finely granular tongues of mucosa extending into the esophagus. These can be patchy in distribution.

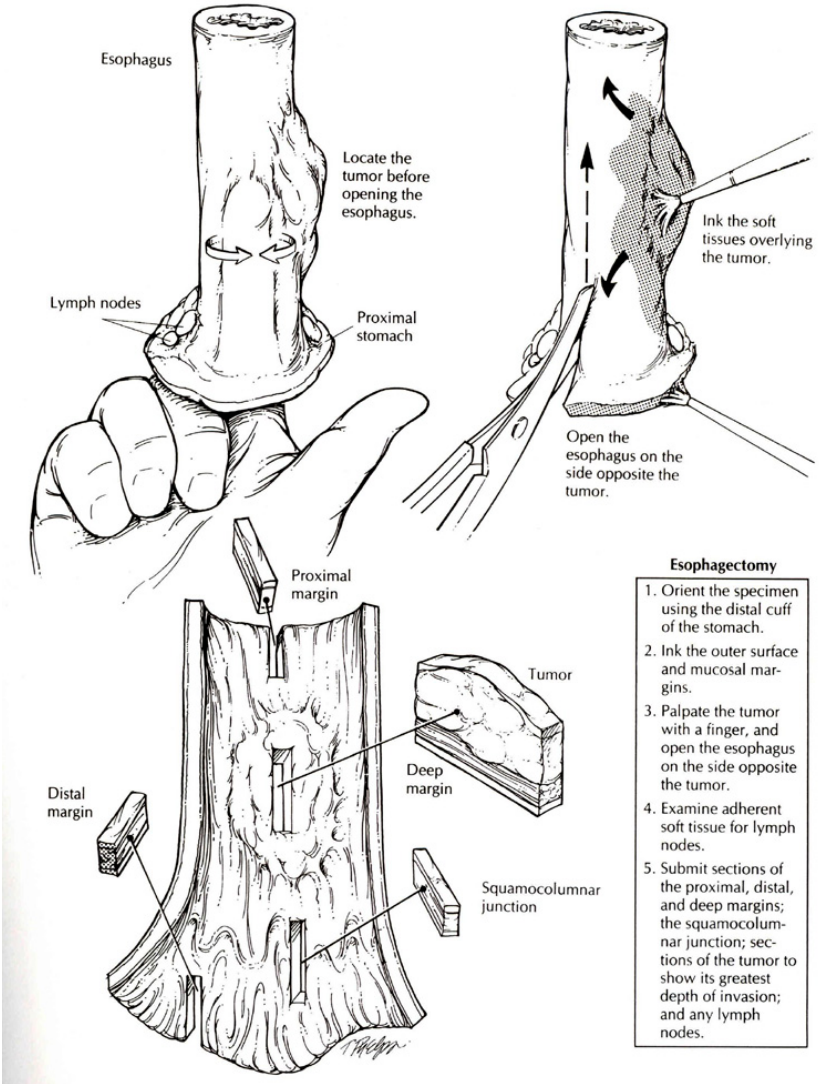


Figure 7: From Westra W.H. et al. Surgical Pathology Dissection, First edition.

6. Describe the lesion
    - Measure distance from proximal (esophageal) and distal (gastric) margin.
        - Submit proximal margin - **en face** (shave) or longitudinal (if close to tumor)
        - Submit entire gastric margin-**en face (even if this margin has been representatively sampled for frozen)**. See photos below.
    - Location
        Gastroesophageal junction, esophagus or proximal stomach.
    - Relationship of tumor to GEJ – Proximal or distal or at GEJ, and **Measure the distance of the tumor midpoint to the gastroesophageal junction.**
        - Entirely within tubular esophagus
        - Tumor midpoint in distal esophagus and involves GEJ
        - Tumor midpoint at the GEJ
        - Tumor midpoint in the proximal stomach or cardia and involves the GEJ. (AJCC staging 2007: Carcinomas with epicenter within the proximal 5cm of the stomach (cardia) that extend into the GEJ are classified as esophageal carcinomas).
    - Tumor configuration (polypoid, exophytic, ulcerated, infiltrative)
    - Size (length, width, thickness) and color
    - Percent of circumference involved
    - Depth of invasion

7. Describe the uninvolved esophagus and stomach
    - Normal squamous esophagus- smooth/gray mucosa
    - Normal stomach velvety pink
    - Presence of Barrett's mucosa: **Measure the length of Barrett's segment**
    - Any other abnormalities, lesions, hemorrhage etc.
8. Ink the adventitial surface/margin. Unlike serosal surface, adventitial surface represents a true margin. Once the adventitial surface has been inked, serially section the tumor and submit full-thickness sections of tumor containing the inked adventitial surface.

9. In the absence of a visible lesion/tumor (usually occurs after pre-operative chemoradiation therapy), review EPIC note/prior endoscopy report for location of the tumor (GEJ or proximal/mid/distal esophagus/cardia) and thoroughly sample any suspicious mucosal irregularities, squamocolumnar junction, as well as the specific segment of esophagus documented to have tumor pre-operatively. Document the distance of the targeted area from margins.

10. Lymph nodes: After all sections have been obtained, the entire adventitial soft tissue should be dissected off the specimen and submitted for light microscopy. In addition, all separately submitted lymph node specimens/"packets" should be sampled for lymph nodes and entirely submitted. If the lymph nodes appear matted, if possible, please specify the appropriate number of lymph nodes and submit the specimen entirely

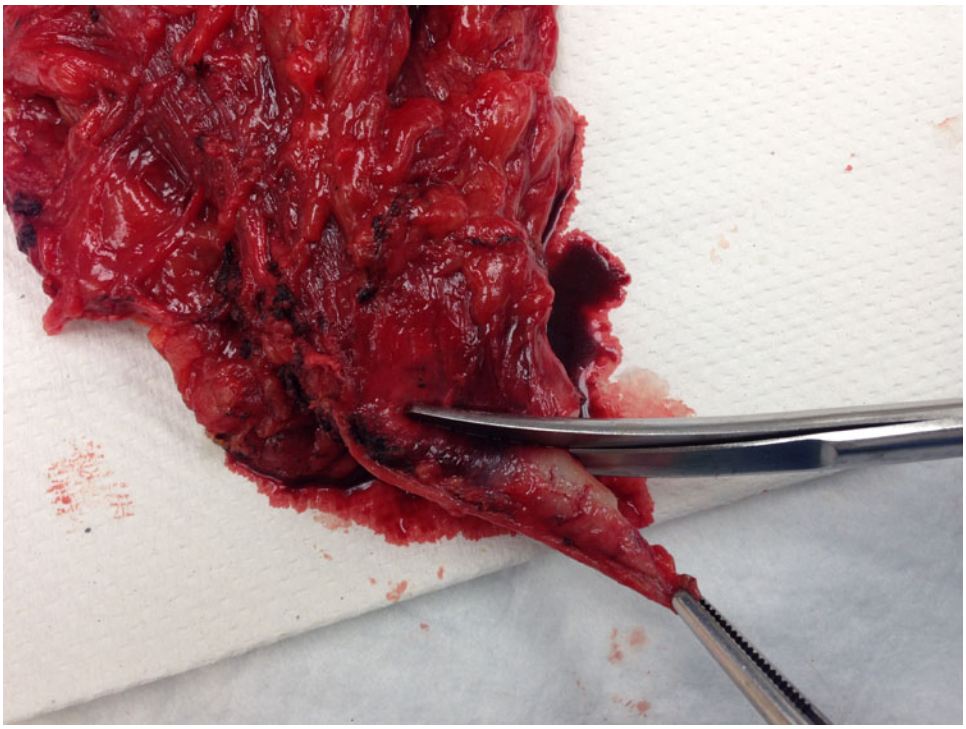
If tumor is not grossly apparent three specific areas should be submitted entirely for evaluation:

1. **The squamous columnar junction**
2. **Abnormal mucosa in Barrett's segment**
3. **Previous biopsy sites/segment of esophagus demonstrated to contain tumor pre-operatively**

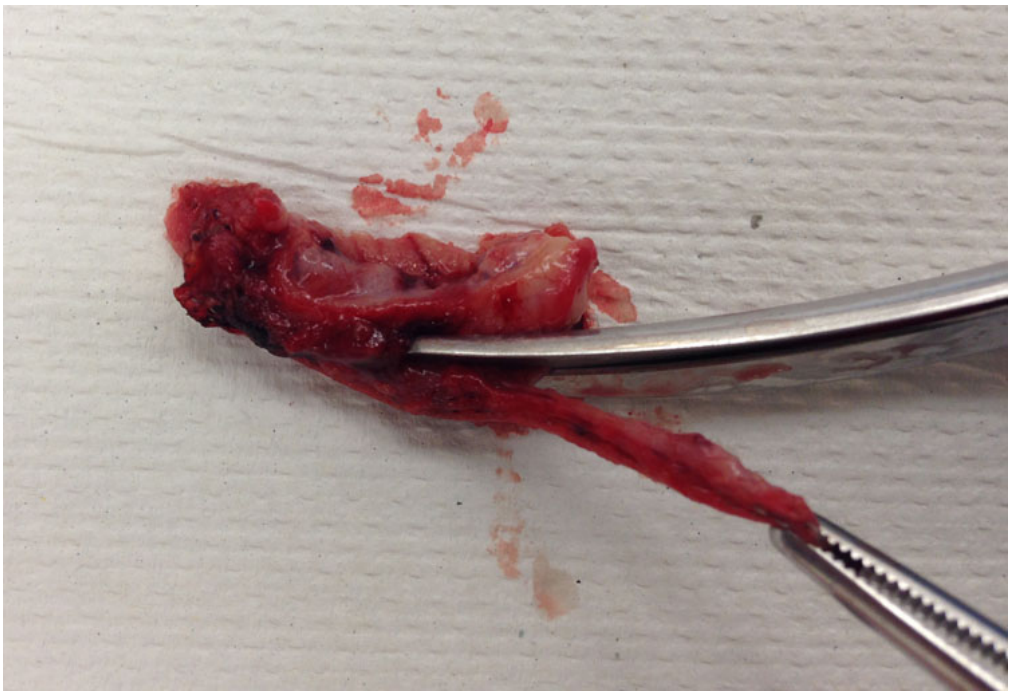
NOTE: Removal of Margins in Esophagectomy and Gastrectomy specimens – En Face Sections. For frozen section diagnosis please consult the flow chart in grossing manual.

Method #1

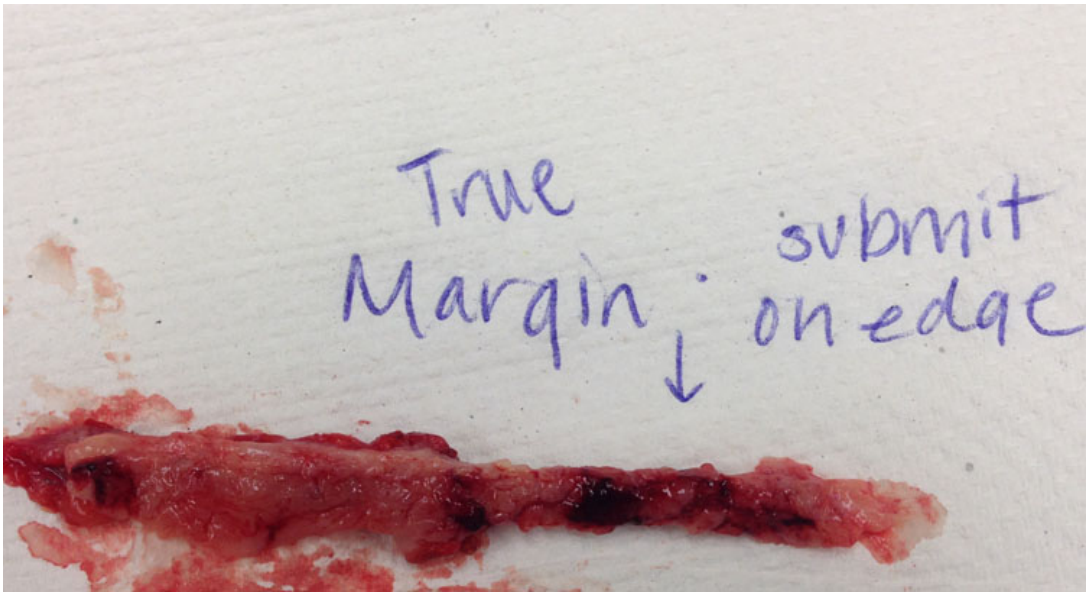
1. To remove the margins, cut the entire margin approximately 2-3mm inside the stapled line.



2. Carefully detach the strip of mucosa, submucosa and muscle wall from the stapled line. Take care to preserve as much muscle wall as possible and cut close to the staples.



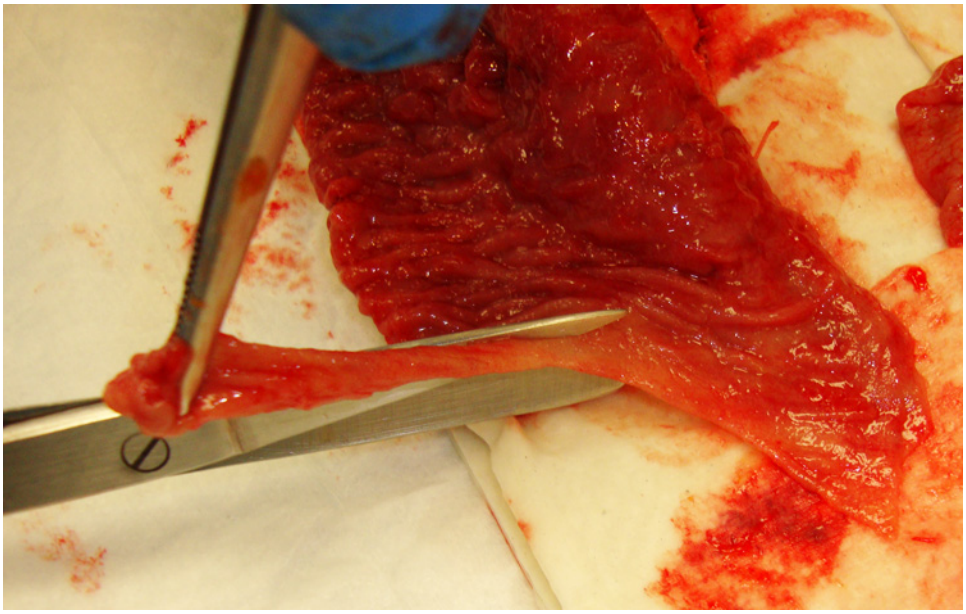
3. Lay the strip of tissue flat keeping adequate orientation, section and submit the pieces for frozen section. The side closest to the stapled line is your true margin. Submit on edge and facing up.



Alternate method (Pathologists' Assistant supervision is recommended)

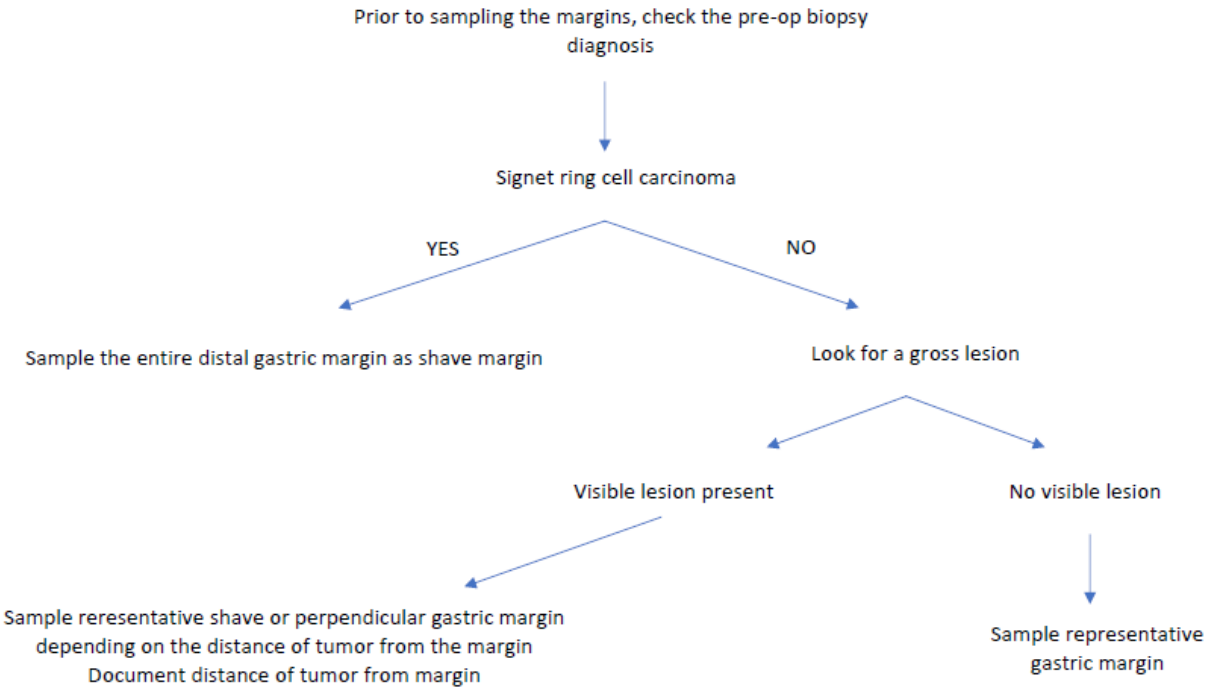
1. Carefully remove the staple line as close to the staples as possible (proximal and distal margins).
2. Lay entire specimen flat on the cutting board.

3. Hold all three layers while cutting in order to preserve the muscle wall as well as mucosa and submucosa.
4. Proceed to cut the strip of marginal tissue.
5. Section and submit for frozen section on edge.



SAMPLE DICTATION AND BLOCKS FOR DISTAL ESOPGAEAL CANCERS:

Received fresh labeled with the patient's name, medical record number and "_____" is an esophagectomy specimen consisting of esophagus (____cm length x __cm in circumference and ___ cm in wall thickness) and a portion of proximal stomach (__cm in length x ___ cm circumference and __cm in wall thickness). The adventitia is inked black. Opening of the specimen reveals a __cm X __cm X__cm *tan/pink, centrally ulcerated tumor* in the *distal tubular* esophagus that *extend to involve the GEJ*, with the **tumor midpoint** located ___cm proximal to the gastroesophageal junction. The lesion is __ cm from the proximal mucosal margin and __ cm from the distal mucosal margin. Sectioning reveals *tan-white homogeneous cut surfaces with extension through the muscularis propria into adjacent soft tissue*, ___cm from the inked adventitial soft tissue margin. A___cm tongue of salmon-colored mucosa is identified adjacent to the tumor. A lymph node dissection reveals ___# possible lymph nodes, ranging from __ to ___cm in greatest dimension. The rest of the adventitial tissue is entirely submitted for light microscopy.
Cassette #1: Proximal esophageal margin (en face or perpendicular if close to tumor)
Cassette #2-#8: Distal gastric margin (entirely submitted- en face sections) (See below)
Cassette #3: Deep margin, tumor with deepest extent of invasion.
Cassette #4: Deep margin, tumor with deepest extent of invasion.
Cassette #5: Tumor and adjacent esophageal mucosa
Cassette #6: Adjacent esophageal mucosa (Barrett's segment)
Cassette #7: Adjacent esophageal mucosa (Barrett's segment)
Cassette #8: GE junction
Cassette #9: Largest possible lymph node- bisected
Cassette #10: ___ possible lymph nodes, submitted in toto
Cassette #11- #14: Remainder of the adventitial tissue.



B. ESOPHAGECTOMY – non-neoplastic:

Esophagectomies for achalasia or esophageal rupture require the same gross assessment as a neoplastic esophagus. Submit the proximal and distal margins for light microscopy as well as sections of abnormal and normal esophagus and any palpable lymph nodes.

IV. STOMACH

A. GASTRECTOMY – Neoplastic: (Figure 8)

Gastrectomies may be total or partial. Look carefully at the margins to determine if you have any esophagus and/or duodenum present.

Gross examination and microscopic sections

1. Orient specimen. Identified proximal (cardia) and distal (duodenum) margins.
2. Measure length of greater curvature and lesser curvature.
3. Measure circumference of proximal and distal margins.
4. Ink proximal and distal margins and serosal surface under tumor.
5. Examine outer surface of the specimen (describe color, glistening, dull, induration or tumor invasion).
    a. Submit entire proximal and distal margins en-face.
6. Locate the lesion by carefully palpating the specimen and open the specimen longitudinally on the opposite side.
7. If a lesion is not palpable then open the specimen along the greater curvature
8. Identify the lesion:
    a. Measure distance of lesion from proximal and distal margins and omental margin (lesser omentum and greater omentum-if present)
    b. Location (antrum, fundus, body, greater etc)
    c. Tumor configuration (polypoid, ulcerated, diffuse, exophytic)
    d. Size in three dimensions (important especially for gastrointestinal stromal tumors (GISTs) in which the staging is based on size, not depth of invasion. Size cut offs for different T-stages in GISTs are 2 cm, 5 cm and 10 cm, thus try and be as accurate as possible.
    e. Depth of invasion including perforation of visceral peritoneum.

9. Describe the uninvolved mucosa color, texture (glistening, hemorrhagic, granular, flattened, fibrotic), and the preservation or absence of rugal folds.

10. Remove the entire perigastric soft tissue and look for lymph nodes. A minimum of fifteen lymph nodes should be submitted. If fifteen lymph nodes cannot be harvested, submit at least 8 additional cassettes of perigastric fat for lymph nodes.

SAMPLE DICTATION AND BLOCKS:

Received fresh labeled with the patient's name, medical record number and "stomach" is a ___ (greater curvature) × __ (lesser curvature) × __ (circumference of proximal margin) × __ cm (circumference of distal margin) total gastrectomy specimen with attached portion of duodenum (___ cm in length ×___ cm in circumference). The maximal wall thickness is __ cm. The serosal *surface is pink-tan, smooth and glistening*. Opening of the specimen reveals a __ x __ x ___ cm *tan-pink, firm polypoid tumor with central ulceration* located on the lesser curvature, __ cm from the proximal margin, __ cm from the distal margin and __ cm from omental margin. Sectioning of the lesion reveals *tan homogeneous cut surfaces with extension through the muscularis*

propria into perigastric soft tissue, ___ cm from the inked serosal surface. The remainder of the mucosal surface appears *tan and atrophic*. A small amount of attached omental tissue (approximately __ × __ × __ cm) is identified containing a ___ nodule measuring ___ cm in greatest dimension. A lymph node dissection of the perigastric adipose tissue reveals ___ possible lymph nodes, ranging from ___ to __ cm in greatest dimension.
Cassette #1- #3: Proximal margin- entirely submitted en face
Cassette #4 - #8: Distal margin- entirely submitted en face
Cassette #9: Omental margin (if applicable) (lesser omentum and greater omentum-if present)
Cassette #10-#11: Deepest extent of tumor/serosal surface
Cassette #12-#13: Tumor and adjacent uninvolved stomach
Cassette #14: Gastric fundus
Cassette #15: Gastric body
Cassette #16: Gastric antrum
Cassette #17: Five possible lymph nodes, submitted intact.
Cassette #18: Five possible lymph nodes, submitted intact.
Cassette#19: Five possible lymph nodes, submitted intact.
Cassette #20: Omental nodule
Cassette #21 - 28: Additional perigastric fat (if you are not confident that you have found at least 15 lymph nodes)

B. GASTRECTOMY – Non neoplastic:

Partial gastrectomy for gastric bypass surgery or ischemia (2-4 blocks)

a. Describe color and texture of mucosa and any lesions present.
b. Sample any lesions and adjacent mucosa.
c. Sample proximal and distal margin if lesions are present.
d. If no lesions are identified submit 2-3 random sections of stomach (full thickness).
e. Submit any palpable lymph nodes.

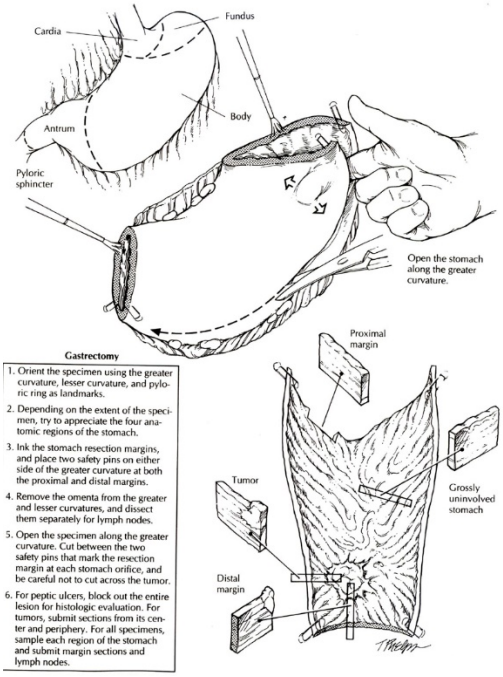


Figure: 8

V. SMALL BOWEL

A. SMALL BOWEL RESECTION –neoplastic:

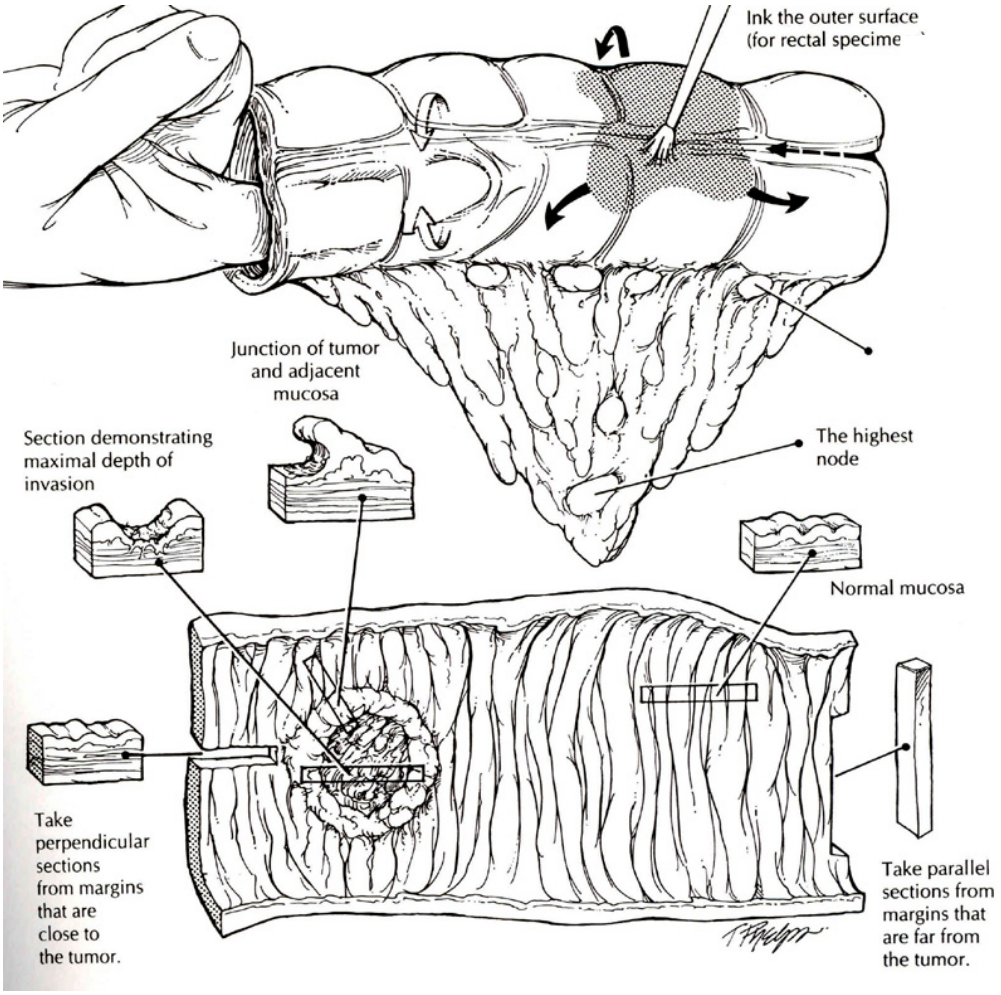


Figure 9 – Small bowel or Colon except rectal tumors

Primary small bowel adenocarcinomas are quite rare. In most cases, you will receive resections for neuroendocrine tumors or mesenchymal tumors. Neuroendocrine tumors can be multifocal in nature (even if preoperative biopsy only mentions one lesion). They are tan-yellow in color and often located submucosally. It is therefore important to sample all polypoid or mural lesions. A couple of unique things about neuroendocrine tumors: 1) They can extend transmurally into the subserosal fat and involve the mesenteric margin. 2) They are often accompanied by "mesenteric nodules/deposits". These nodules either represent direct extension of the tumor into the mesentery or completely replaced lymph nodes. Be sure you look for and sample these nodules.

Gross examination and microscopic sections

1. Orient specimen. Identify proximal and distal margins. Remove all stapled margins.
2. Measure length and circumference of bowel.
3. Examine outer surface of the specimen (describe color, glistening, dull, induration or tumor invasion).
4. Locate the lesion by carefully palpating the specimen and open the specimen longitudinally along the opposite wall of the bowel.
5. Identify the lesion:
    a. Measure distance of lesion from proximal, distal and mesenteric margins.
        - Submit margins **perpendicular** if close to tumor – **en face** (shave) if not.
    b. Tumor configuration (polypoid, ulcerated, diffuse, exophytic)
    c. Size of lesion
    d. Depth of invasion
    e. Perforation of wall
6. Describe the uninvolved mucosa color, texture (glistening, hemorrhagic, granular, flattened, fibrotic), and the preservation or absence of folds.
7. Remove the mesenteric fat and look for lymph nodes and additional nodules/deposits.

Sample dictation and blocks

Received fresh, labeled with the patient's name, medical record number and "___" is a ___ cm in length segment x ___ to __ cm in circumference un-oriented segment of small bowel. The serosal surface is pink-tan, smooth and glistening. Opening of the bowel reveals a ___× __ × ___ cm tan-pink centrally ulcerated tumor with serpiginous borders, located__ cm from proximal margin, ___cm from distal margin, and ___cm from the mesenteric margin. Sectioning reveals (for example; *tan-yellow homogeneous*) cut surfaces with extension into___, but not through___(*for example : the muscularis propria*). The lesion spares only ___ cm of the small bowel circumference and the lumen is narrowed to approximately __ cm in diameter. The remainder of the mucosa is *(for example: tan with the usual intestinal folds).* A lymph node dissection reveals __ possible lymph nodes, ranging from ____to ___ cm in greatest dimension.

Cassette #1: Proximal margin, en face (perpendicular section if the lesion is close to the margin)
Cassette #2: Distal margin, en face (perpendicular section if the lesion is close to the margin)
Cassette #3: Mesenteric margin, en face (or perpendicular)
Cassette #3-4: Deepest extent of tumor
Cassette #5-7: Tumor and adjacent mucosa
Cassette #8: Any other lesions (mucosal or mesenteric)
Cassette #9: Representative uninvolved mucosa
Cassette #10: ___ possible lymph nodes, submitted intact
Cassette #11: ___ possible lymph nodes, submitted intact

B. SMALL BOWEL RESECTION – Non neoplastic

1. Crohn's disease
Resection for Crohn's disease, see inflammatory bowel disease.

2. Ischemia

If the small intestine has been resected due to ischemia, sample the margins, the ischemic portion, and vessels found in the mesentery (sample two separate areas: within the segment of ischemia and away from the segment of ischemia) to look for vascular lesions such as atherosclerosis, thrombi, or vasculitis.

C. SMALL BOWEL RESECTION- MECKEL DIVERTICULUM

If the specimen contains a segment of bowel with a blind ending loop, measure the length of the specimen and describe the serosal surface. Open the specimen along the antimesenteric border. Describe the mucosa and wall thickness. Meckel's diverticulum often harbors different heterotopic mucosa (gastric, pancreatic). Sample any mucosa that looks different from small bowel mucosa. Submit bowel margins and one or two full thickness sections of the bowel in addition to two sections of the diverticulum (one containing normal and other containing different appearing mucosa). The tip of the diverticulum is the most likely location for heterotopic tissue, and should be submitted if no other suspicious areas are identified.

D. SMALL BOWEL RESECTION - OSTOMY

An end ostomy has a rim of skin at one end. A loop ostomy has a central defect with a rim of skin in a segment of bowel. The loop ostomy may be Y -shaped with the bottom of the Y corresponding to the ostomy site. Describe whether the anastomotic site appears intact or disrupted. Look for fistula tracts or abscess in adjacent soft tissue. Submit 1 representative section of the anastomotic site, and 1 section of the uninvolved bowel. A mucous fistula is anatomically similar to an end ileostomy, but the proximal end is open to the skin, and the bowel segment is out of circuit.

VI. COLON

A. APPENDECTOMY:

GENERAL

The most common clinical indications for appendectomy are appendicitis and "mucoceles" (dilated appendix filled with mucin). "Mucocele" (Figure 10) is a clinical term that encompasses diseases like appendiceal mucinous neoplasms and retention cysts. One of the components of staging of appendiceal mucinous neoplasms includes assessing the serosal aspect for extraappendiceal mucin. The nature of the serosal surface (smooth, indurated, perforated, with or without mucin) should be accurately documented and photographed. There are three situations where you are required to submit the entire appendix: 1).If the appendectomy was performed for acute appendicitis, and the appendix is grossly normal, 2) Mucinous lesions of the appendix, and 3) Goblet cell carcinoid

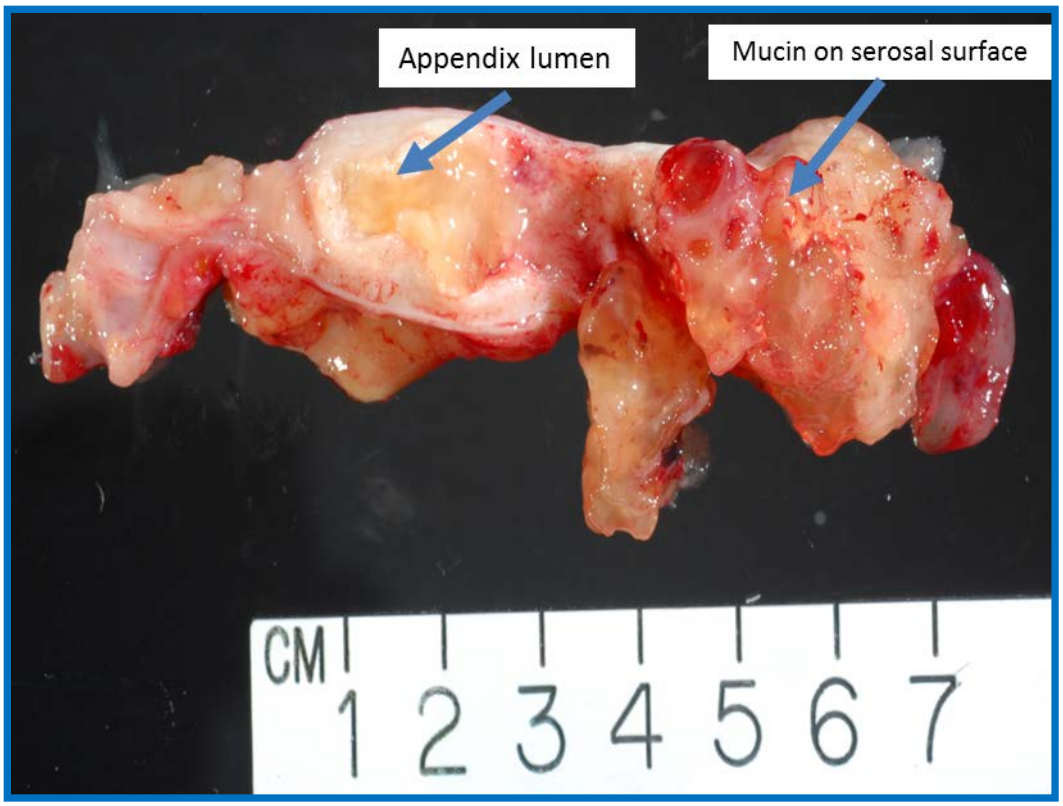
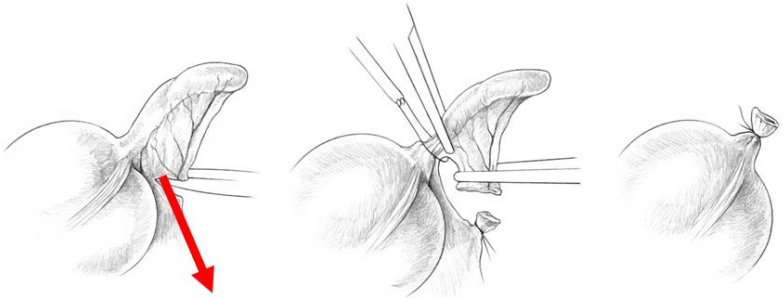


Figure 10: "MUCOCELE"

NON-"MUCOCELE" APPENDECTOMIES

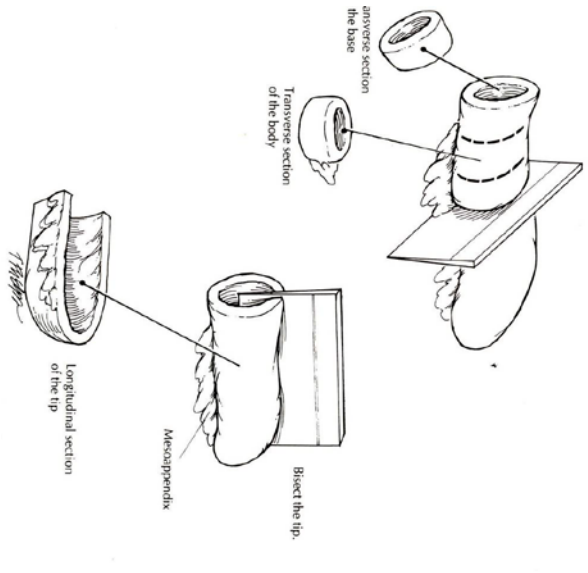
1. Record dimensions (length, diameter including range), color (tan/pink, gray/green), external surface (edematous, fibrinous exudate, mucin, hyperemia, purulence, perforations, or hemorrhage (may be seen in endometriosis).

2. If the mesoappendix is present, record dimensions, color, appearance (edema, fibrinous exudate, purulence). **Ink mesoappendiceal margin and submit separately.** See figure 9A.



3. Ink the proximal margin and submit a cross section of the entire proximal margin.

4. Transect the tip of the appendix in a section big enough to fit in a cassette. **Bisect the tip and submit both halves in one or two cassettes. Figure 9B**



5. Then section the body of the appendix at 5mm intervals

6. Record the thickness of the wall, diameter of lumen (dilated or fibrosed) and condition of mucosa (glistening, ulcerated) and contents of lumen including fecaliths, mucin, parasites, feces.

7. Submit one-two representative cross sections of the body, including any abnormalities seen (perforations, ulcerations, serositis).

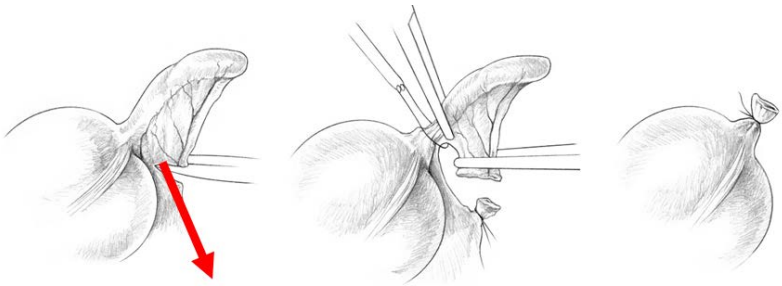
8. If there is a mass/nodule, mucin accumulation in the lumen (i.e., a possible cystadenoma or cystadenocarcinoma) or an area suspicious for tumor, **submit the entire appendix,** pay close attention and submit inked mesoappendiceal margin and the proximal appendiceal margin in a separate cassette.

   If the appendectomy was performed for acute appendicitis, and the appendix is grossly normal, the entire specimen must be submitted.

"MUCOCELE" APPENDECTOMIES

1. Record dimensions (length, diameter include ng range), color (tan/pink, gray/green), external surface (edematous, fibrinous exudate, mucin, hyperemia, purulence, perforations, or hemorrhage

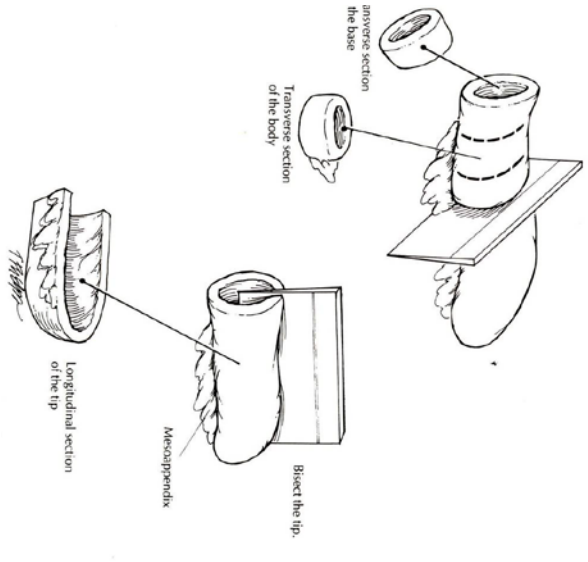
2. If the mesoappendix is present, record dimensions, color, appearance (edema, fibrinous exudate, mucin purulence). **Ink mesoappendiceal margin and submit separately.** See figure 8A.



Mesoappendix margin
Not always present in simple appendectomy specimen

3. Ink the proximal margin and submit a cross section of the entire proximal margin.

4. Transect the tip of the appendix in a section big enough to fit in a cassette. **Bisect the tip and submit both halves in one or two cassettes. Figure 9B** In cases with massive dilatation of the appendix, it may be difficult to identify the tip, but try your best.



5. Then section the entire dilated appendix at 5 mm intervals.

6. Record the thickness of the wall, diameter of lumen (dilated or fibrosed) and condition of mucosa (glistening, ulcerated) and contents of lumen including fecaliths, mucin, parasites, feces. Similar to ovarian mucinous neoplasms, specifically look for any areas of thickening or nodule formation.

7. Submit the entire appendix and submit inked mesoappendiceal margin and the proximal appendiceal margin in a separate cassette.

SAMPLE DICTATION AND BLOCKS – Non-"mucocele" appendectomies

Received fresh, labeled with the patient's name, medical record number and "appendix," is a ___ cm in length × ___ cm in diameter appendix with attached mesoappendix (__ ×___ ×__ cm). The serosal surface is *(for example tan, dull and covered with purulent material)*. Located __ cm from the appendiceal tip, a __ cm in diameter transmural defect is present in the appendiceal wall. The mesoappendix is *(for example edematous, tan/brown, and has areas of focal hemorrhage).* Sectioning reveals *(for example: red-brown and ulcerated mucosa)* with a __ × ___ × ___ cm brown friable fecalith in the lumen of the proximal appendix.
Cassette #1: Proximal margin and appendiceal tip (bisected)
Cassette #2: Any site of perforation or induration or mass.

SAMPLE DICTATION AND BLOCKS – "mucocele" appendectomies

Received fresh labeled with the patient's name, medical record number, and "appendix" is a __ cm in length x __ cm in diameter appendectomy specimen with a __ cm stapled resection margin. The distal portion of the appendix has a __ x __ x __ cm *(for example: flocculent tan-yellow)* lesion/mass that obliterates the distal appendiceal tip and is located ___ cm from the proximal resection margin. The serosal surface is *(for example: pink-tan, smooth and glistening) with or without* no extra-appendiceal mucin. On sectioning, yellow mucinous material is released and the lesion *adjacent to, but does not (or it does)* involve the serosal surface, **Gross photographs of the specimen are taken.** Entire specimen submitted as follows:
C1: Proximal resection margin, en face
C2-C4: Sections of the mucinous mass
C5-C6: Sections of uninvolved appendix wall
C7-C22: Remainder of appendix submitted as

B. COLON RESECTION - neoplastic

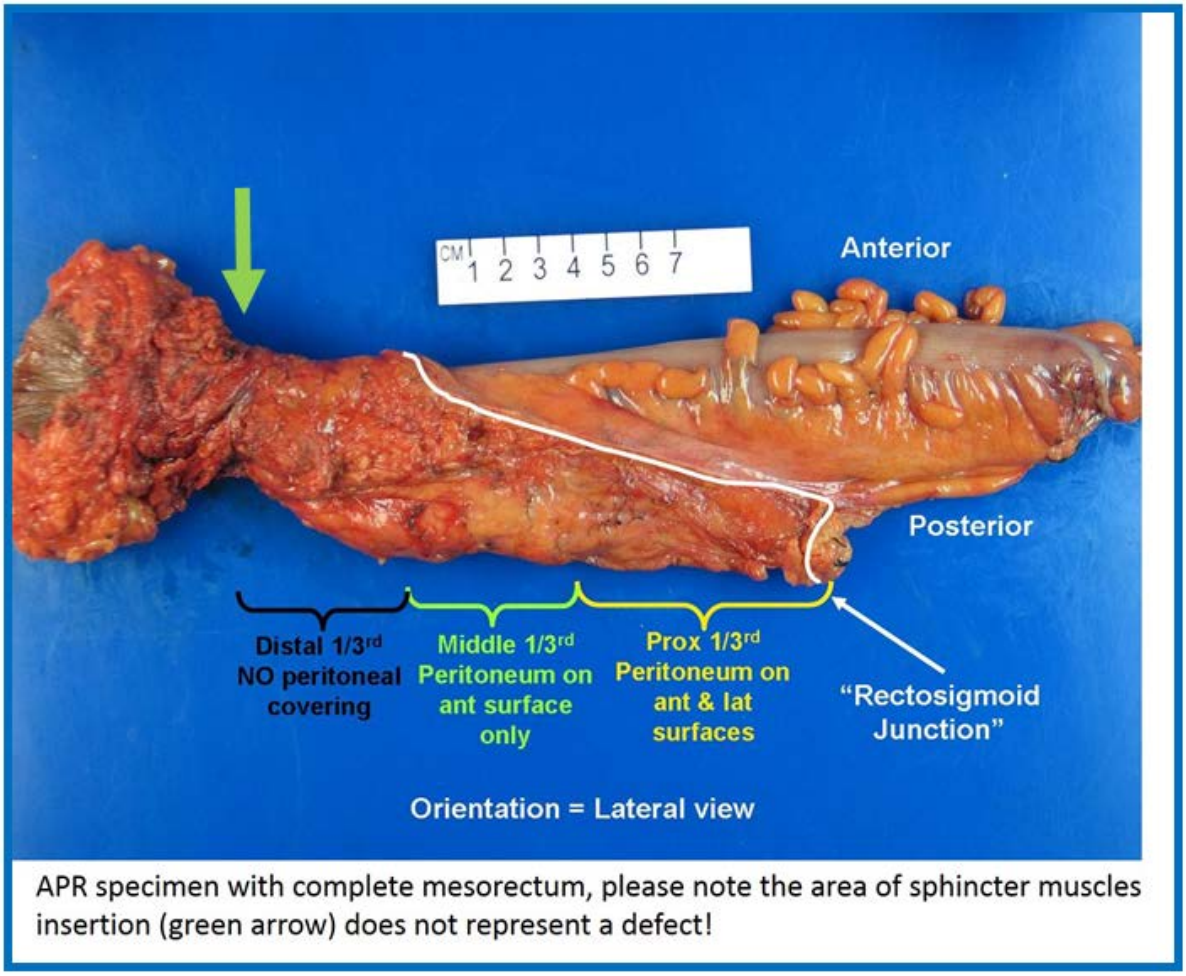
Gross examination and microscopic sections

1. Orient the specimen if possible, with respect to distal and proximal; most resections will contain some segment that can be used as a landmark for orientation (i.e. terminal ileum, peritoneal reflection and mesorectal surface). **All resections containing cecum also have a small segment of terminal ileum (this is the proximal margin).** Some resections will consist entirely of an intraperitoneal segment of bowel (i.e. sigmoid) and cannot be oriented with respect to distal or proximal, unless done so by the surgeon. Remove all stapled margins.
2. Measure the length of colon. If present, measure the length of terminal ileum and appendix. If no appendix is identified, review EPIC to check if patient has had an appendectomy. Only after confirming this, state that no appendix was identified on gross.
3. Review imaging studies, pre-operative office notes, or operative notes to help assess location of tumor and extent of disease (i.e. which bowel segment includes the tumor).
4. Inspect before opening the bowel. Locate the lesion by carefully palpating the specimen. Note if there is perforation present at the tumor site or proximal to the tumor site. Note if there is puckering or apparent involvement of the peritoneal surface (i.e. visceral peritoneum) either of the bowel wall serosal lined surface or of the attached mesentery.
5. Attempt to identify which anatomic subsite the tumor occupies predominately. If 2 subsites are involved to the same extent, state the subsites the tumor overlaps (see Table 1).

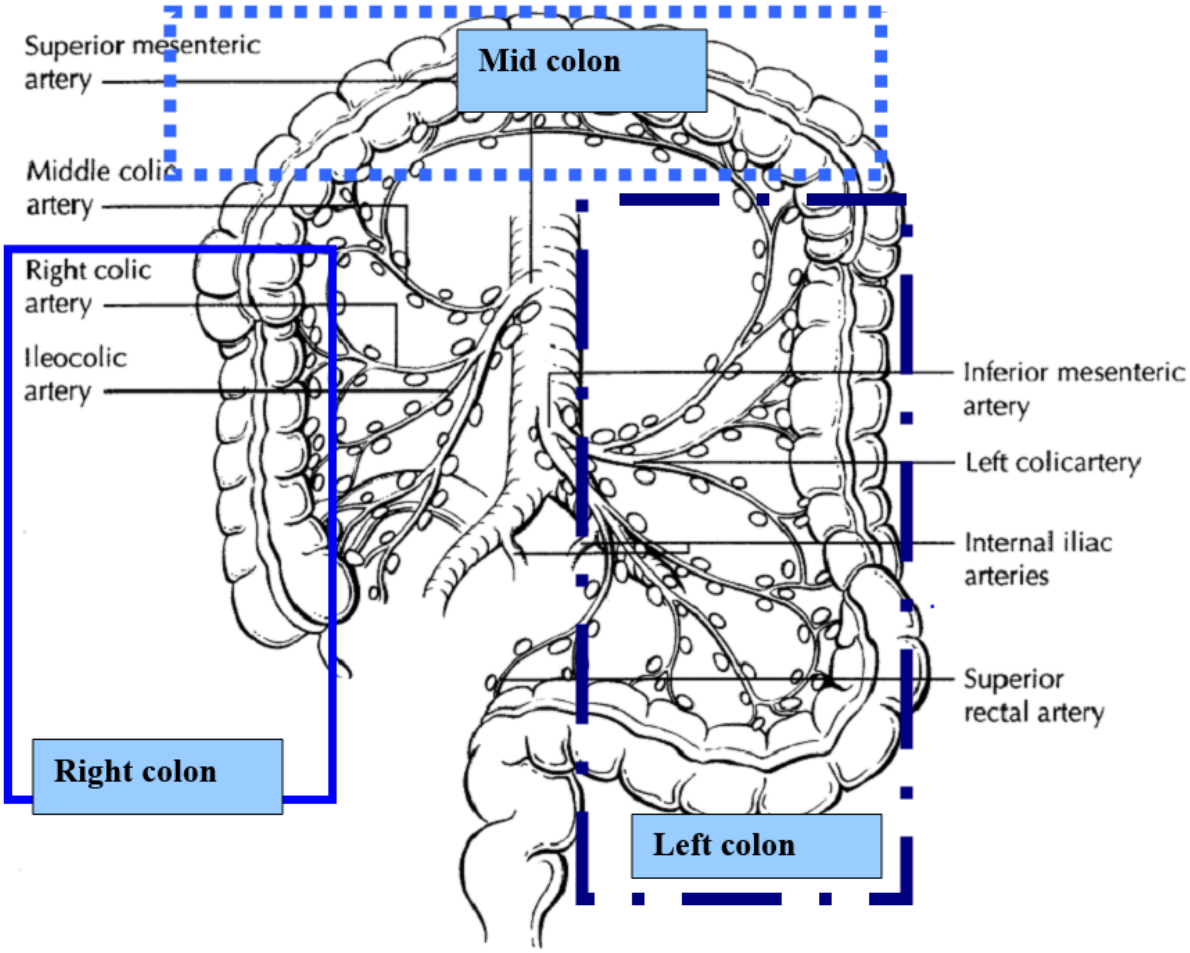
Anatomic Sites of the Colon and Rectum

Subsite	Relationship to Peritoneum	Approximate dimensions
Cecum	Entirely covered by peritoneum	Around 9 cm in length
Ascending colon	Posterior surface lacks peritoneal covering; lateral and anterior surface covered by visceral peritoneum	15-20 cm in length **Ink posterior surface**
Transverse colon	**Intraperitoneal;** has mesentery	Variable
Descending colon	Posterior surface lacks peritoneal covering; lateral and anterior surface covered by visceral peritoneum	10-15 cm in length **Ink posterior surface**
Sigmoid colon	**Intraperitoneal;** has mesentery	Variable
Rectum	Upper third covered by peritoneum on the anterior and lateral surfaces; middle third covered by peritoneum only on the anterior surface; lower third has no peritoneal surface	12 cm in length **Ink entire posterior surface. Lateral & anterior surfaces in mid & lower rectum**

TABLE 1



APR specimen with complete mesorectum, please note the area of sphincter muscles insertion (green arrow) does not represent a defect!



6. Ink the proximal and distal margins two different colors.
7. The mesenteric margin is relevant in segments of colon completely surrounded by peritoneum (i.e. transverse and sigmoid). The mesenteric margin is usually widely free of tumor and a shave margin should suffice. If tumor approaches the mesenteric margin, ink and submit a perpendicular section. **IMPORTANT**: The serosal surface (visceral peritoneum) does not constitute a surgical margin, but the tumor's relationship to the serosal surface is an important determinant of pT stage. Sections should be taken to document this relationship. It is helpful to ink the serosal surface overlying the tumor a different color than what the mesenteric margin was inked.
8. *Radial margins* are predominantly assessed in rectal specimens and should also be assessed in colonic segments with a *non-peritonealized surface* (i.e. posterior aspect of the ascending and descending colon). It is often difficult to identify this non-peritonealized surface. Inspect the posterior surface for any areas of roughening or attached portions of skeletal muscle, these areas will be clues to potential involvement of this retroperitoneal area. The non-peritonealized surface of the rectum and colon should be inked in those applicable segments of bowel.

9. Open the specimen longitudinally on the ***opposite side of the tumor***. (Make sure you are able to orient the specimen and you have submitted margins before your start cutting through the tumor/lesion)

10. Describe the lesion
    - Tumor size in three dimensions
    - Tumor configuration (polypoid, exophytic, ulcerated, infiltrative)
    - Percent of bowel circumference involved (predominantly anterior or posterior)
    - Depth of invasion: take multiple transmural cross-sections through the tumor and identify deepest point of invasion into the bowel.
        a. Submit 1-2 sections showing **deepest point of invasion** into bowel wall.
        b. Submit 1-2 sections showing relationship of tumor to the serosal surface (if applicable). Note that this may be the same as the tumor invasion with deepest extent section, and should correspond to a puckered serosal surface if one was identified (and inked).
        c. **Include at least one section that contains tumor with adjacent normal mucosa** (this is helpful for MSI studies, identifying in situ component, finding LVI and perineural involvement).
        d. If no definite submucosal invasion is identified, submit the entire mass lesion.

    - Measure the distance from margins: distal, proximal, and **radial or mesenteric**. (read above to understand the concept, if you have question, do not hesitate at all asking PA or the GI faculty to assist you and teach you) Submit sections documenting each margin. Perpendicular sections are recommended if the distance from tumor to margin is less than 5cm.

11. Describe the non-neoplastic portion of bowel
    - Normal colonic mucosa or presence of polyps, diverticula, ulcerations, colitis
    - Submit 2 sections showing tumor and adjacent non-neoplastic mucosa.
    - Submit 1 section of non-neoplastic mucosa away from tumor.

12. In neoadjuvant treated cancers with no obvious residual mass identified, the surgeon will often mark an area of interest. At times, a small area of ulceration is identifiable as is a fibrous tumor bed (describe these findings). This entire area and the surrounding tissue should be submitted for evaluation.

13. If you do not see an obvious lesion, look for endoscopic tattoo (black ink within the wall, which may be visible from the mucosal or serosal surface. Carefully re-examine the tattoo and 2-3 cm surrounding area for any lesion, including thickened wall on cut section, or polypectomy site. If you still do not find a lesion, submit the entire tattoo and surrounding area for evaluation. In some cases, there may be tattoo and a nearby obvious lesion; do not submit the entire tattoo separately in this case, as it is just a marker to help you find the lesion of interest nearby.

14. Lymph nodes
    - After all sections have been taken, strip the fat from the bowel wall and dissect through the fat at 2 mm intervals to identify all possible lymph nodes. The lymph node yield is highest in fat that is located immediately adjacent to the bowel wall. Submit all possible lymph nodes, regardless of the number of grossly positive nodes. For cases that have received prior radiation therapy, you may find very few

lymph nodes. In these cases, put 10 additional cassettes of pericolonic/perirectal fat (close to the bowel wall). See comment below and Table 3 for notes regarding regional and non-regional lymph nodes.

15. You may receive in the same bucket or as a separate specimen the ANASTOMOTIC DONUTS. These are the rings of bowel that are created when the colon is surgically reconnected. They may still be attached to the surgical anastomotic device. These rings of bowel are the final proximal and distal margins. If both are present in the same container, one often has a suture. Describe whether the rings appear as complete intact rings or if they are incomplete rings. They should be entirely submitted.
16. For prophylactic stomach, CDH mutation. Submitted 3 sections from cardia, 10 form body, 5 from

IMPORTANT-REGIONAL VS NON-REGIONAL LYMPH NODES

In general, segmental resections for colorectal carcinoma contain only regional lymph nodes, but extended resections such as for IBD related cancers or synchronous carcinomas may contain non-regional lymph nodes. When examining lymph nodes from large resection specimens (i.e. containing more than one anatomic subsite of colon), the lymph nodes must be designated as regional versus non-regional according to the anatomic location of the tumor.

Right sided tumor regional nodes= nodes up to right colic artery distribution (i.e. Cecum to splenic flexure ~25cm segment)

Left sided tumor regional nodes= nodes up to inferior mesenteric artery distribution (i.e. anal verge to splenic flexure ~ 72 - 82 cm)

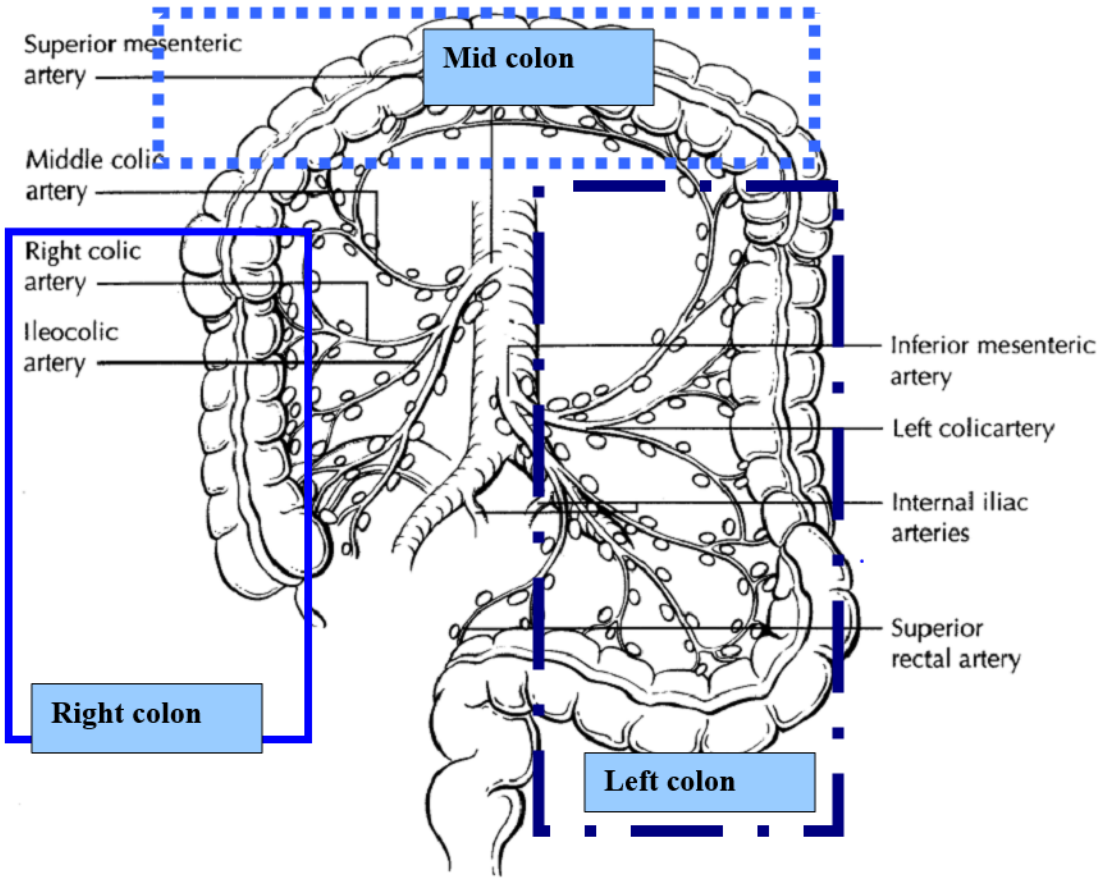
Transverse colon tumor= nodes in the middle colic artery distribution
(i.e. transverse colon segment ~ 45cm length)

A metastasis to a regional lymph node is classified as pN while involvement of a non-regional lymph node is classified as a distant metastasis, pM.

Regional lymph nodes for the anatomic subsites of the large intestine

Cecum: anterior cecal, posterior cecal, ileocolic, **right colic**
Ascending colon: ileocolic, **right colic,** middle colic
Hepatic flexure: middle colic, **right colic**
Transverse colon: **middle colic**

Splenic flexure: middle colic**,** left colic, **inferior mesenteric**
Descending colon: left colic, **inferior mesenteric**, sigmoid
Sigmoid colon: **inferior mesenteric,** superior rectal sigmoidal, sigmoid mesenteric
Rectosigmoid: perirectal, left colic, sigmoid mesenteric, sigmoidal, **inferior mesenteric**, superior rectal, middle rectal
Rectum: perirectal, sigmoid mesenteric, **inferior mesenteric**, lateral sacral, presacral, internal iliac, sacral promontory, superior rectal, middle rectal, inferior rectal



SAMPLE DICTATION AND BLOCKS

Received fresh is a ___ cm in length x ___ (distal) to ___ cm (proximal) in circumference-oriented segment of ___ and ___colon. The proximal mucosal margin (designated with a suture) is inked blue and the distal mucosal margin is inked orange. The serosal surface is pink-tan, smooth and glistening with the exception of an (FOR EXAMPLE: area of puckering overlying a palpable mass, which is inked black). Opening of the bowel reveals a ___ x ___x __cm tan-pink centrally ulcerated tumor. It is located ___ cm from the proximal margin, __cm from the distal margin, and ___cm from the **mesenteric margin**. The tumor spares only ___% of the anterior circumference of the colon and the lumen is narrowed to __cm. Sectioning reveals (FOR EXAMPLE: tan homogeneous cut surfaces) with extension (FOR EXAMPLE: through muscularis propria into the pericolonic tissue, with the lesion focally abutting the inked serosal surface.) .
A ___cm soft polyp is identified ___ cm from the proximal margin, and __ cm from the tumor. Sectioning reveals that the lesion appears confined to the (*FOR EXAMPLE: mucosa*).
The remainder of the mucosa is tan with the usual colonic folds. A lymph node dissection reveals ___ possible lymph nodes, ranging from __ to __ cm in greatest dimension. Representative sections are submitted as follows:

Cassette #1: Distal margin, shaved (perpendicular section if tumor is close to the margin)
Cassette #2: Proximal margin, shaved (perpendicular section if tumor is close to the margin)
Cassette #3: **Mesenteric margin**, en face
Cassette #4: Tumor with deepest extent of invasion and **serosal surface**
Cassette #5: Tumor with deepest extent of invasion and **serosal surface**
Cassette #6: Tumor and adjacent non-neoplastic mucosa (interface)
Cassette #7: Tumor and adjacent non-neoplastic mucosa (interface)
Cassette #8: Tumor
Cassette #9-10: Polyp, entirely submitted
Cassette #11: Uninvolved colon, between polyp and tumor
Cassette #12: ___possible lymph nodes, submitted in toto.
Cassette #13: ___possible lymph nodes, submitted in toto
Cassette #14: ___ possible lymph nodes, submitted in toto
Cassette #15: ___possible, lymph node, bisected
Cassette #16: ___ possible lymph nodes, submitted in toto
Cassette #17: ___Additional pericolonic/perirectal fat for cases that have received prior therapy (rectal cancers)

C. COLON RESECTION – non-neoplastic:

1. INFLAMMATORY BOWEL DISEASE

Many patients with inflammatory bowel disease undergo surgical resection. The most common specimen from a UC patient is a total colectomy. Crohn's patients more often have segmental resections, especially ileocecectomy, consisting of a long ileal segment with attached cecum and appendix. Crohn's patients also often have re-resection of the ileocolic anastomosis.
It is very important to review the medical record before grossing an IBD specimen. **In UC patients, look for prior biopsies showing dysplasia, and take additional sections from the previously involved areas**. **In Crohn's** patients, they have often had prior imaging, such as a CT enterography or MR enterography. These imaging reports are extremely helpful in identifying **sites of stricture and whether or not a fistula tract(s) is also present**. Also note

whether the patient has had prior bowel resections, and if you are expecting to find a prior **anastomosis site** in the current specimen (always look for these regardless). In some cases, a Crohn's ileocecal resection may come with an **inflammatory mass** or with looped bowel **adhesions**. Careful sectioning in these areas may also yield fistula tracts, abscess, or an involved appendix.

GROSS EXAMINATION AND SECTIONING

1. Orient specimen. Identify proximal and distal margins. Remove all stapled margins, leaving the staple line hanging off, but still attached.
2. Measure length and circumference of bowel.
3. Ink proximal and distal margins. In colectomy specimens, the proximal margin is ileum (make sure you open the specimen completely and identify the stapled proximal margin).
4. Examine outer surface of the specimen (describe color, glistening, dull, fat wrapping).
5. Examine the mucosal surface, describe cobblestoning, ulcers, loss of mucosal folds, and granularity. Note that erythema is different from ulceration. Ulcers indicate a breakdown of the mucosa, while erythema may be due to mucosal or submucosal processes.
6. Describe extent of disease, if the process is diffuse or patchy.
6a. **Identify any strictures or areas of wall thickening**. Measure and record the wall thickness in the area of stricture as well as proximal and distal to the stricture. If there is no stricture, an "average" wall thickness is sufficient. The length of the strictured or narrowed segment should also be noted, as well as distance to nearest margin (strictures may harbor malignancy). Also record the internal circumference within the stricture.
7. Submit consecutive sections starting distally and proceeding proximally **at approximately 10 cm intervals** (if bowel wall is thin place up to 2 sections per cassette).

8. Section any areas of wall thickening at 3 cm intervals or less. **In ulcerative colitis the bowel wall is usually not thickened and lays flat. Areas of strictures in ulcerative colitis are rare and should be considered malignant until proven otherwise.** If you suspect **Crohn's disease** because of patchy distribution, wall thickening, fissuring ulcers, adhesions, fistulae and/or fat wrapping, **concentrate your sections on the most thickened/strictured or abnormal areas.**

8a. Section through the mesenteric adipose tissue in thickened areas to look for fistula tracts or abscess.

9. Sample areas of deep ulceration and adjacent bowel.

10. If ***multiple polyps*** are present, sample bowel at 5 -10 cm intervals and especially include any indurated or fixed polyps.

11. ***If mass lesion(s) is present***, use the colon cancer protocol.
If flat velvety mucosa or other abnormal mucosal or areas of previously documented dysplasia are identified without obvious gross invasion, ***sample liberally at 1 cm intervals***.

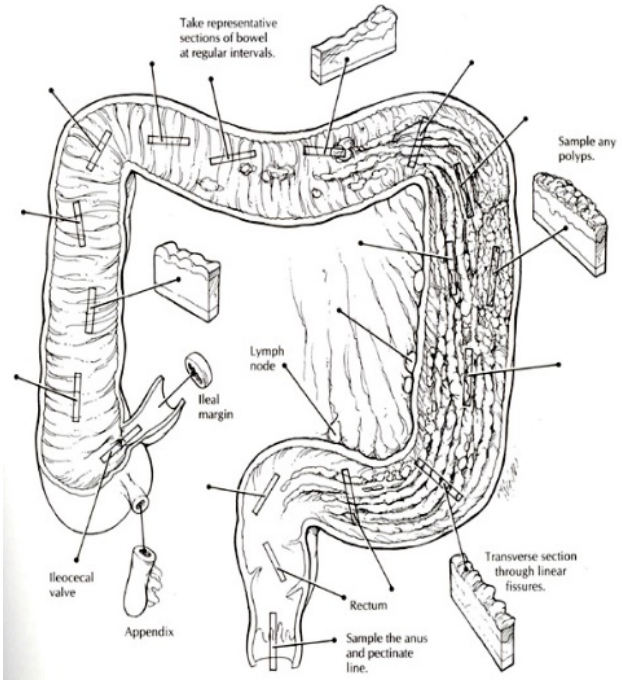
12. Appendix (if normal, submit only ONE block with bisected appendiceal tip and cross section through mid-portion). Abnormal appendix -see section appendectomy for neoplasia.

13. Lymph nodes: Must be searched for and evaluated because of the increased risk of carcinoma in these patients, which can occur in young patients and be difficult to detect by biopsy alone.

IBD resection specimens without history of dysplasia: Submit grossly palpable/visible lymph nodes by regions up to 12 nodes. Specify region if possible (right, left and mid colon).
IBD with biopsy proven high grade dysplasia or obvious cancer - full lymph node dissection should be performed including all regional and non-regional lymph nodes**.**

SAMPLE DICTATION AND BLOCKS – Total colectomy

Received fresh labeled with the patient's name, medical record and "Total colectomy" is a specimen consisting of terminal ileum (___cm in length × ___ cm in circumference), colon (___ cm in length x __ cm in circumference) and attached appendix (__ cm in length × __ cm in diameter. The serosal surface is pink-tan, smooth and glistening without fat wrapping. The proximal mucosal margin is inked ___ and the distal mucosal margin is inked ___. On opening the bowel lies flat. The distal __ cm of colonic mucosa is (FOR EXAMPLE: dusky red and has multiple ulcers and pseudopolyp formation) which extend (to involve) the (proximal or distal) margin. A __ cm (soft polyp) is identified in the transverse colon, which appears confined to the mucosa on sectioning. The remainder of the proximal colonic and terminal ileal mucosa is tan-brown with the usual intestinal and colonic folds. The bowel wall is thin and the distribution of the adipose tissue is normal. Examination of the pericolonic adipose tissue reveals __ possible lymph nodes, ranging from __ to __ cm in greatest dimension.
Cassette # 1: Proximal ileal margin, shaved.
Cassette # 2: Distal margin, shaved.
Cassette # 3-5: "polyp or any other grossly identified lesion"- entirely submitted
Cassette # 6-16: **Sequential sections of colon every 10 cm submitted from distal to proximal (must state direction of sampling)**
Cassette # 17 Ileocecal valve
Cassette 18: Appendiceal tip (bisected) and representative cross section of appendix. (If there is appendiceal lesion, submit the entire appendix.)
Cassette #19: __ possible right colon lymph nodes, submitted in toto
Cassette #20: ___ possible mid colon lymph nodes, submitted in toto
Cassette # 21: ___ possible left colon lymph nodes, submitted in toto



D. RECTAL CANCER

Total mesorectal excision (TME) is a surgical technique that entails precise sharp dissection within the areolar plane outside (lateral to) the visceral mesorectal fascia to remove rectum. This plane encompasses the rectum, its mesentery, and all regional nodes. The plane in which the surgeon performs the dissection of the rectum will influence the completeness of the mesorectum and therefore reflects the quality of the surgery. **The presence of mesorectal tears or defects predisposes to both local and distant recurrence.** Studies have shown that high-quality surgery with intact mesorectal surface significantly reduces local recurrence rate and improves long-term survival in patients with rectal cancer.

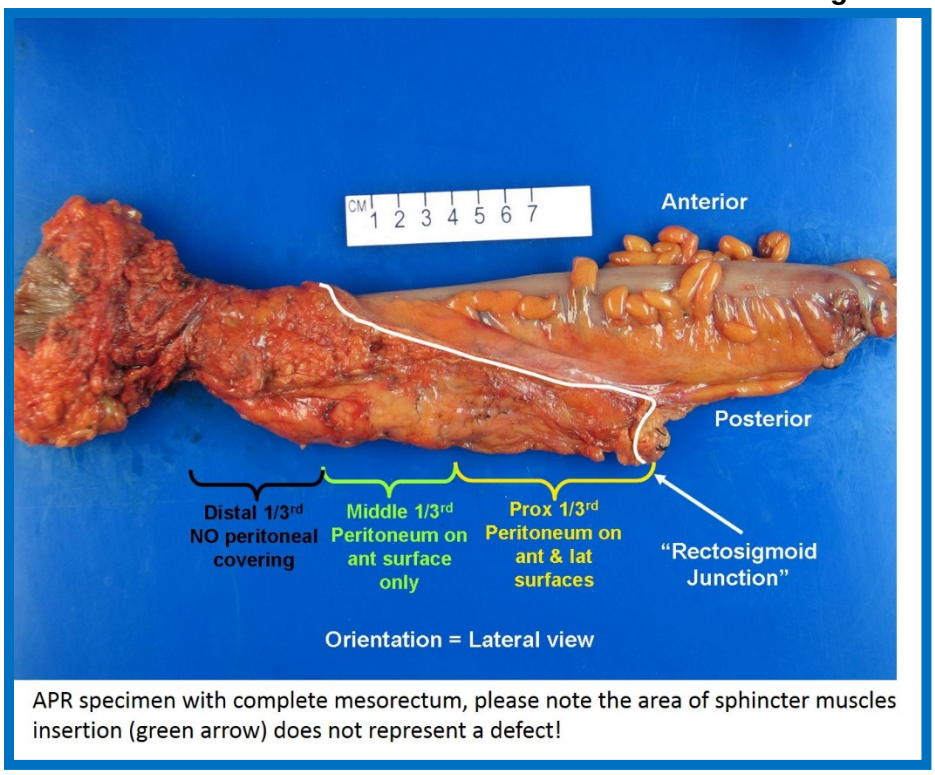
As part of the guidelines and compliance requirements, each TME specimen should have the following elements reported during grossing:

1. All rectal cancer specimens (fresh or fixed) **must be photographed** prior to opening the specimen to document the quality of the mesorectum.

2. These photographs must include **anterior, posterior, left lateral and right lateral views**. Document that photographs were taken in the gross description.

3. The images should follow good gross photography rules (label, ***no ink***, no blood, in focus and minimal background).

4. **The intactness of mesorectum should be commented on gross examination**.

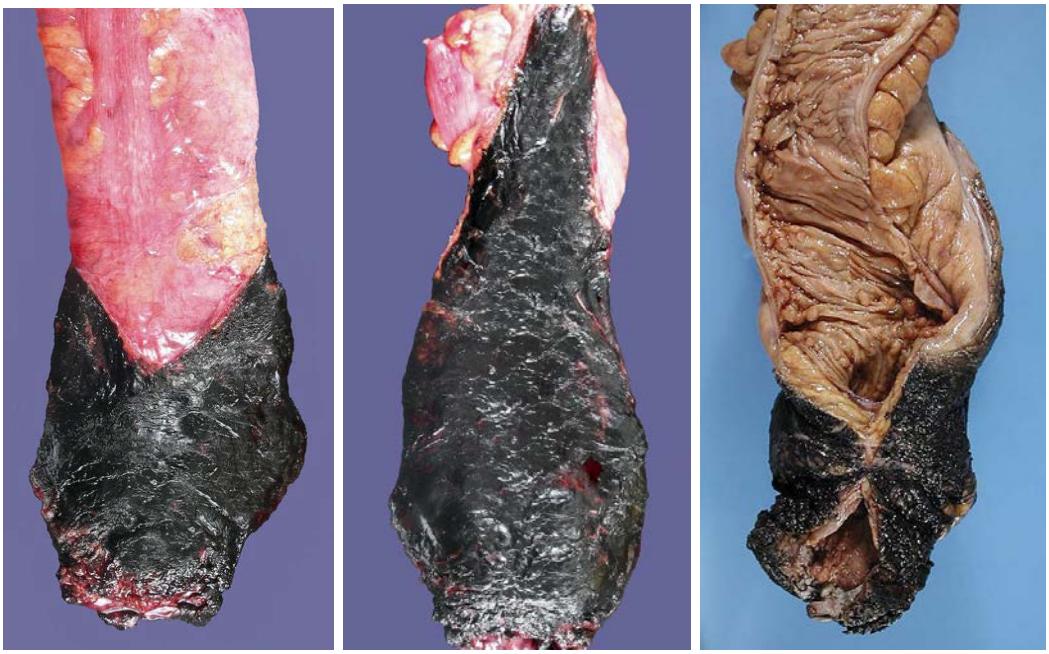


APR specimen with complete mesorectum, please note the area of sphincter muscles insertion (green arrow) does not represent a defect!

TOTAL MESORECTAL EXCISION (TME) - QUIRKE'S METHOD – CCF MODIFICATION

Fresh specimen

- Orient specimen according to the anterior and posterior surface.



- **ANTERIOR POSTERIOR OPEN AND FIX OVERNIGHT**
- Assess the quality of the mesorectum. The surgical quality of a TME is a factor in local recurrence and long-term survival. The extent of resection is determined by gross evaluation of the non-peritonealized surface of the rectum with the specimen scored according to the worst area seen grossly. See grading table below.
- Photograph all rectal cancer cases (4 photographs: anterior, posterior, right lateral and left lateral) with additional images of any mesorectal defects.

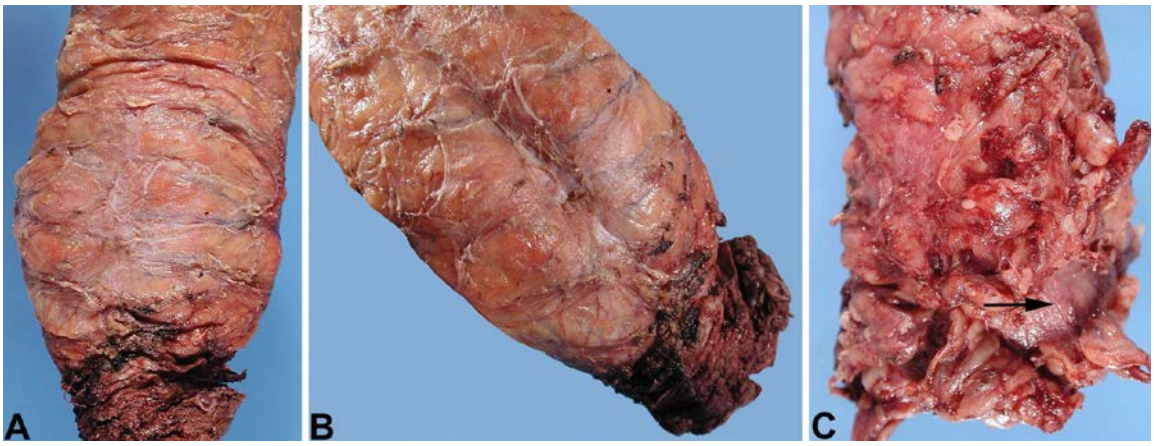
Grading of quality and completeness of the mesorectum in a TME specimen

	Mesorectum	Defects in mesorectum	Coning	Circumferential radial margin
Complete	Intact and bulky with smooth surface	Only minor irregularities Not surface	None	Smooth, regular

	Mesorectum	Defects in mesorectum	Coning	Circumferential radial margin
		defects >0.5cm in depth		
Nearly complete	Moderate bulk, Irregularity of the mesorectal surface with defects >0.5 cm, but none extending to the muscularis propria	No visible muscularis propria except at insertion site of levator ani muscles	Moderate	Irregular
Incomplete	Little bulk	Down to muscularis propria	Moderate–marked	Irregular

From: J Clin Pathol 2007 August; 60(8): 849**–855**

COMPLETE **COMPLETE** **INCOMPLETE**



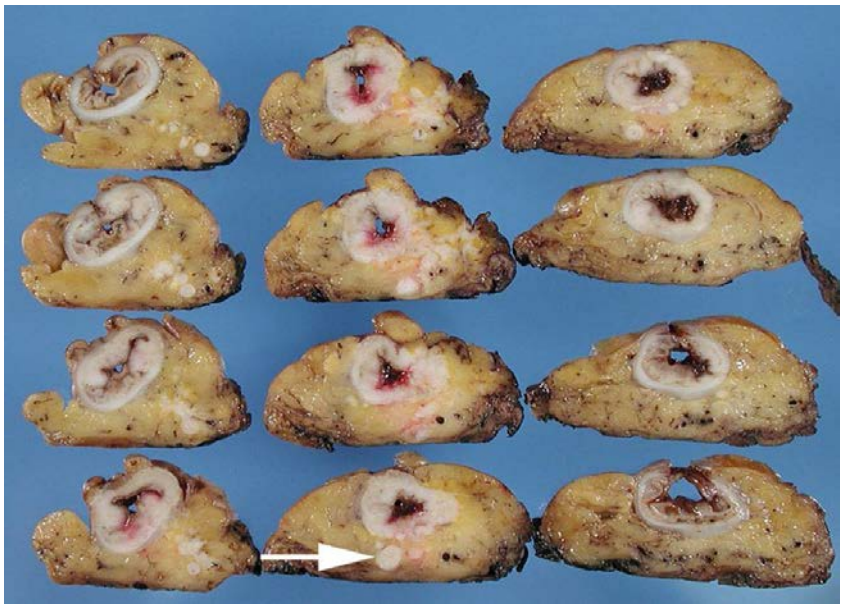
- Ink the non - peritonealized bare areas of the specimen circumferential resection margin (CRM).

    - Anterior CRM consists of a narrow band of non-peritonealized surface, below the peritoneal reflection.
    - The posterior CRM consists of a long, triangular, non-peritonealized surface, typically protected by a greater degree of soft tissue compared to the anterior CRM
- Identify the tumor or tumor bed by palpation.
- Open the specimen along the anterior aspect from the top and the bottom, leaving the bowel intact at a level just above and just below the tumor
- Place loose, formalin soaked gauze wicks into the unopened ends of the bowel
- Fix the specimen overnight. (If we are not submitting section for tissue bank)

Fixed specimen

- Assess proximal and distal margin and measure the distance between the lower end of tumor and distal margin. If this distance is less than 2cm submit perpendicular sections of the distal margin before cutting into the tumor.
- Open the specimen **longitudinally on the opposite side of the tumor.** [Quirke method- Slice through the unopened rectum at 3–5 mm intervals; lay slices down on the work surface (orient anterior to posterior) and proximal to distal
- Inspect these mucosa and describe the tumor:

a) Tumor size in three dimensions, location (i.e. anterior wall, posterior wall, right or left lateral walls) and the relationship to the anterior peritoneal reflection (above, below, spans).
b) Tumor configuration (polypoid, exophytic, infiltrative)
c) Percent of bowel circumference involved
d) Depth of invasion: take multiple transmural cross-sections through the tumor and identify deepest point of invasion into the bowel. Extent of tumor and the closest distance of tumor to the circumferential radial margin (record this distance)
e) Record whether the closest distance of tumor to circumferential radial margin is anterior, posterior or lateral.
f) Relation of tumor to serosal surface (if applicable, especially for tumors located at the rectosigmoid junction
g) Any obviously positive nodes and the distance of any positive node to the circumferential radial margin (record this distance). Trim fat away from the entire specimen and examined to detect lymph nodes.(After you submit the other sections. Take care not to double count lymph nodes.



SLICING TECHNIQUE FOR QUIRKE'S METHOD

Block selection

- Proximal and perpendicular distal resection margins (distal margin includes both mucosa and mesorectum)
- Three blocks of tumor showing closest **circumferential radial margin**
  - For tumors after neoadjuvant therapy, sample the tumor bed carefully and submit additional sections as needed. Contact GI staff if necessary.
- One block showing tumor and **serosal surface (if applicable)**
- Two blocks of tumor showing luminal aspect with adjacent uninvolved bowel (often helpful for subsequent MSI studies)
- All lymph nodes (When using the slicing method, be careful not to double count nodes present in more than one slice. In order to submit an entire lymph node, you may have to cut out the rest of the node from an adjacent cross section)
- Any polyps or lesions
- One block of uninvolved colon

Reference: Parfitt J. The total mesorectal excision specimen for rectal cancer: a review of its pathological assessment. J Clin Pathol 2007 August; 60(8): 849–855

UAB DEPARTMENT OF PATHOLOGY
PANCREATIC AND HEPATOBILIARY
TABLE OF CONTENTS

PANCREATICOBILIARY SPECIMENS

FROZEN SECTION GUIDELINES

A. ***Liver needle biopsy*****:** Freeze entirely.

B. ***Liver wedge biopsy*****:** Freeze entirely.

C. ***Liver wedge excision or larger excision for tumor*** **(including lobectomy and partial hepatectomy):** Weigh, measure. Identify and ink margin. **Serially section perpendicular to the inked margin**. Identify any gross lesions. Measure distance of lesion from inked margin. Sample the lesion closest to the inked margin.

D. ***Whipple or distal pancreatectomy for margin*****. Pancreatic neck margins submitted separately from main resection specimen:** Identify main pancreatic duct. Measure duct diameter. Note any gross lesions or mucin in the duct. If specimen is received oriented, orient the specimen as per the instructions. Shave the margin and freeze entirely, en face. If margin is received unoriented (most common scenario), call OR to clarify.

E. ***Whipple or distal pancreatectomy. Main resection specimen*** **and you are asked to freeze tumor and/or margins.** Orient the specimen and identify all surgical margins. Determine which margins are to be frozen. Ink and freeze shave margins. *Pancreatic margin should be shaved and submitted en face.* Orient the tissue with true margin facing up in the frozen chuck.

II. SINKING GUIDELINES (FIXING OVERNIGHT)

A. Liver

1. **weigh** and **measure** the specimen
2. make several incomplete cuts into the specimen perpendicular to the long axis
3. avoid the hilum to preserve important structures
4. note the presence of any shunts, coils, or filters to alert the resident the next day

B. Whipple

1. Check for ink from the OR (blue-portal vein, yellow-uncinate margin). If ink is not present alert staff/senior resident. You may have to call the OR and have them come and ink the specimen. *Do not ink yourself without staff approval*
2. **Measure and open the duodenum** (as you would a colon)
3. **Identify and probe the bile duct** (leave probe in place)

a. If you have to open the bile duct (staple, suture), **take the margin now** and **place in a labeled cassette**

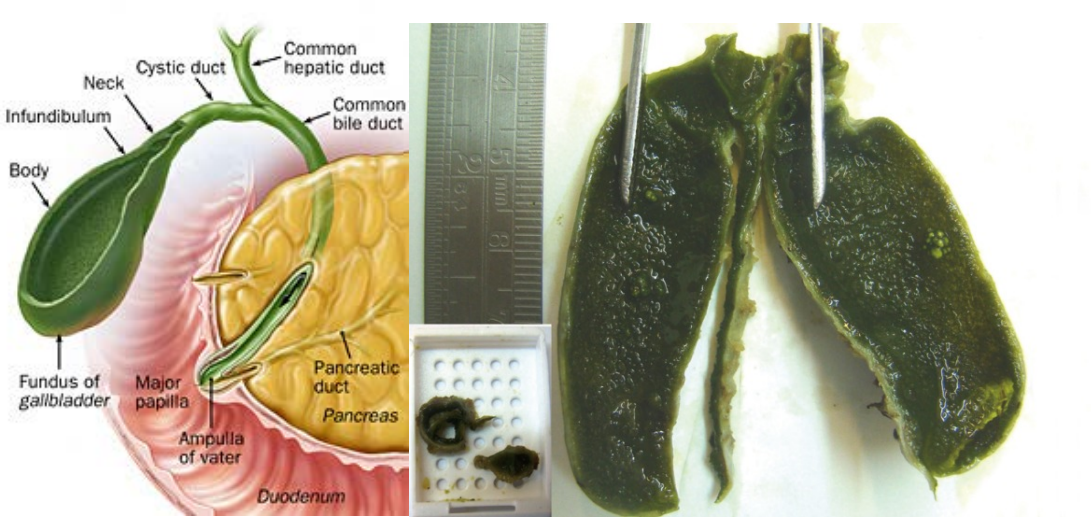
4. **Identify and probe the main pancreatic duct** (leave probe in place)
5. **Bivalve (After discussing with the GI faculty on service)**

III.GALLBLADDER- CHOLECYTECTOMY

Carefully examine the mucosal surface and wall for any nodules, lesions, or polyps. Note the presence or absence of stones in every case. Cut through one or more stones and examine the cut section. Attempt correlation of the stone morphology with the chart below.

Routine sections should include: **two of the gallbladder wall (or an entire longitudinal section with swiss roll) and one complete cross section of the cystic duct margin**, in one cassette for a routine case without lesions. Any gross lesions, mucosal abnormalities, nodules or polyps should be submitted.

Type	Stone Appearance	Frequency
Cholesterol	Yellow green	80%
Pigment	Small, dark	20%



The longitudinal sampling technique: a sample taken from the neck region and another sample taken lengthwise from the fundus toward the neck (the latter rolled with the "swiss-roll" method) are placed together in one cassette (Korean J Pathol. 47(6):519-525).

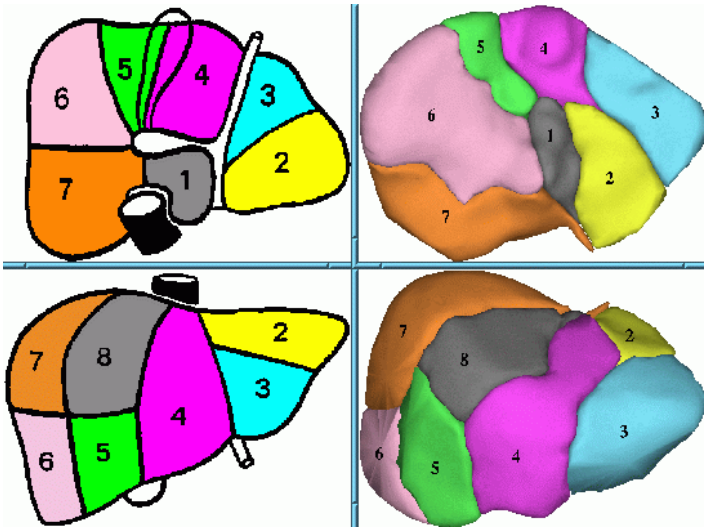
Sample Dictation:

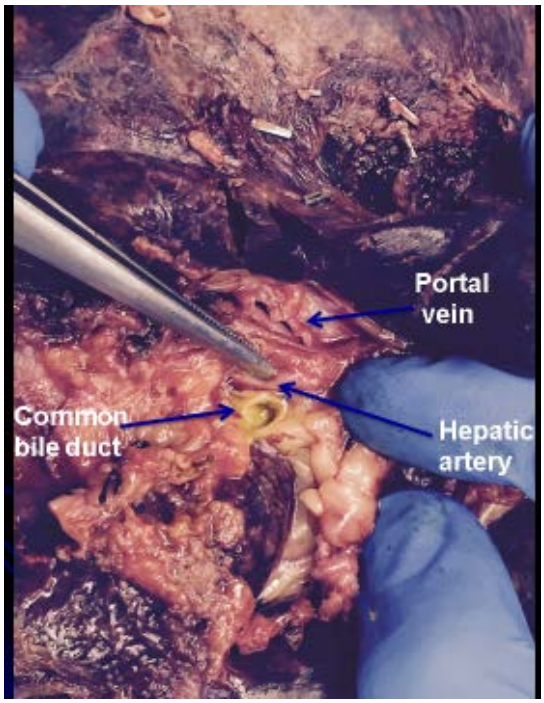
The specimen consists of a gallbladder measuring ____ x ____ x ____ cm. The serosal aspect is (FOR EXAMPLE: smooth and glistening (dull, erythematous, demonstrates fibrinous exudate). A perforation (is, is not) present. The cystic duct inked blue and the entire outside aspect of the gallbladder in black. The lumen contains _____. The wall of the gallbladder averages ____ cm

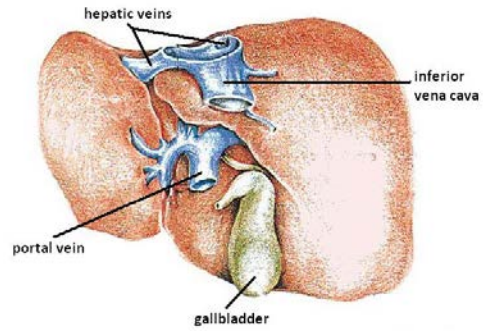
in thickness. Calculi (are, are not) present and are __in color. A calculus (is, is not) impacted in the cystic duct. The mucosa is (For Example: bile stained, hemorrhagic, or demonstrates longitudinally oriented yellow streaks more prominent on the summit of mucosal ridges). Representative sections are submitted in (__) cassettes.

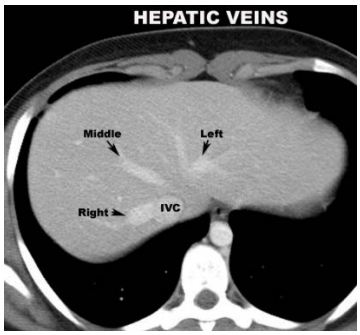
IV.LIVER WEDGE RESESECTIONS, LOBECTOMY SPECIMENS AND EXPLANTED LIVERS

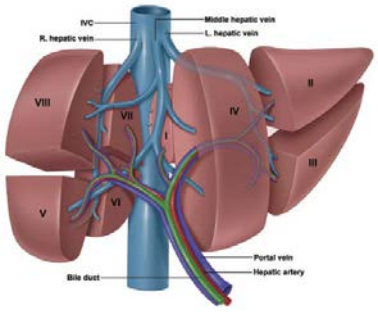
ANATOMY OF THE LIVER SEGMENTS



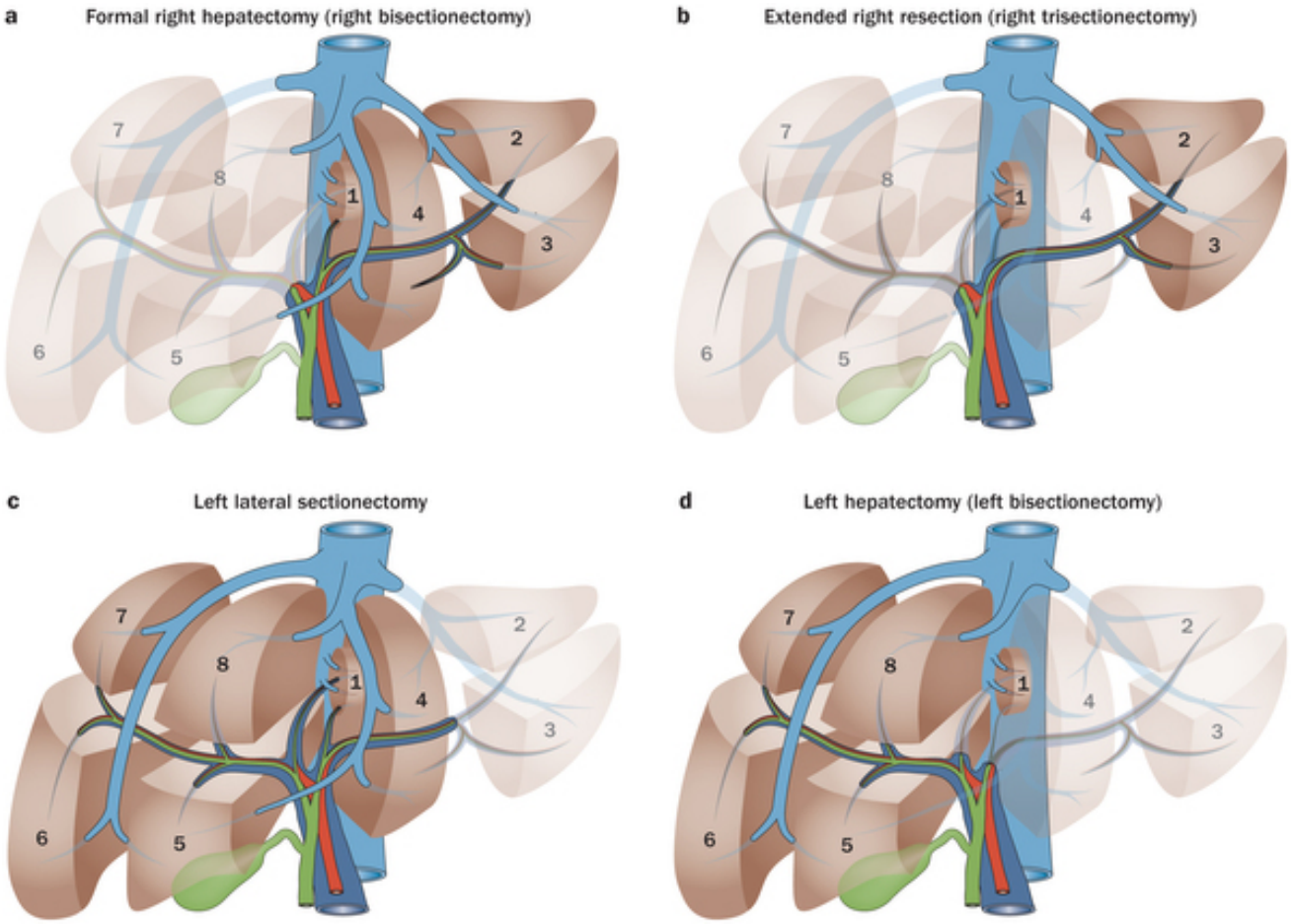








Surgical procedures:



Overview:

1. Weigh and measure the specimen. Identify the cut surgical margins and the capsular surface. Assess the overall appearance of the resected liver (e.g., normal homogeneous parenchyma with a smooth capsule versus the nodular and fibrotic appearance of a cirrhotic liver). Identify the vascular pedicle.
2. Ink any parenchymal resection margins.
3. Section the specimen thinly at 0.5 cm to look for lesions
4. Describe the size, location (with respect to the liver capsule and with respect to the surgical margins), **color**, and other gross features (**central scar, hemorrhage, nodularity, bulging** on cut section) of any gross lesions. In an explanted liver, indicate the **location of the lesion** (for example, hepatic lobe and segment).
5. Any grossly appearing tumor must be measured in three dimensions. Describe the tumor and its location. **A measurement must also be taken of the distance from the tumor to the nearest resection margin**.

6. Describe the Tumor Growth Pattern as **Mass-forming, Periductal infiltrating, Mixed mass-forming and periductal infiltrating, or Cannot be determined** (** This information is Required for the CAP Synoptic Report element for carcinomas of the intrahepatic bile ducts).
7. Describe **the remainder of the liver parenchyma** including color, presence of nodules (give range of sizes), congestion, and fibrosis. Describe the appearance of the capsule: normal = thin smooth and glistening; abnormal = thickened, nodular, adhesions, etc. Examine the **major portal vein and hepatic vein structures for gross evidence of vascular invasion.**
8. Take sections to demonstrate the ***lesion, nearby vasculature, cauterized margins, vascular margins, and uninvolved liver.***
9. If uninvolved liver is present, submit one block *as far as possible* from the tumor (**NOT** Close to the Capsule). Please order **iron, PAS/D and trichrome** stains on one block of uninvolved liver from **explanted livers.**

In wedge or segmental resections- CASE BY CASE.

LIVER TRANSPLANT SPECIMENS FOR NON-TUMOR/TUMOR

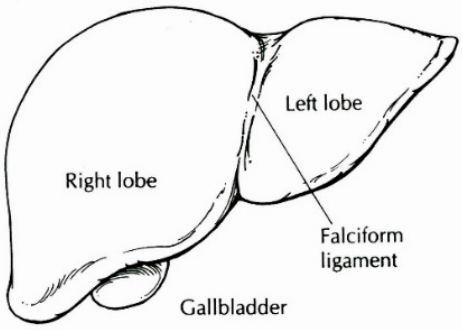
Gross Description

(Follow instructions regarding infectious precautions, photography and fresh tissue procurement. Be especially careful if a metal tip stent is in place, as these have many sharp wires that could easily impale your hands.)

Check Imaging Study *to make sure no nodules/tumors/lesions were identified radiographically that you may have missed. Specimens should be photographed, and sections taken for tissue procurement and electron microscopy as requested by staff pathologists or surgeon. Sections are submitted (in formalin) under the following designations:*

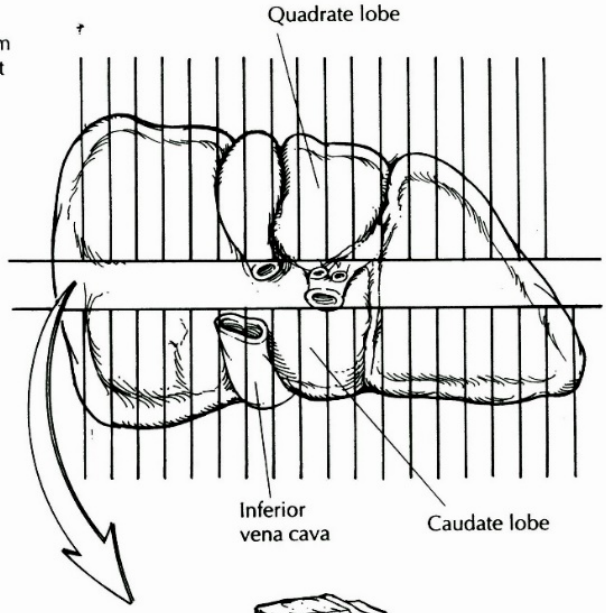
1. **Hepatic duct, hepatic artery and portal vein margins** (cut a plug of liver at the hilum and submit a cross-section of liver with large hilar duct and vessels)
2. **Hepatic veins margins**
3. **Gallbladder and cross-section of cystic duct margin**
4. **Multiple sections of liver parenchyma** (including area of fibrosis, portal tracts and subcapsular areas, minimum of 4)
5. **Any other lesions** – include a sample of all nodules >1 cm. (1 sx/cm of tumor)
6. If received fresh, freeze – representative portion of cirrhotic liver and tumor (hepatocellular carcinoma and cholangiocarcinoma) when present.

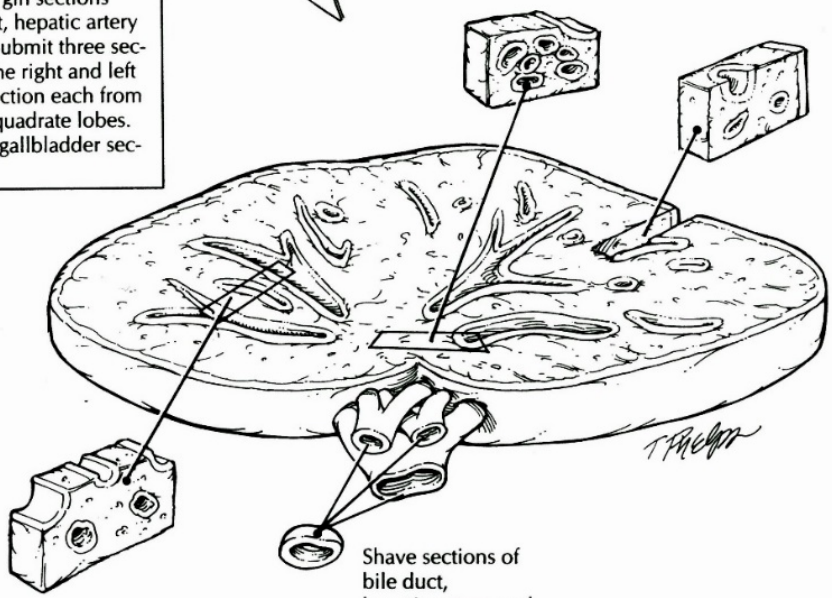
Note: For non-tumor liver resections: Four sections from right lobe, one from Caudate and 2 from left lobe



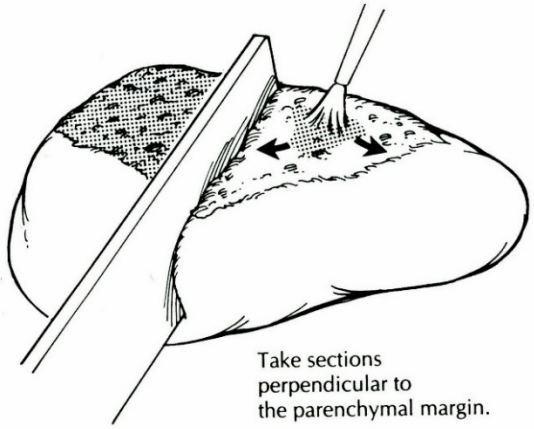
Total Hepatectomy

1. Orient the liver by identifying the four lobes: right, left, caudate, and quadrate. Weigh and measure the liver.
2. Identify and sample the structures of the porta hepatis.
3. Dissect the gallbladder from its bed, and routinely process.
4. Section the liver along its longest axis on either side of the hilum. Serially section the detached portions of the liver perpendicular to the long axis.
5. Submit shave margin sections from the bile duct, hepatic artery and portal vein. Submit three sections each from the right and left lobes, and one section each from the caudate and quadrate lobes. Include standard gallbladder sections.



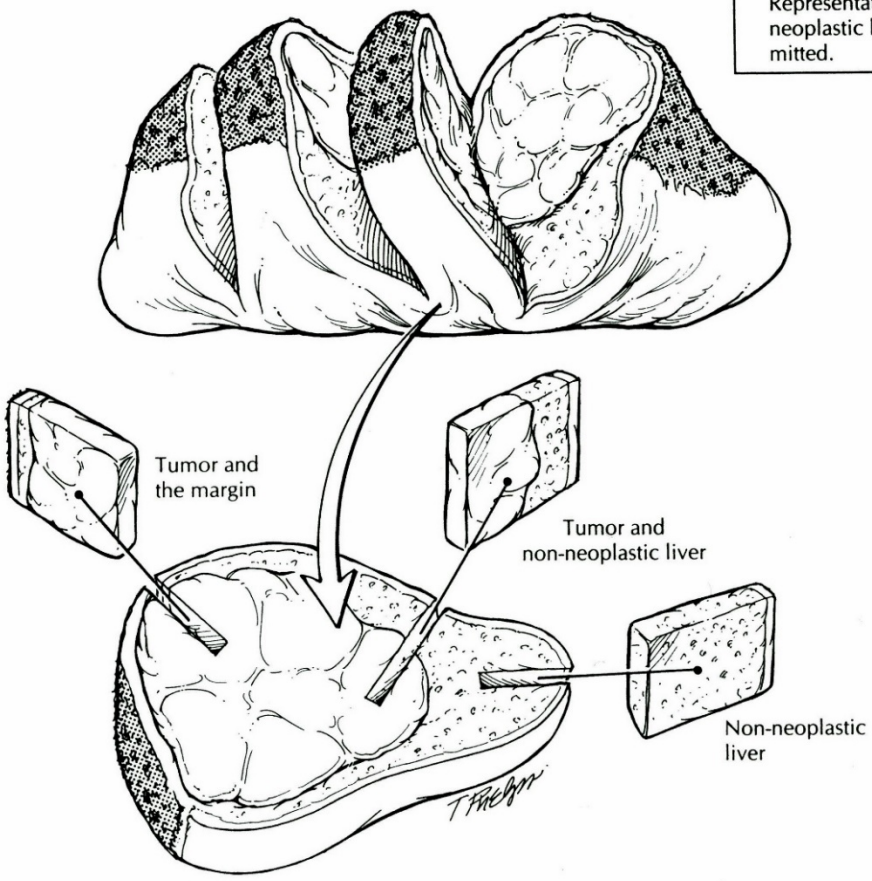


Shave sections of bile duct, hepatic artery, and portal vein (the porta hepatis)



Partial Hepatectomy

1. Weigh and measure the specimen.
2. Identify and ink the liver resection margin.
3. Serially section the liver perpendicular to the resection margin at 0.5-cm intervals.
4. Document the distance from the resection margin to the edge of the tumor.
5. For metastatic lesions, submit sections from the periphery of the tumor and of the margin. Sample primary liver tumors more extensively, including perpendicular sections from the resection margin at points most closely approached by tumor. Representative sections of non-neoplastic liver should also be submitted.



Sample Dictation for liver explant:

Received (FOR EXAMPLE fresh, fixed in formalin), is an entire liver and attached segments of the extrahepatic biliary tree including gallbladder (without gallbladder) weighing ____ gms and measuring ___ x ___ x ___ cm. The capsule is smooth and glistening (For example: has a macronodular, micronodular texture). The overall configuration of the liver is (FOR EXAMPLE: normal, enlarged, swollen with blunted edges, shrunken or cirrhotic). On cross section the parenchyma is (FOR EXAMPLE: red-brown, appears congested, green-brown, dark-red, golden yellow and greasy) and reveals (FOR EXAMPLE: a normal lobular pattern or reflects the macro/micronodular cut surface). Cirrhotic nodules range in size from ____mm to ____mm. Nodule(s) >1 cm is/are (or is/are not) present. (Specify location FOR EXAMPLE: right lobe, caudate lobe) and size for each nodule. Sample each nodule separately and indicate in cassette inventory which nodule/lesion is in which cassette(s).) The hepatic and portal veins are (FOR EXAMPLE: normal). Intrahepatic bile ducts (are, are not) prominent. [Insert comments regarding stent placement, biopsy sites, distribution (diffuse, centered about portal tracts) and degree of fibrosis, as well as any other lesions such as prominent nodules, size, character,location of lesions (central, subcapsular), hemorrhage or necrosis and distance to the margin.]

The gallbladder measures ___ x ___ x ___ cm. The serosal aspect is (FOR EXAMPLE: smooth and glistening /dull/, erythematous, demonstrates a fibrinous exudate). The lumen contains ___. The wall of the gallbladder averages ___ cm in thickness. Calculi (are, are not) present of the ___ type*. A calculus (is, is not) impacted in the cystic duct. The mucosa is (bile stained, hemorrhagic).

Sample Dictation for liver explant for tumor:

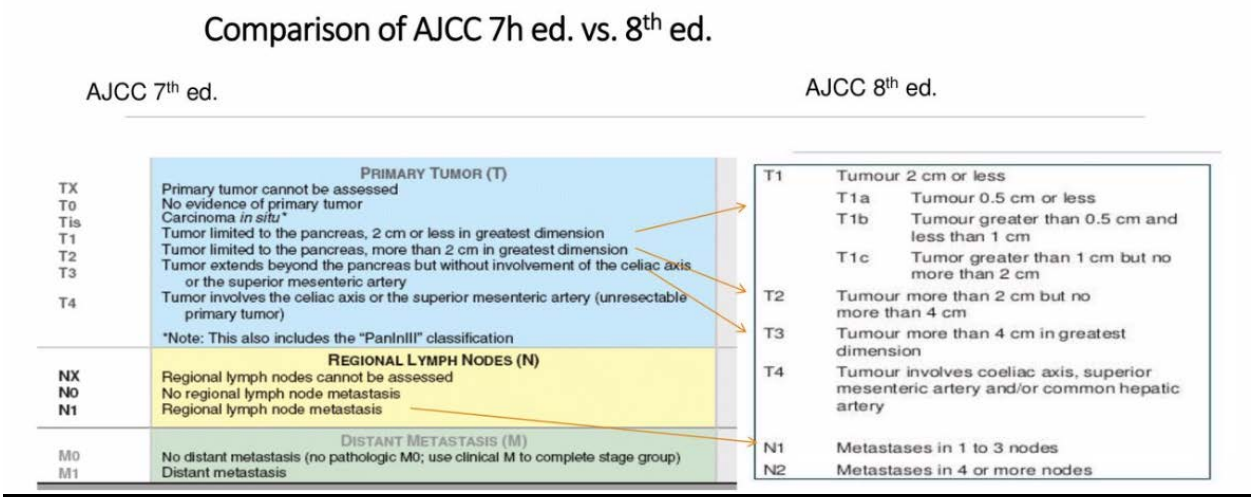
Received (fresh, fixed in formalin) is a wedge of liver measuring ___ x ___ x ___ cm and weighing __gm. The capsular surface is (FOR EXAMPLE: smooth and glistening/ or distorted by a subcapsular mass) and (FOR EXAMPLE: intact or ulcerated). On cross section (a mass or multiple masses is/are present) which measures ___ x ___ x ___ (range in size from ___ to ___ cm) and is/are located ___ cm (or abut/s) from the closest parenchymal margin of resection. The mass/masses (is, are) (FOR EXAMPLE: well-circumscribed OR ill-defined) (dark red-brown OR tan yellow, centrally (FOR EXAMPLE: necrotic, scarred, OR has cystic-describe contents if any). The surrounding parenchyma is (FOR EXAMPLE: red-brown and unremarkable. Tissue is submitted for frozen archives as per protocol – include one sample of lesion and a separate frozen sample of uninvolved liver.

Sections are submitted as follows:

1. Perpendicular, inked margin of resection closest to tumor.
2. 1 section of the mass every 1 cm.
3. Section of the mass with adjacent hepatic parenchyma
4. One section of normal liver taken as far as possible from the mass.

V. PANCREAS:

WHIPPLE PROCEDURE



Overview

The Whipple procedure is an en bloc removal of organs usually performed to remove an obstructing lesion involving the head of the pancreas, which may arise in the head of the pancreas, common bile duct, ampulla, or duodenum. The specimen usually consists of proximal duodenum), head of the pancreas, and distal common bile duct (CBD) and in some cases the gastric antrum. The gallbladder may be submitted with the specimen or in a separate container and should be examined as per the gallbladder protocol. The Whipple specimen should be examined carefully to determine the site or origin of the obstruction (ie, usually a tumor located in the duodenal, ampullary, periampullary, distal CBD, pancreatic duct, or head of pancreas region. Whipple specimens should arrive with **blue ink demonstrating the vascular bed** where the superior mesenteric vein/portal vein lies, and **yellow ink indicating the" superior mesenteric artery/uncinate margin"** (henceforth termed the uncinate margin.) The uncinate margin refers to the margin where the pancreatic head is dissected from the retroperitoneal soft tissues, just right lateral along the superior mesenteric artery. Orientation is important. If you have any questions or need assistance,

Ink the **bile duct** green and the **pancreatic duct** yellow (before and re ink after bivalving).

Ink also: **Posterior pancreatic** and posterior pancreatoduodenal = Green.

Anterior pancreatic (and duodenal surface) and anterior pancreatoduodenal = Orange

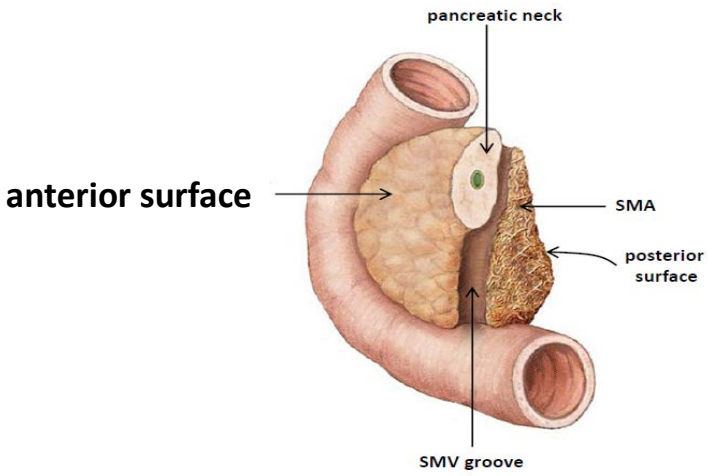
Superior mesenteric/portal vein margin (other color): just in case of a segment of superior mesenteric/portal vein attached to the vascular groove. **DO NOT MISS IT! ---very important**

It looks like either a tubular structure or a small smooth "patch-like" structure adherent to the groove. If a portion of vein is attached, it is critical to document +/- involvement of the vein by tumor. **If a tubular structure** is present, the two ends can be shaved and submitted as margins (see the figure below). **If a patch is present**, do not shave the edges but rather **take section to include perpendicular margins/edges**. Afterward, submit sections the vessel with the vascular

groove. Prior to sectioning, contact the surgeon to confirm that actual portal vein resection has been done if you cannot find the history on the OR report or requisition.

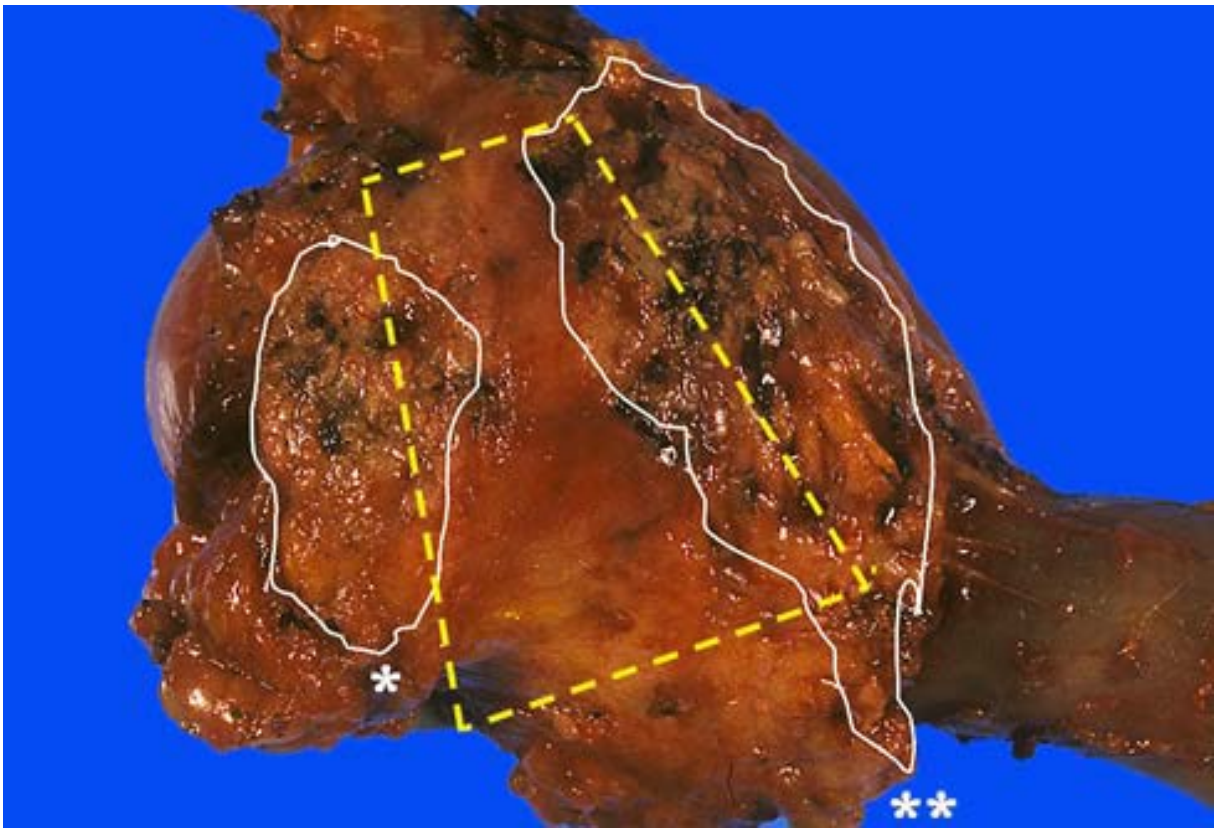
please page the GI Pathology Fellow/attendings. For further reading see **Adsay et al. AJSP 2014;38:480-493].** In some cases, Whipple resections are performed for benign disease (ie., chronic pancreatitis).

Please confirm the clinical suspicion of a tumor (or lack thereof) in the Imaging study and also grossly, and complete the gross examination and sampling accordingly.

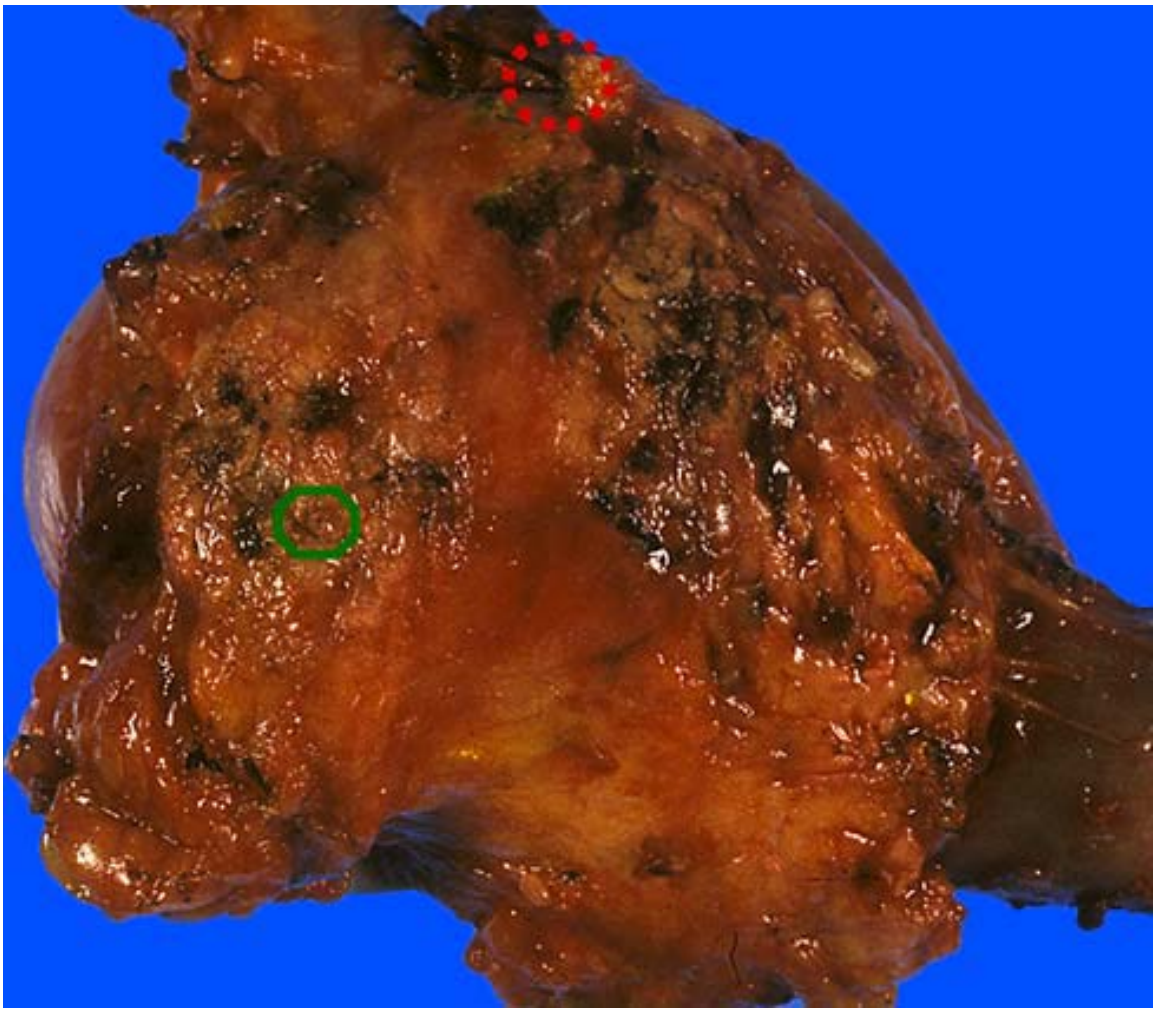


Examination of Specimen

Measure the duodenal length, common bile duct length, and pancreatic head remnant (in three dimensions). Orient the specimen according to the illustrations in Figure 30 and 31, with the duodenum down and the pancreas on top. Identify the “trapezoid” on the postero-median aspect of the pancreatic head, with the (distal) pancreatic neck margin on the left vertical edge of the trapezoid, the uncinate margin, and the concave, smooth firm area in between (the superior mesenteric vein/portal vein margin, submitted with blue ink). Locate the 3 key margins: Pancreatic neck, uncinate, and **common bile duct margin (CBD, located at the upper right quadrant of the pancreatic neck;** may be sutured; see Figure 31). Measure the diameter of the cut pancreatic neck margin and ink the cut pancreatic neck margin.



Laying the duodenum with the pancreas on top readily allows the identification of the “trapezoid,” located in the postero-median aspect of the pancreatic head. The left vertical edge of the trapezoid is formed by the pancreatic neck margin* (often cauterized, relatively flat and reveals fine granularities) and the right vertical edge by the uncinate margin** (elongated, relatively soft and convex with highly irregular/nodular appearance; submitted with yellow ink). A concave-shaped, smooth surfaced, relatively firm area in between these 2 margins is the vascular bed, where the superior mesenteric vein/portal vein (inked blue) and superior mesenteric artery lie originally. [Source: AJSP 2014; 38:480-493].



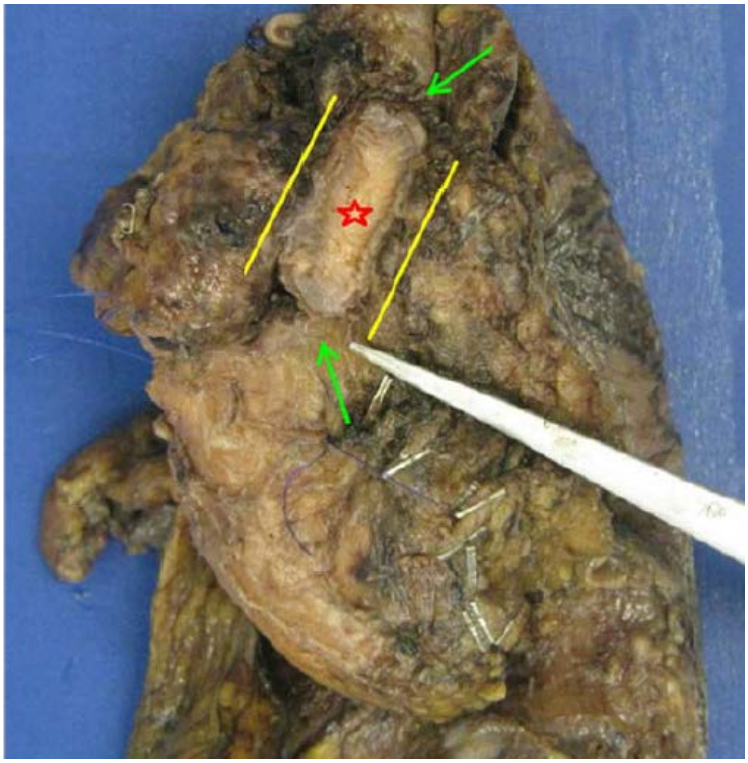
The pancreatic duct orifice (green circle), usually located in the upper right quadrant of the pancreatic neck, may be difficult to identify because of its small size. The CBD orifice (red dashed circle) is located at the plateau at the upper right edge of the uncinate margin. It is much larger than the pancreatic duct and should be identifiable in every case. If it has been stitched surgically, the removal of the stitch would make it readily accessible. [Source: AJSP 2014; 38:480-493].

The optimal dissection and sampling strategy will depend in part on the initial gross examination. For example, if a gallbladder is attached the biliary margin would be the common hepatic duct margin. If the tumor arises from the common bile duct, one should ink the soft tissue surrounding the duct.

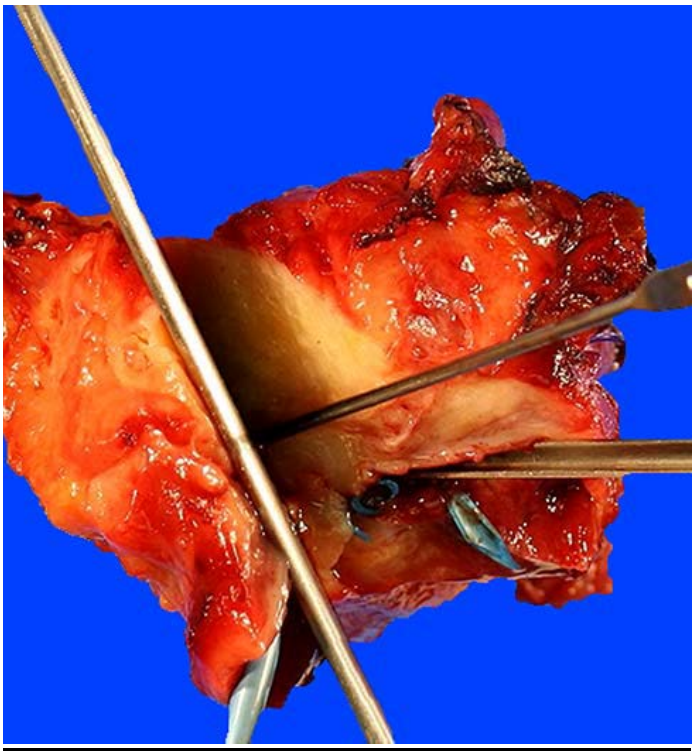
Sample the key margins as follows:

1. **CBD margin: shave and submit en face** (Ink Green)
2. **Pancreatic neck margin: shave and submit en face.** If the tumor is very close to the distal margin, ink the margin, shave and submit perpendicular sections “on edge”.

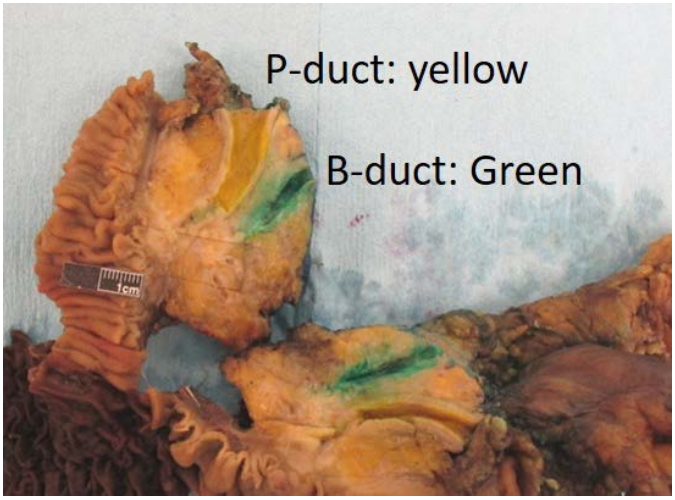
3. **Uncinate margin (black): Shave a 3-5mm slice, then bread-loaf and submit entirely** as a perpendicular margin (may require multiple cassettes)
4. Superior mesenteric/portal vein margin (other color): just in case of a segment of superior mesenteric/portal vein attached to the vascular groove. **DO NOT MISS IT! ---very important.** It looks like either a tubular structure or a small smooth "patch-like" structure adherent to the groove. If a portion of vein is attached, it is critical to document +/- involvement of the vein by tumor. **If a tubular structure** is present, the two ends can be shaved and submitted as margins (see the figure below). **If a patch is present**, do not shave the edges but rather **take section to include perpendicular margins/edges**.



The resection margins of the vein (yellow lines) could be ends of the segment (green arrows). The intimal surface of the vessel (red star) is not a true margin.



This image illustrates the bivalving of the pancreatic head after both ducts are probed. There is also a stent (blue) in the CBD. With every cut made, the prosector re-checks whether both ducts are still in the same plane. In this case, the knife would have to be re-angled to re-include the CBD. [Source: AJSP 2014; 38:480-493].



Ink the bile duct green and the pancreatic duct yellow (after bivalving).

Summary:

Identify the proximal and distal enteric margins and take shave margins.

Open the specimen along the anterior wall of the pylorus and down the lateral edge of the duodenum (ie. edge away from the ampulla and pancreas). Measure the pyloric/gastric segment and note any abnormalities of the mucosa or wall. Examine the duodenal mucosa and note any lesions (especially around the ampullary region). Palpate the area around the ampulla and head of the pancreas and note any firm areas. If an ampullary tumor is present, review the CAP Tumor template on ampullary tumors. Evaluate the accessory ampulla, usually located approximately 2cm proximal and slightly anterior to the papilla of Vater. Mucosal abnormalities and/or tumor involvement of the duodenum, ampulla, or accessory ampulla should be described, photographed, and sampled.

The specimen should next be inked over all remaining surfaces, including the anterior free surface and posterior retroperitoneal surface of the pancreas. These surfaces are covered by serosa and authorities debate whether they should be considered true margins. Your job is to document their involvement or lack thereof. Next, search for lymph nodes. This task is more easily completed prior to dissection of the head of the pancreas. After the margins have been removed, the soft tissues covering the pancreas are shaved off for identification of lymph nodes. For tumor cases, examine and entirely submit all soft tissue fragments even if no lymph nodes are identified grossly, in attempt to identify any microscopic lymph nodes. If there is no tumor suspected clinically or identified grossly, sample grossly identifiable lymph nodes only (ie., do not submit all of the peripancreatic soft tissue in chronic pancreatitis.)

At this point, a decision must now be made as to what plane the remainder of the specimen should be sectioned. **There are various approaches**, each with advantages and disadvantages. Return to the common bile duct and try to pass a probe though it, exiting at the ampulla. This may not be possible in a specimen that has been fixed overnight. Palpate the duct and note any areas of firmness. Next, identify the main pancreatic duct. This can be done via the ampullary (duodenal) side or the pancreatic (resected) side. Place a probe in the duct and try to advance it though the ampulla. If an obstruction is present, note its general location. In a small percentage of patients, the main pancreatic duct will exit though an accessory papilla and not have a direct connection with the ampulla. Bivalve the pancreatic head along the two probes all the way to the ampulla for the CBD, and as far as possible for the pancreatic duct. The bi-valved pancreatic head will now show a cut surface revealing both ducts along their lengths and the ampulla. Assess for tumor location in relationship to both ducts and to the ampulla (Figures 33-35). Record the tumor s**ize**, **location**, **color, consistency**, and **distance to all margins**. If the lesion extends into adjacent structures (eg. soft tissue or another organ) note this and document histologically. Also describe **any other pancreatic abnormalities including fibrosis, cysts (size, location, and specify if there is communication with main pancreatic duct**), fat necrosis or calculi.

The ampulla is not covered by the pancreas at the pancreaticoduodenal junction (groove), where ampullary tumors often invade into the periduodenal soft tissues and duodenal serosa without having to go through the pancreas. Therefore, for proper staging of ampullary tumors in this plane, it is important to ink the serosa at the groove area and take perpendicular sections (from tumor to the serosa) to document the tumor spread to this region.

Also please photograph all Whipple specimens. For specimens with tumor, take a photo of the tumor in relation to nearby structures.

Sample Dictation for Whipple procedure:

Received (**fresh/fixed**) is an en bloc resection of organs from a Whipple procedure. The specimen consists of (a portion of stomach which measures __ cm along the greater curvature and __ cm along the lesser curvature, and __ cm length of pylorus,) a __ cm length of distal common bile duct, a __ cm length of duodenum, and a __ x ___ x ___ cm remnant of attached pancreas. The gallbladder (is/is not) present (DESCRIBE THE GALLBLADDER IF PRESENT). Examination of the specimen reveals a (duodenal/ampullary/periampullary/pancreatic/common bile duct) mass which measures __x ___x___cm. The mass is (DESCRIBE THE MASS) and (causes/does not cause) obstruction of the (main pancreatic duct/ampulla of Vater.) The mass is located __ cm from the pancreatic neck margin, ___ cm from bile duct margin, ___ cm from uncinate, __ from vascular groove, ___ cm from anterior pancreatic aspect, ___ from posterior pancreatic aspect, ____ from proximal (gastric margin) and ____ from distal (duodenal) margin.

The pancreatic duct diameter at the cut pancreatic neck margin measure __ cm. The mass is __ cm from the ampulla of Vater. The tumor (**does**) grossly involve the (FOR EXAMPLE: duodenum, anterior/posterior aspect of the pancreas, pancreatic duct and bile duct). Tumor (**does not**) involve the (FOR EXAMPLE: duodenum, anterior/posterior aspect of the pancreas, pancreatic duct and bile duct).

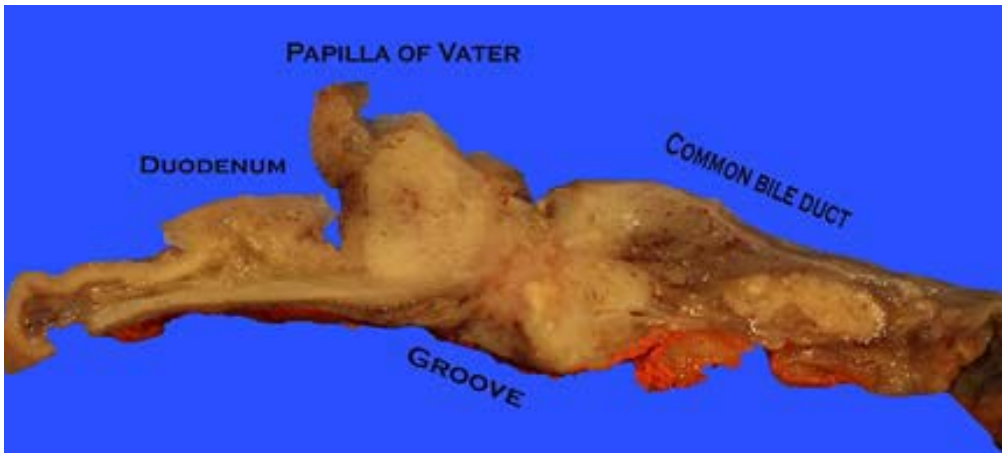
The lesion **(appears confined/does not appear confined)** to the (FOR EXAMPLE: pancreas/common bile duct/duodenum). The distal common bile duct (**is not/is**) obstructed by the mass.

The common bile duct (**is unremarkable/describe lesion**). The gastric wall (**is not thickened/is thickened**) and measures __ cm in maximal thickness (**or describe other abnormalities**). The duodenal mucosa (**is unremarkable/describe lesion**). Sectioning of the surrounding peripancreatic fibroadipose tissue reveals multiple lymph nodes, ranging in size __ to __ cm

Also please photograph all Whipple specimens. Sections are submitted for microscopic evaluation:

1. CBD margin: shave and submit en face
2. Pancreatic neck margin: shave and submit en face**. If the tumor is very close to the distal margin, ink the margin, shave and submit perpendicular sections "on edge".**
3. Uncinate margin (yellow): Shave a 3-5mm slice, then bread-loaf and submit entirely as a perpendicular margin (may require multiple cassettes)

4. Superior mesenteric/portal vein margin (blue): Shave, bread-loaf, and submit entirely as a perpendicular margin
5. Proximal (**gastric or duodenal** margin) of resection (shave)
6. Distal duodenal margin of resection (shave)
7. Representative sections of tumor (showing anatomic relationships to pancreas, ampulla, common bile duct, duodenum, anterior free surface, posterior retroperitoneal free surface, and additional margins as appropriate)
8. Duodenum, groove, ampulla, and common bile duct. (see below picture)
9. Duodenum, groove, ampulla, and pancreatic duct. (see below picture)
10. Lymph nodes and peripancreatic soft tissue submitted entirely.
11. Plus any other abnormalities including extra-pancreatic spread of tumor



For ampullary/periampullary lesions: so-called "GROOVE SECTION" The ampulla is not covered by the pancreas at the pancreaticoduodenal junction (groove), where ampullary tumors often invade into the periduodenal soft tissues and duodenal serosa without having to go through the pancreas. Therefore, for proper staging of ampullary tumors in this plane, it is important to ink the serosa at the groove area and take perpendicular sections (from tumor to the serosa) to document the tumor spread to this region. At least two groove sections…..submit them rountinely: 1. Duodenum, groove, ampulla, and common bile duct. 2. Duodenum, groove, ampulla, and pancreatic duct.

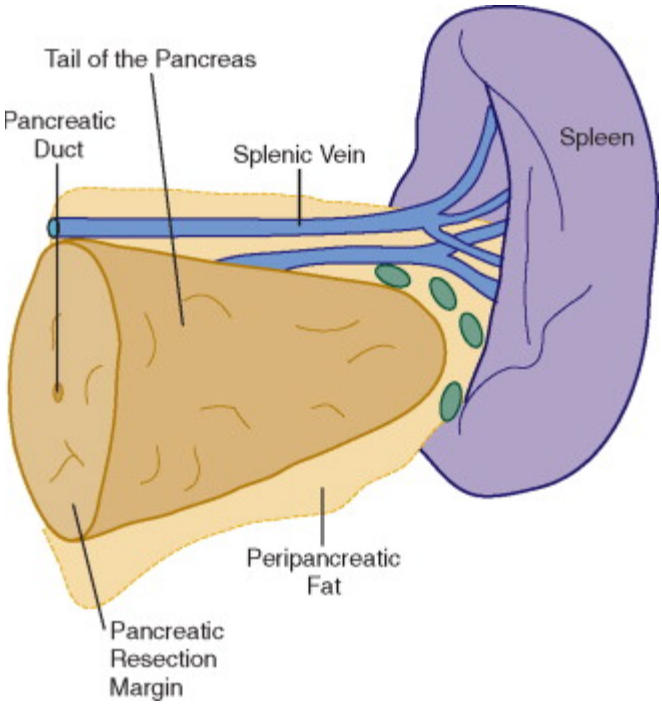
DISTAL PANCREATECTOMY

1. State the overall specimen makeup and measure components in cm (distal pancreatectomy +/- splenectomy +/- other)
2. Take a thin shave margin of the proximal pancreatic margin (may have been done at the frozen desk.) If tumor is close to proximal margin, ink and submit as a perpendicular margin "on edge."

3. Identify the main pancreatic duct and measure the main pancreatic duct. Indicate the pancreatic duct diameter at the cut pancreatic neck margin in the gross description.
4. Diameter or circumference. Make a fresh cross section through the proximal pancreas to better identify the duct. To differentiate the main duct from a blood vessel, blot the cut surface with a paper towel and gently squeeze the pancreas in this region: if clear mucus exits the tubular structure in question, you have found the main pancreatic duct!!; if blood escapes, it is very likely you have found only a vessel. Measure the diameter of the cut pancreatic duct at the proximal pancreatic margin. Place a probe in the duct and try to advance it through the distal pancreatic tip. If an obstruction is present, note its general location. After cannulating the main pancreatic duct, fillet the pancreas open longitudinally along the duct by keeping the blade of your knife directly on and along the metal probe within the duct. Describe the main duct once the pancreas is filleted open.
5. If there is a cystic tumor of the pancreas, describe whether it communicates (connects) with the main pancreatic duct or appears to be separate (non-communicating). This gross aspect is an important part of the differential diagnosis between 1) a mucinous cystic neoplasm with mesenchymal stroma (which is non-communicating and usually also solitary and in the pancreatic tail) and 2) an intraductal papillary mucinous tumor of pancreas (which is communicating and usually involves the ductal system multifocally or diffusely).
6. Record the tumor size, color, consistency, and distance to the proximal pancreatic parenchymal margin of resection and to the peripancreatic soft tissue margin. If the lesion extends into adjacent structures (e.g. soft tissue or another organ like the spleen or colon) note this and document by submitting sections. Also describe any other pancreatic abnormalities including fibrosis, cysts, fat necrosis or calculi.
7. Finally, a search for peripancreatic lymph nodes is mandatory. Unless specifically oriented and requested by the surgeon, no specific anatomic regions of the specimen need to be dissected and separately submitted. Transect off the entire inked peripancreatic fibrofatty tissue and submit entirely.
   NOTE: It is difficult to impossible to grossly separate lymph nodes from peripancreatic fat lobules or pancreatic lobules in pancreatic resection. For this reason, cut off and submit the entire inked fibrofatty margin and peripancreatic tissue. There are characteristically many more lymph nodes using this technique than you can separately identify and dissect visually or by palpation.

- If present, weigh the spleen and serially section at 1 cm intervals. Describe any lesions or state if uniform. Sample any gross lesions and take 1 section of unremarkable spleen.

Splenic vessels run along the longitudinal axis of the distal pancreas: submit some sections of splenic vessels, in which there may be tumor thrombus (the cause of sinistral portal hypertension), with/without pancreatic section. Submit splenic vein margin if you can find it.



Sections to submit (Distal Pancreatectomy):

NOTE: Take all margins and benign sections first to avoid tumor contamination.

Fixed Sections:

1. Proximal pancreatic parenchymal inked margin (shave, submit en face)
2. Representative block of spleen

4-7. Representative sections of tumor (including sections showing relationship to main duct, and inked peripancreatic soft tissue surface).

8-20+ All of transected peripancreatic inked soft tissue to identify all of the lymph nodes (see discussion above).

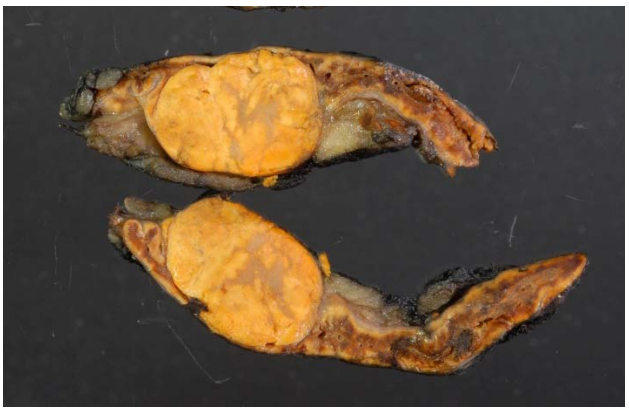
ADRENAL GLAND

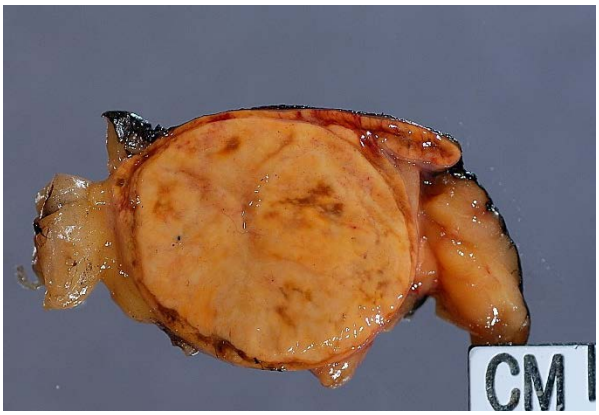
Ink the adrenal specimen before stripping the fat!

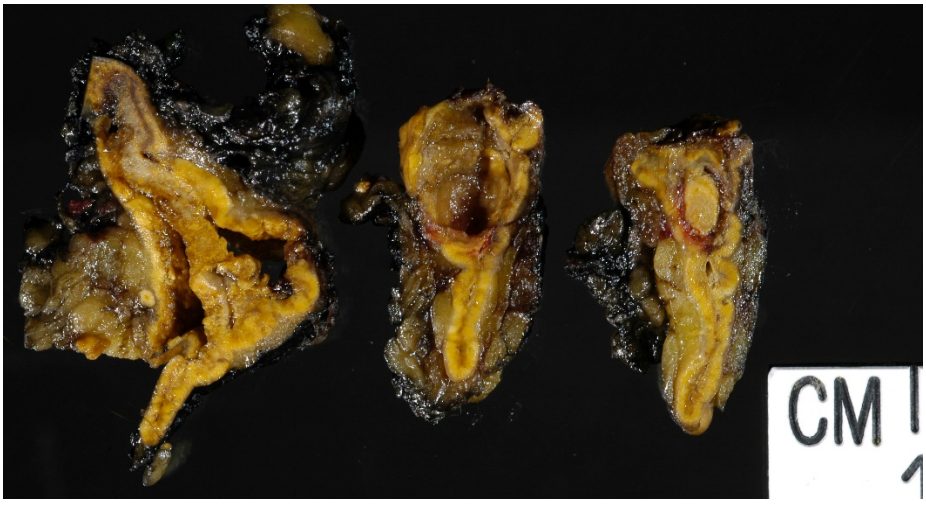
ADRENAL CORTICAL ADENOMA

Gross: The specimen consists of an adrenal gland with ovoid tissue mass measuring ___x___x___cm. and weighing ____gms after dissecting off the fat. Along one aspect is stretched a segment of recognizable adrenal measuring ___x___x___cm. The mass (is, is not) encapsulated, (brown, yellow), and moderately firm. On cross-section, the mass bulges and (is, is not) somewhat lobulated. Foci of (hemorrhage, necrosis, cystic degeneration) (are, are not) present. The segment of adrenal tissue stretched over the mass shows yellow, cortical tissue and virtually no medullary component. A photograph (is taken). **One section is taken per cm of tumor diameter up to 5 cm. If greater than 5 cm, submit one section per 2 cm of tumor.** At least 1 section of normal adrenal is submitted. Take sections including the inked margin!!!!

Make sure to describe the background adrenal cortex as either normal, nodular, thickened, etc….



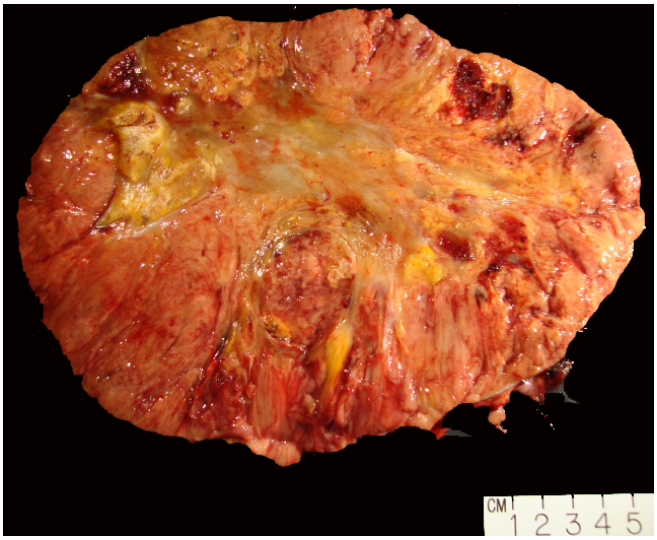


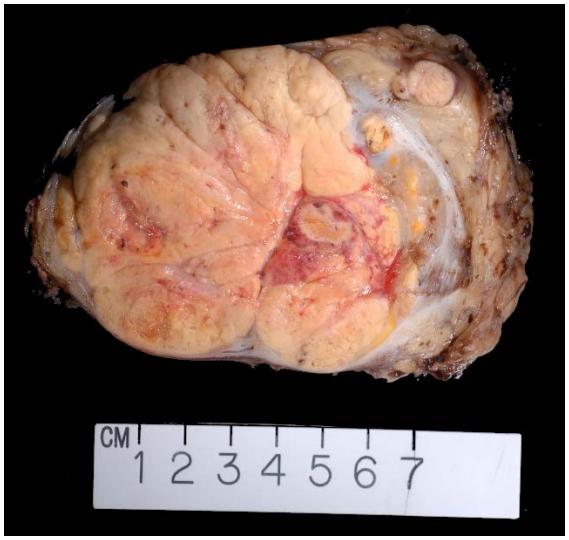


MALIGNANT ADRENAL TUMORS

Gross: The specimen consists of an (ovoid, irregular) tissue mass measuring ___x___x___cm. and weighing ___gms after dissecting off the fat. The mass appears _____ (encapsulated, unencapsulated) and (is, is not) surrounded by adipose tissue. The external surface is of ____color. The external surface is inked with _____ ink. On cut section there (is, is not) encapsulation. Recognizable adrenal gland (is, is not) present and is located along one aspect of the mass. The mass is variegated and comprised of (yellow, white, red, hemorrhagic, gray, necrotic, calcific) tissue. Areas of necrosis measure ____cm. in greatest dimension. The tumor (does, does not) extend through the capsule. Vascular invasion (is, is not) identified. A photograph is taken.

Representative sections should be taken involving all types of tissue (e.g., hemorrhagic, yellow, red, necrotic, calcified). **As a rule of thumb, one section should be obtained per centimeter of maximum dimension up to 5 cm. with an additional slide for every 2 cm. above that.** A significant number of the sections should include the inked capsular surface.

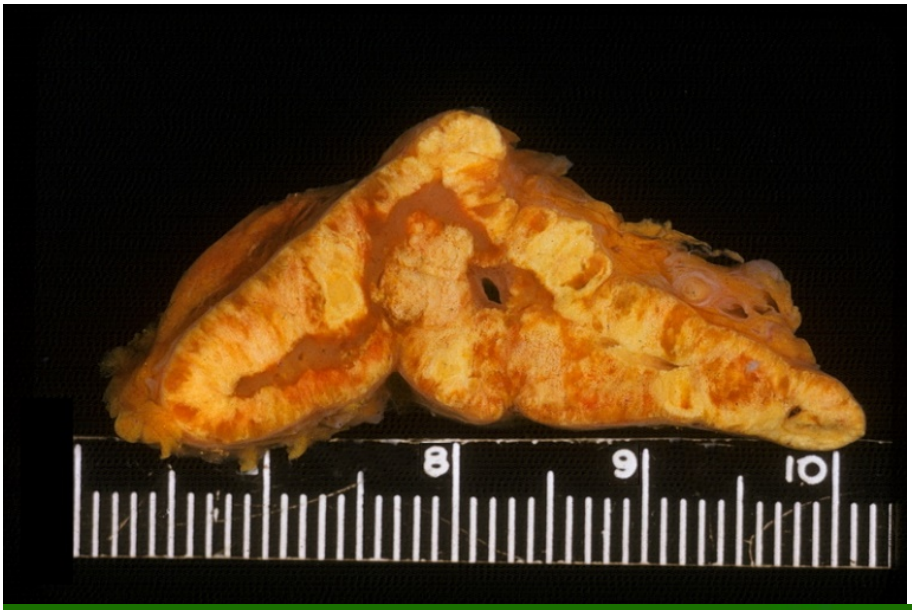


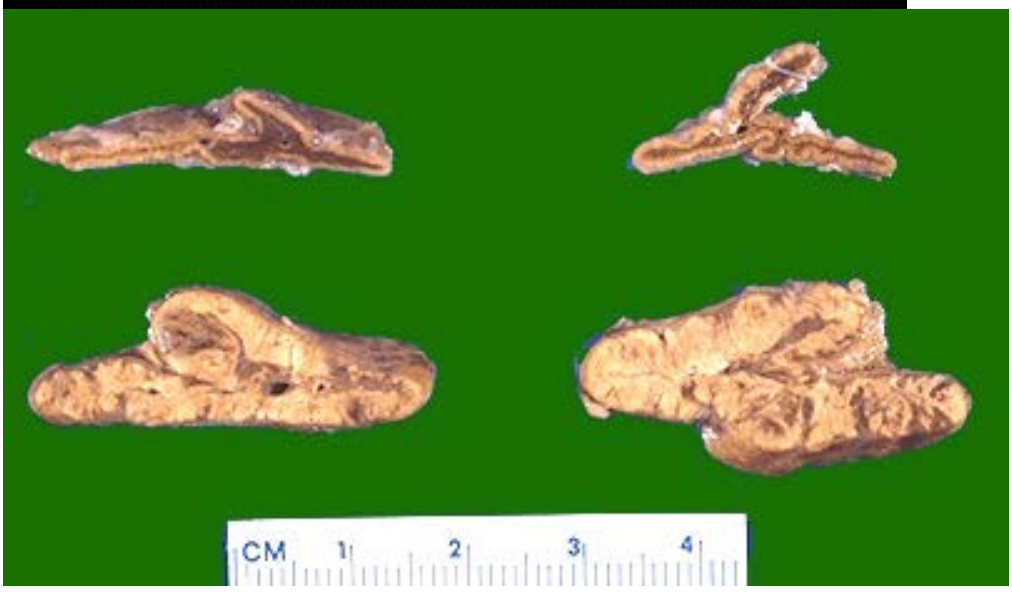


NODULAR ADRENAL CORTICAL HYPERPLASIA

Gross: The specimen consists of an adrenal gland measuring ___x___x___cm. and weighing _____grams after complete stripping of periadrenal fat. Normal adrenal outline is present, but the external surface has a knobby appearance and on cross-section, the adrenal cortex is (yellow, tan, ___), (coarsely nodular or increased to a thickness up to ___cm). Nodules measure up to ___cm. in greatest diameter and are of ____ color. Multiple transections reveal scant medullary tissue. A photograph is taken.
Representative sections are submitted. **1 per gram of tissue up to a maximum of 4 sections**. Discuss the number of sections with the staff pathologist about this.

If adrenal cortical hyperplasia has been diagnosed clinically, both glands will be removed.



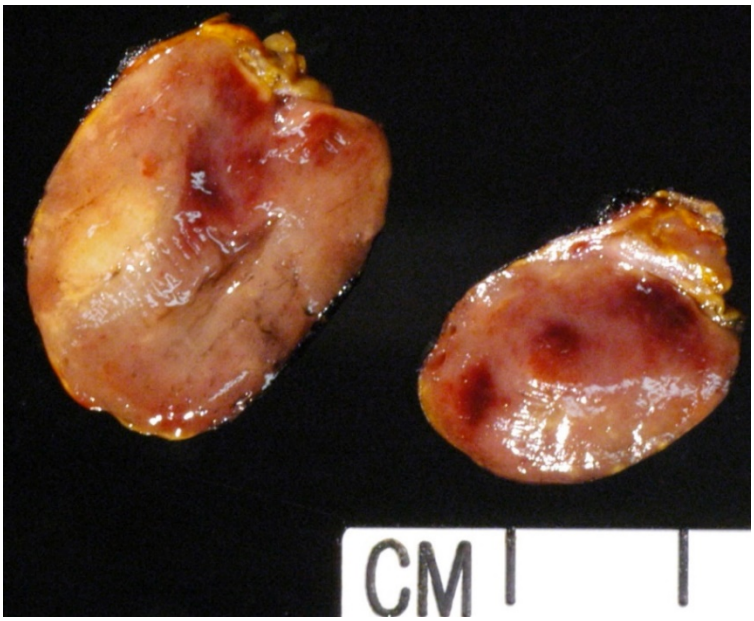


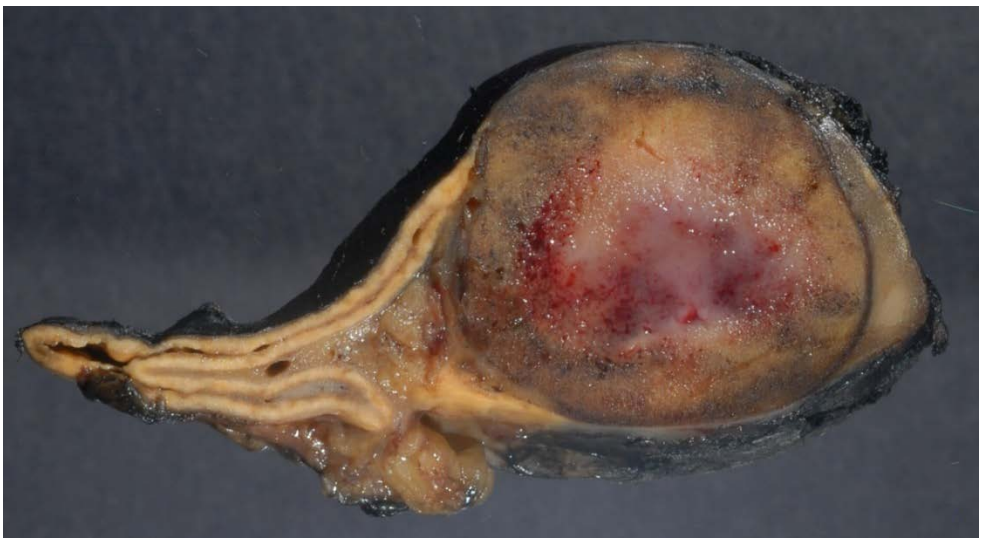
PHEOCHROMOCYTOMA

Gross: The specimen consists of an ovoid tissue mass measuring ___x___x___cm and weighing ____gms. Externally, the lesion appears encapsulated and is (rubbery, firm) and is (pale gray, pink to dusky brown). Cross section reveals the sharply circumscribed nature of the lesion, presenting a slightly bulging cut surface. Cystic spaces (are, are not) present and measure up to ___cm. in greatest diameter. The lesion is 3 mm from (or approaches) the inked margin of resection. The specimen is submitted in formalin. **1 section/cm of maximum dimension up to 5 cm. 1 section per 2 cm above this.**

Make sure to describe the background adrenal cortex (normal, nodular, thickened)

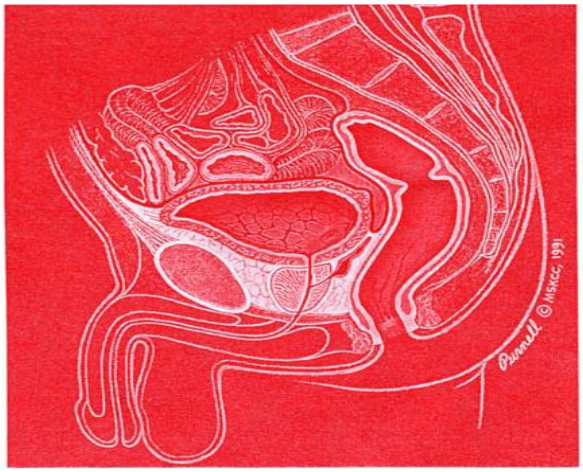
Take sections including the inked margin!!!!

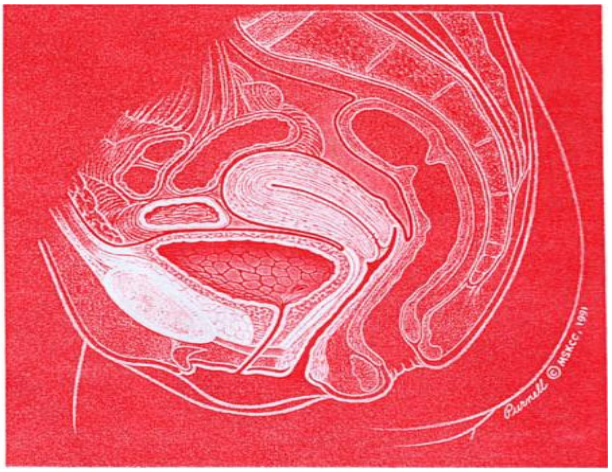




BLADDER

TOTAL CYSTECTOMY (MALE and FEMALE)

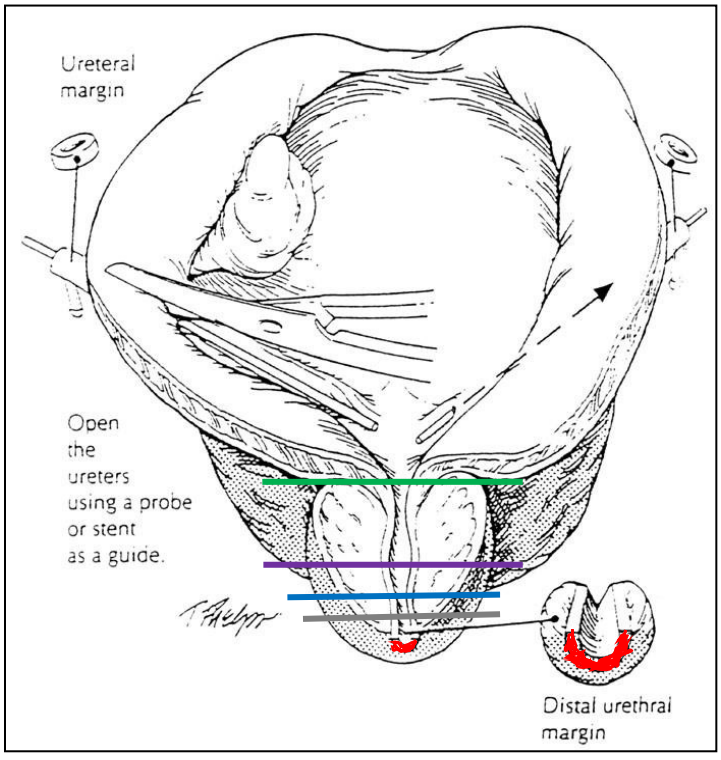


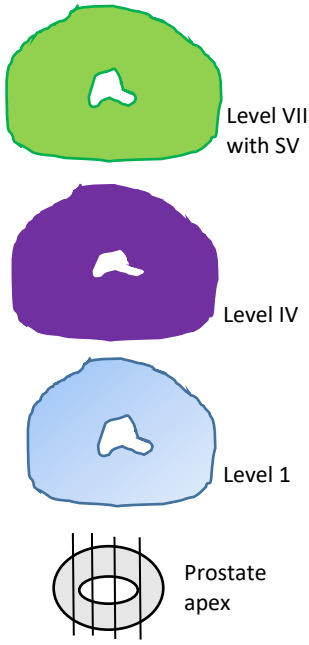


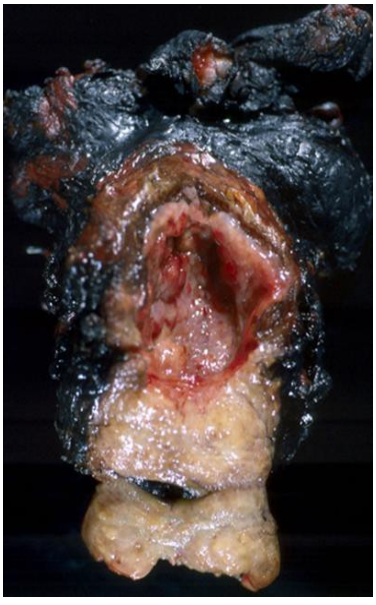
Staging of primary tumor requires documentation of depth of invasion (invasion to lamina propria, muscularis propria or perivesical adipose tissue, macroscopically or microscopically) and involvement of surrounding anatomical structures (prostate, pelvic wall and abdominal wall).

Evaluation of regional lymph nodes requires documentation of # of lymph nodes and size of biggest involved lymph nodes.

If a prostate gland is received with the specimen, it should be handled the same way as a radical prostatectomy.







Day #1 - It is responsibility of the resident or PA on GU to obtain distal urethral margin and ureteral margins. **Distal urethra should be teased out and a shave margin should be obtained (this should look like a small circle)**. These margins should be placed in cassettes that will be submitted the following day when the remainder of the specimen is processed. The bladder is then inked and opened along anterior aspect just above the prostate. If a mass is identified (see above), a sample of fresh tumor should be banked. Prostate should be inked according to RP protocol. Lumen of bladder should be filled with formalin-soaked gauze, and specimen should be put back in its container and allowed to fix in formalin overnight.

Day #2 - Gross dissection of bladder and prostate.

Gross: The specimen consists of a urinary bladder, bilateral ureters, prostate and attached seminal vesicles and vas deferentia. The bladder measures _x_x_cm. The exterior surface of the bladder is covered by a smooth serosal lining at the dome and fibroadipose tissue at the remaining portion. After the bladder is opened (see above), a (mass, ulcer) measuring _x_x_cm is identified in the (trigone, dome, R or L wall). The mass is (papillary, solid, ulcerated). On sectioning, the mass extends _cm into the bladder wall and (not) through the muscularis propria. (describe what structures the mass involves: mucosa, lamina propria, muscularis propria (detrusor muscle), adipose tissue). It appears (not) to involve the perivesical adipose tissue. The mass does/does not approach the inked line of resection. The remaining bladder mucosa is (unremarkable, edematous). A segment of right ureter is _cm. It is (patent, cannot be probed). Its mucosa is _. A segment of left ureter is _cm. Its mucosa is _. It is (patent, cannot be probed). Lymph nodes should be examined so the total number of lymph nodes can be tallied.

The prostate measures _x_x_cm craniocaudally, anterior-posteriorly and transversely. The capsule surface is (smooth, irregular). The gland is inked XX on the right and YY on the left and sectioned from apex to base transversely at 3 mm intervals perpendicular to the urethra. The cross sections (do, do not) reveal a mass lesion that measures __cm in greatest dimension. The mass (does, does not) extend to the periphery of the specimen in the (right, left, anterior, posterior, basal, mid, apical) portion of the gland. Other firm masses measuring up to __cm in greatest dimension (are, are not) present. Rubbery nodularity (is, is not) present. The seminal vesicles are __(unremarkable). Segments of vas deferens are unremarkable.

Sections submitted:

1 - Distal urethral mucosal margin.
2 - Bilateral ureteral margins (only if no frozen sections were taken; **if ureteral margins were already taken as frozen sections, DO NOT TAKE ADDITIONAL ureteral sections**).
3 - Representative sections of bladder neoplasm including maximum extent of invasion and closest deep margin.
4 - If tumor involves contiguous organs (uterus), there should be additional description and representative sections to demonstrate relationship of tumor and adjacent organs.
5 - Random sampling of bladder mucosa from different anatomic sites, such as dome, anterior, posterior, right and left walls and trigone.
6 - Apical margin of prostate (**amputate prostate apex of, bread-loaf it and totally submit it**)
7 - Submit entire **Level I** and **Level II** of prostate
8 - Submit **Level V** (mid portion) of prostate

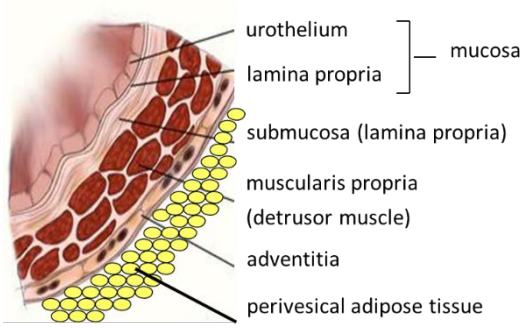
9 - Submit **Level 7 or 8** (base of prostate)
10 - Submit representative sections of both seminal vesicles.
11 - Lymph nodes should be examined so the total number of lymph nodes can be tallied.
If the specimen is a pelvic exenteration, it may include gynecologic organs (uterus, cervix, vagina, tubes, ovaries) and/or rectum and anus. In this case, the vaginal cuff margin and anal or rectal margins need to be taken, as well as routine sampling of these additional organs, including sections demonstrating tumor involvement.

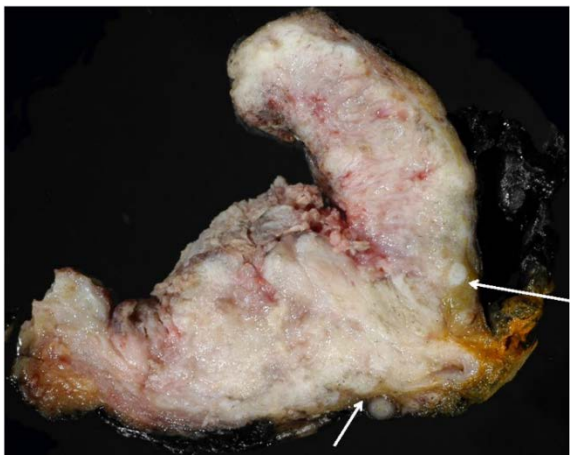
Noninvasive papillary tumor

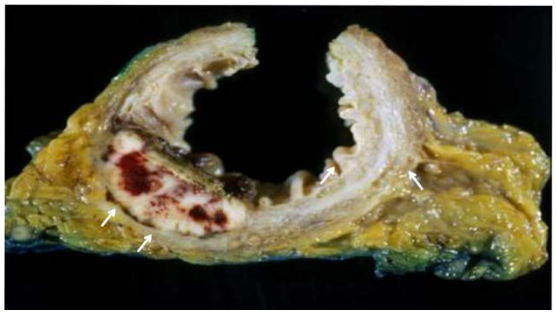
Invasive papillary tumor

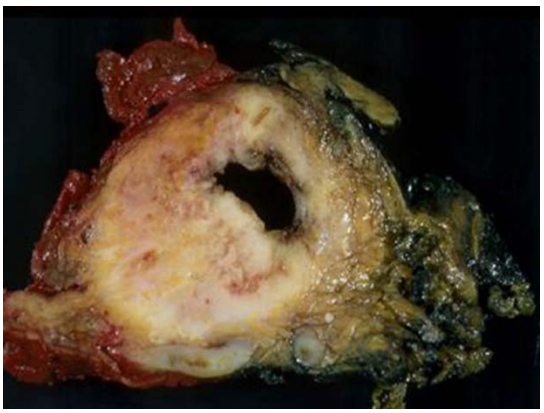
Flat noninvasive tumor (carcinoma in situ [CIS])

Flat invasive tumor







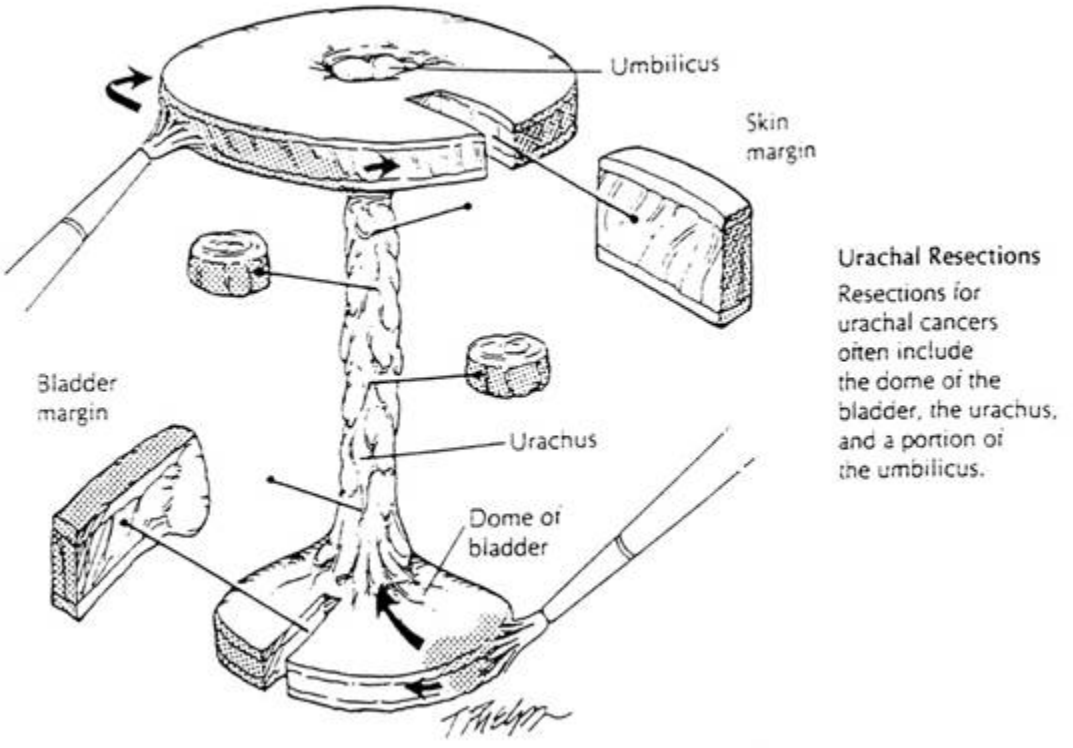


Partial Cystectomy for Cancer

Partial cystectomies are rarely done and are usually confined to localized dome tumors. Urachal tumors are unusual specimens in that the specimen will usually contain the **urachus** and sometimes the **umbilicus**. Peripheral <u>margins of bladder mucosa and serosa should be inked</u>.

- Peripheral bladder margins should be taken as:
    - shave if tumor is grossly far away from margin
    - perpendicularly **(at least 3 submitted in separate cassettes)** if tumor is close to (within 5 mm of) margin of resection

- Cross sections of urachus and perpendicular section of umbilicus should also be taken.
-

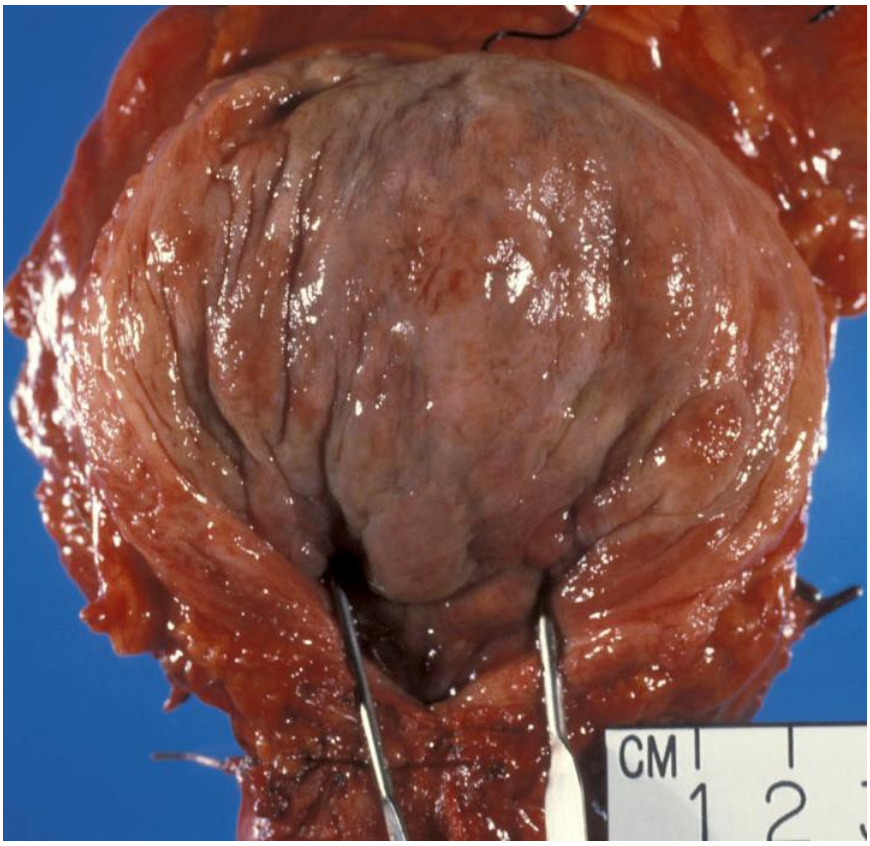


The specimen consists of a portion of bladder stated to be from the (bladder dome, other). The portion of bladder measures ___x___ cm to a depth of ___ cm. Adjacent to the bladder is abundant adipose tissue measuring ___x___x___cm. It (does, does not) culminate in an umbilicus measuring ___ cm in maximum dimension. Within the wall of the bladder there is a ___x___ cm firm area. It (does, does not) extend through the bladder wall into perivesical adipose tissue. The fibroadipose tissue is serially sectioned and (does, does not) contain firm tissue. Representative sections of peripheral margin of bladder including mucosa are labeled _____. Sections of the neoplasm are labeled ____. Sections of the perivascular fibroadipose tissue in the region of the urachus are labeled _____. Sections of umbilicus are labeled _____.

Cystectomy for Benign Disease

The specimen consists of a bladder with attached segments of ureter. The bladder measures __x__ cm in greatest dimension. A smooth serosal lining and fat covers the dome of the bladder. The specimen is opened anteriorly to the dome of the bladder. The mucosal surface is _____ color (and is ___ in appearance) (please describe any gross lesions, noting their size and location). The segment of right ureter measures ___ cm in length. It (is patent, cannot be probed). Its mucosa is _____. The segment of left ureter is ___ cm in length. The mucosa is _____. It (is patent, cannot be probed).

Representative sections of all gross lesions should be obtained incorporating them into the six sections from right and left lateral wall, anterior wall, posterior wall, dome, and trigone.

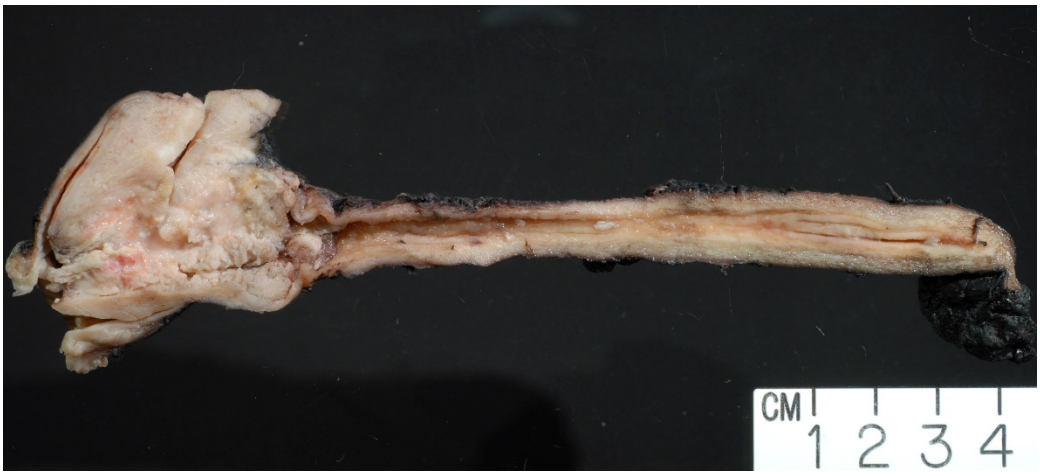


URETHRECTOMY SPECIMEN

Urethrectomies are usually submitted in patients with urothelial carcinoma of the bladder and/or prostate and/or prostatic urethra. The extent of the neoplasm should be indicated. The specimen should be carefully oriented. If the prosector cannot orient it, call the surgeon. The proximal margin will include muscular tissue of the urogenital diaphragm and may contain Cowper's glands. The distal margin may include the distal urethral orifice. The specimen is tubular and is surrounded by corpus spongiosum.

The specimen should be opened longitudinally and pinned on a paraffin block. The entire mucosal surface should be inspected for lesions which may be single or multiple. The size, distribution, color and growth pattern should be indicated. A lesion may not be grossly visible, particularly an in-situ urothelial carcinoma, which may predominantly or exclusively involve the submucosal glands of Littre.

If a gross lesion is present it should be cross-sectioned and submitted in its entirety. If no gross lesions are present the urethra should be totally cross-sectioned at approximately 2-3 mm intervals. Sections should be numbered so that their location can be identified**. If there is no gross lesion, sections should be obtained at a rate of one section per two cm of urethral length, including proximal and distal margins. Margins should be taken as shave margins, unless the tumor is within 5 mm of the margin, in which case perpendicular sections (3) should be taken at the areas of closest approach.** If further sections are needed the prosector should be able to go back to particular areas (that means that the remaining specimen should be stored in an orderly fashion).



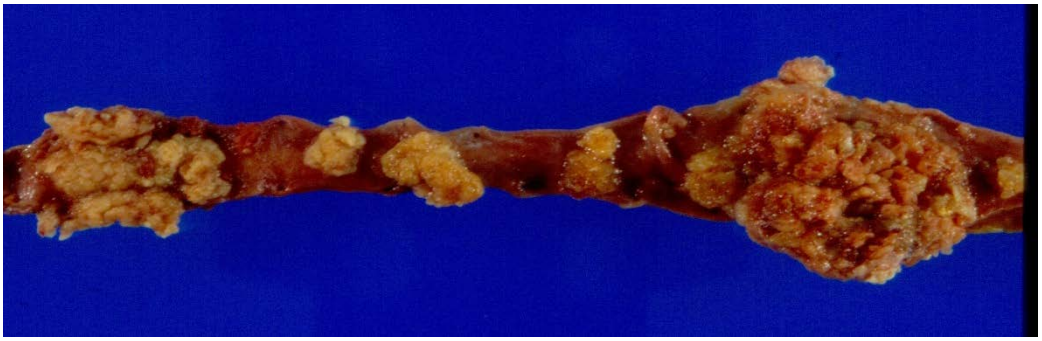
URETERECTOMY SPECIMEN

Ureterectomy specimens (partial excision) are submitted in patients with urothelial carcinoma of the ureter. The specimen is tubular and is surrounded by soft tissue. The distal margin may include a portion of bladder cuff.

The specimen should be inked, opened longitudinally and pinned on a paraffin block. The entire mucosal surface should be inspected for lesions which may be single or multiple. The size, distribution, color and growth pattern of the lesion/s should be indicated. A lesion may not be grossly visible, particularly an in-situ urothelial carcinoma.

If a gross lesion is present, it should be cross-sectioned and submitted in its entirety. Proximal and distal margins should be obtained as shave margins, unless the tumor is within 5 mm of the margin, in which case perpendicular sections (3) should be taken at the areas of closest approach.

If no gross lesions are present the segment of ureter should be totally cross-sectioned at approximately 2-3 mm intervals. Sections should be numbered so that their location can be identified. Proximal and distal margins should be obtained as shave margins**. If there is no gross lesion, sections should be obtained at a rate of one section per two cm of ureteral length, including proximal and distal margins.** If further sections are needed the prosector should be able to go back to particular areas (that means that the remaining specimen should be stored in an orderly fashion).



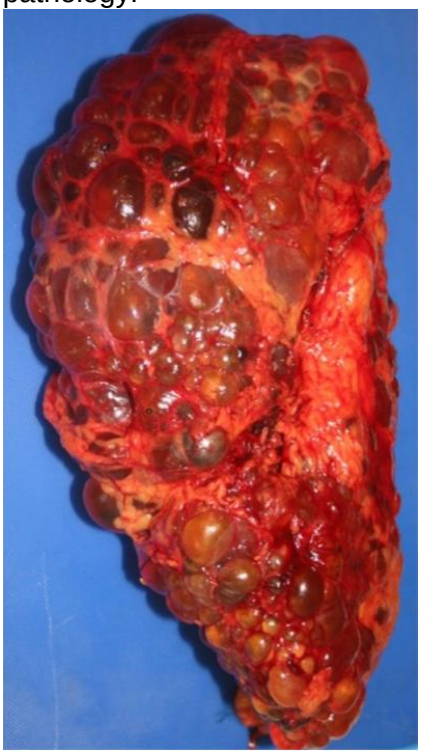
KIDNEY – NON-NEOPLASTIC

CYSTIC KIDNEY DISEASE

There are a variety of cystic diseases of the kidney. Sometimes a single kidney will be removed and sometimes two kidneys will be removed. It is important to evaluate the configuration, to weigh, and measure the kidney. In some cases areas of autosomal dominant (adult) polycystic kidneys, especially, there should be careful evaluation of tumor.

Gross: The specimen consists of a (kidney-shaped, grossly irregular organ), which measures __x__x___ cm and weighs ___ grams. An irregular envelope of fibroadipose tissue surrounds the specimen. Cystic structures are (evident, not evident). On sagittal sections cysts are (irregularly distributed throughout the renal parenchyma, extending in a radial fashion from the hilum to the capsular surface uniformly throughout the kidney, confined to a portion of the kidney). The cysts measure up to ___ cm in maximum dimension. Multiple cross sections (do, do not) demonstrate the presence of a mass. Representative sections are submitted. The renal artery is sectioned and contains atherosclerosis. The renal vein is sectioned and contains thrombus.

In the absence of a lesion suspicious for neoplasm, approximately six sections should be obtained, including sections of cortex and medulla. As in all nephrectomy specimens, blood vessels, pelvis and ureter should be sectioned. Submit sections of renal artery and vein with any pathology.

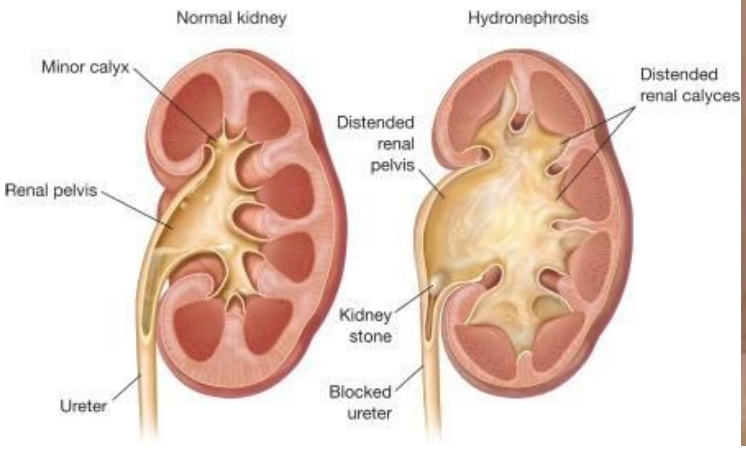


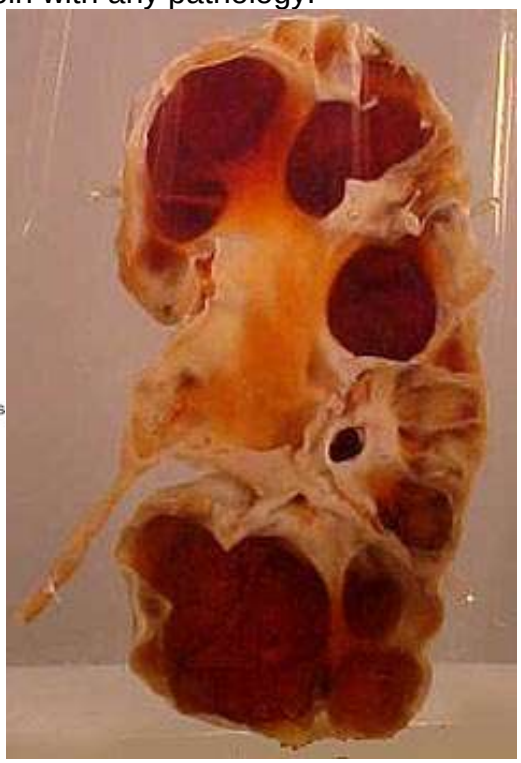
CHRONIC PYELONEPHRITIS/HYDRONEPHROSIS

The specimen consists of a (right, left) kidney measuring __x__ cm and weighing __ gm. The capsule is (tightly, loosely) adherent and the subcapsular surface contains (flat, broad-based, U-shaped) depressions. The cortical surface has a (reddish-brown, tan) color. The size of the scars is variable and their distribution is (haphazard, regular). Beneath (some, most) scars there is thinning of cortex and dilation of renal pelvis. The pelvocaliceal system (is, is not) dilated in the (upper,mid,lower) third of the kidney. The corticomedullary demarcation (is, is not) distinct. The peripelvic fat (is, is not) decreased. Calculi (are, are not) present in the renal pelvis. These are (staghorn, nonstaghorn) in shape. The mucosa of the collecting system is (smooth, rough) and there (is, is no) destruction of underlying renal parenchyma. Stenosis of the ureteropelvic junction (is, is not) present. A __ cm segment of ureter is (unremarkable, dilated). The renal artery is sectioned and demonstrates ___ atherosclerosis. The renal vein is opened and demonstrates ____thrombus. A photograph is taken.

The kidney should be bi-valved. Sections should be obtained from:

- essentially normal kidney
- scarred areas including cortical surface and collecting system
- ureter should be opened in a longitudinal manner and sampled
- blood vessels
- please include sections of renal artery and vein with any pathology.





KIDNEY – NEOPLASTIC

Radical Nephrectomy Specimens - Adults Renal Neoplasms (Jan 2019)

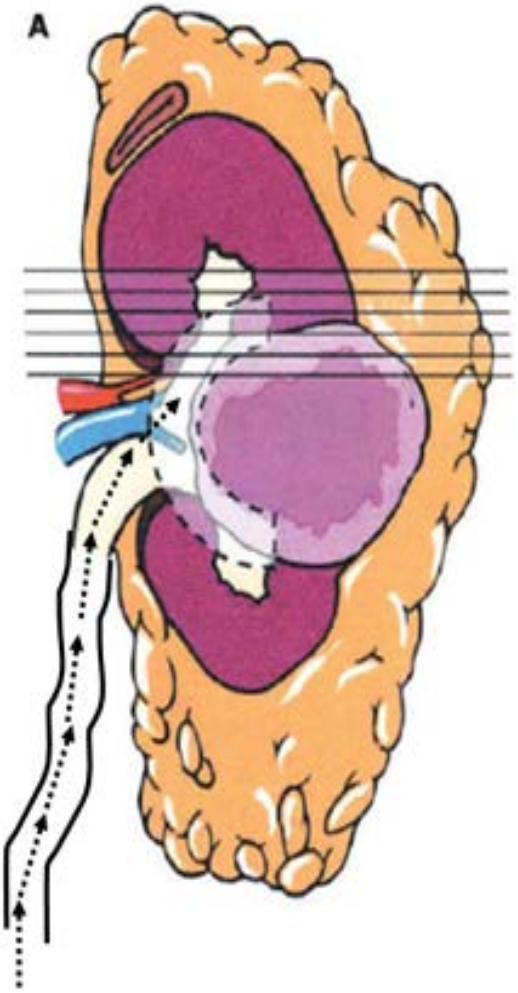
AJCC staging manual mandates pathological examination of tumors and regional lymph nodes. Evaluation of primary tumors includes

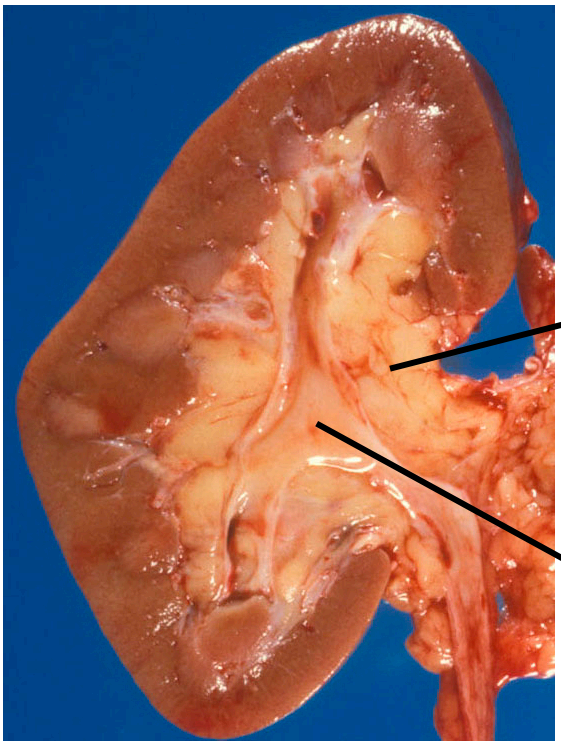
1. tumor size (≤4 cm, 4-7 cm or >7 cm)
2. involvement of perinephric fat and/or renal sinus fat (see photo)
3. involvement of adrenal gland (direct extension **is T4; metastasis is M1)**
4. vascular invasion
5. hilar lymph nodes, if present

vascular (renal vein & artery), ureteral and soft tissue margins should be examined

If a **bladder cuff** is present, **use nephroureterectomy procedure**

- ink outer surface of specimen prior to sectioning
- open ureter longitudinally into the pelvis and bivalve kidney like an open book
- take photograph & fix kidney in formalin overnight





Serially section bivalved kidney from one pole to the other. Look for perinephric invasion and satellite nodules. Examine renal pelvis and renal sinus for involvement of renal sinus fat or vessels.

Gross description: The specimen consists of a (right, left) kidney surrounded by an envelope of fibroadipose tissue measuring ___ x ___ x ___. The kidney measures ___x___x___cm. A ___x___x___cm mass involves the (upper portion, mid-portion, lower portion) of the kidney. On section, the tumor mass is (roughly spherical, irregular), (yellow, yellow-gray, brown, white) with (or without) foci of hemorrhage, necrosis, softening). The tumor (does, does not) extend into the perirenal fat (___ cm) and (is, is not) present at the soft tissue line of the specimen. The tumor (does, does not) invade the renal sinus. The tumor is (sharply, poorly) demarcated from the renal parenchyma which appears (essentially unremarkable, _____). Satellite nodules of tumor (are, are not) present in the renal tissue. There are _____ nodule(s) which

measure from ____ to ____cm. in diameter, and are located ____ cm. from the main tumor. Dissection of the renal veins, particularly those draining the area of the mass (shows, does not show) the intravascular presence of the neoplasm. The adrenal gland (is, is not) present, measures ___x___x___cm., and weighs ____ gms, and (is, is not) involved by a mass (indicate whether tumor directly extends to the adrenal gland). A ____cm. segment of ureter is present and is essentially unremarkable. Lymph nodes (are, are not) present.

Sections:

1. Vascular and ureteral margins
2. Tumor
   - 2 sections to demonstrate perinephric fat invasion and soft tissue margin
   - 2 sections to demonstrate renal sinus involvement
   - 1-2 section to demonstrate vascular invasion
   - Sample tumor areas of different color, consistency, and location. **Total number of sections (including those listed above) in a tumor of uniform appearance should be approximately 1 section per 2 cm of maximum dimension of tumor up to 8 cm. Avoid extensively necrotic areas. If tumor is grossly uniform in appearance, avoid taking multiple sections of grossly identical areas.**

     Sections for satellite nodules (up to four of the largest additional nodules)
3. 1 section for non-neoplastic kidney away from tumor
4. Adrenal gland, if present.
5. Hilar lymph nodes, if present.
6. Location of any additional sections should be entered in the gross description.

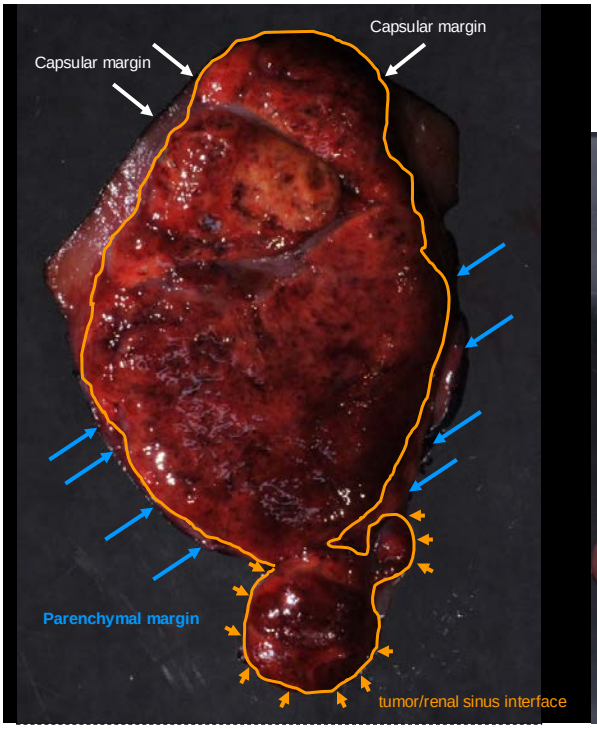
Partial Nephrectomy Specimens

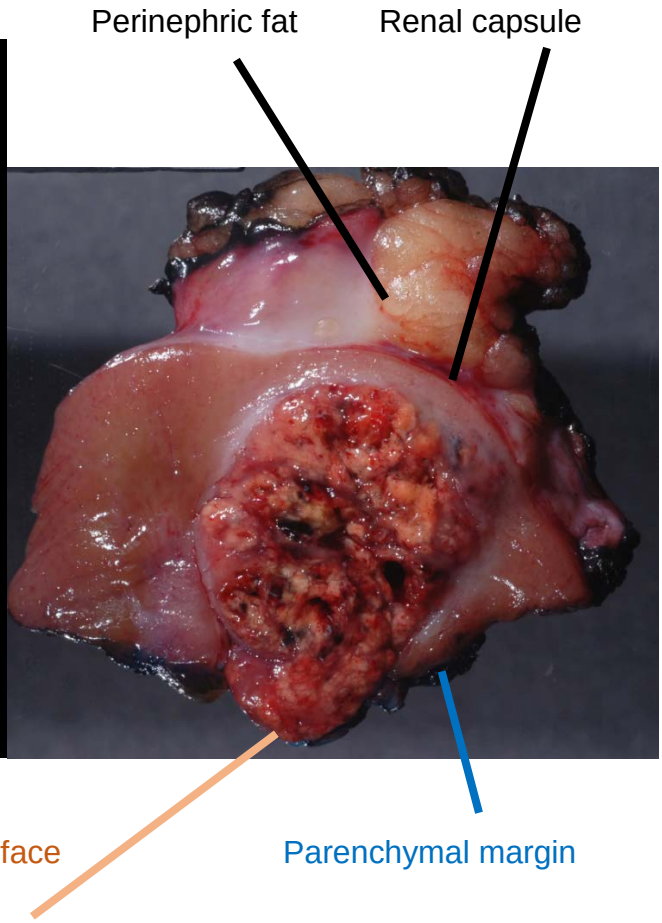
The parenchymal margin of resection, the capsular/soft tissue margin of resection, and the renal sinus fat (if present) should be identified.
The outer surface (capsular/soft tissue margin) of the specimen should be inked with one color (black) different from that used for the parenchymal margin (blue), and for the renal sinus fat (orange). If a portion of the tumor bulges towards the renal sinus, without evidence of renal sinus fat, the above mentioned portion of the tumor should also be inked orange and referred as the tumor/renal sinus interface.
<u>As with radical nephrectomies, all specimens for patients under age 40, tumors with unusual features, and cystic tumors should be photographed.</u>

If uncomfortable with the orientation of the specimen, please contact one of the GU pathologists.

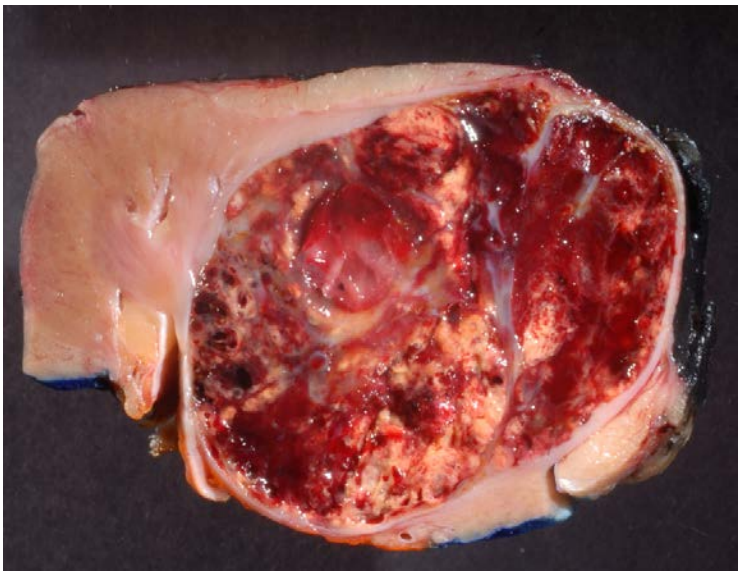
Following this the resident should evaluate the specimen and select tissue for research. The gross description should indicate which part of the kidney has been resected, the distance of the tumor from the closest capsular/soft tissue and parenchyma margins of resection and the relationship of the tumor with the renal sinus fat and/or tumor/renal sinus interface. The specimen is weighed, measured, and evaluated.

The AJCC staging manual requires that TWO sections for resection margins and sections to evaluate for renal sinus involvement for central tumor.





Gross: The specimen is submitted (fresh, in formalin) and consists of a segment of (upper pole, lower pole, mid portion) of kidney measuring ___ x ___x ___ cm and weighing ___ gms. Renal artery, vein, pelvis, and ureter are not present in the specimen. A portion of renal sinus fat is/is not identified within the specimen. A (yellow, yellow-grey, brown, tan) (solid, cystic) mass/tumor measuring ___ cm in maximum dimension is identified in the specimen. There (are, are not) foci of hemorrhage, necrosis, softening). The tumor (invades, penetrates the capsule, and extends ___ mm into peri-renal fat). The tumor invades (or bulges into) the renal sinus. Tumor (is, is not present at the renal sinus, peripheral, renal parenchymal line of resection). The tumor is ____ cm from the inked parenchymal margin of resection.

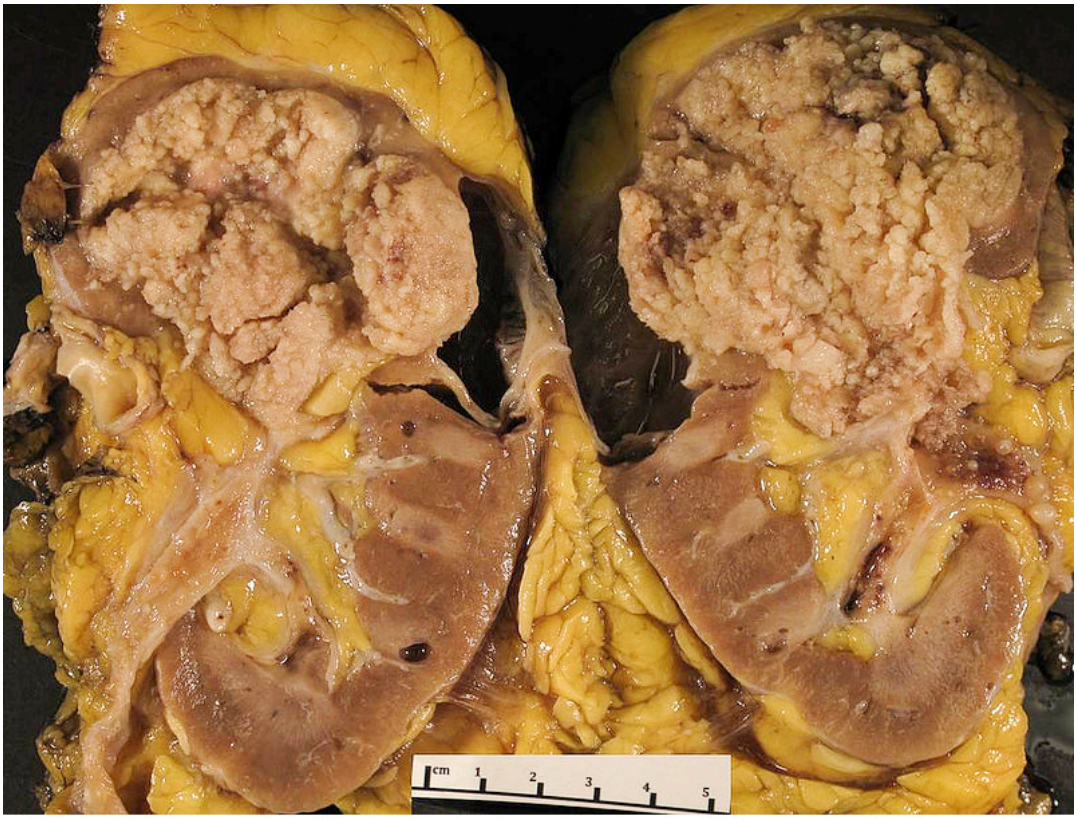


Sections:

1. One section of parenchymal resection margin
2. One section of capsular/soft tissue margin
3. Two sections of renal sinus or tumor/renal sinus interface (if present)
4. **Tumor, one section per 2 cm of tumor, if uniform in appearance (including sections mentioned above)**
5. Location of any section should be entered in the gross description.

Nephroureterectomy for Urothelial Carcinoma of Renal Pelvis or Ureter

Gross description: The specimen consists of a kidney surrounded by an envelope of fibroadipose tissue measuring _ x _ x _cm. The kidney measures __x__x__cm. The attached ureter measures_ cm in length and _ cm in diameter. Upon opening of the ureter and renal pelvis a___x___x___cm tumor/mass (describe color, consistency, configuration) involves the (upper/mid/lower portion of) the renal pelvis (or calyx or ureter). It extends to _x_cm from the ureteral margin. The pelvocaliceal system and/or ureter is/is not dilated. The mucosa of the ureter (remaining ureter if tumor involves the ureter) is granular, or ulcerated, or unremarkable. The tumor/mass appears to extend into the muscular wall of the renal pelvis or ureter (+/-) and peripelvic or periureteral fat (+/-). The lesion (does/does not) invade the kidney parenchyma. [If it invades the kidney parenchyma, does it extend through the kidney to involve the perinephric fat?]. The mass (does/does not) involve the renal veins. Lymph nodes (are/are not) present. Adrenal gland is/is not present. Measure adrenal gland, if present. The nonneoplastic renal parenchymal is atrophic (+/-) or unremarkable.



Urothelial carcinoma of renal pelvis

Sections:

1. Ureteral margin (en face)
2. Vascular margins (en face)
3. Tumor (demonstrating depth and extent of invasion into muscular wall peripelvic/periureteral fat, kidney parenchyma, and/or perinephric fat (one section per cm in general). **If no mass is present, contact the GU staff to consult about sampling.**
4. Additional sections of pelvocaliceal system and ureter: **If a mass is present, one section of uninvolved renal pelvis and one section of uninvolved ureter is sufficient.**
5. Non-neoplastic kidney
6. Hilar lymph nodes, if present
7. Adrenal gland, if present

If a bladder cuff is present, ink the bladder mucosal margin. **If a mass is present less than 5 mm from the bladder cuff, take perpendicular sections (at least 3 submitted in separate cassettes) to demonstrate mass in relation to closest bladder cuff margin. If there is no mass within 5 mm of the bladder cuff, then a shave margin of entire bladder cuff should be taken.**

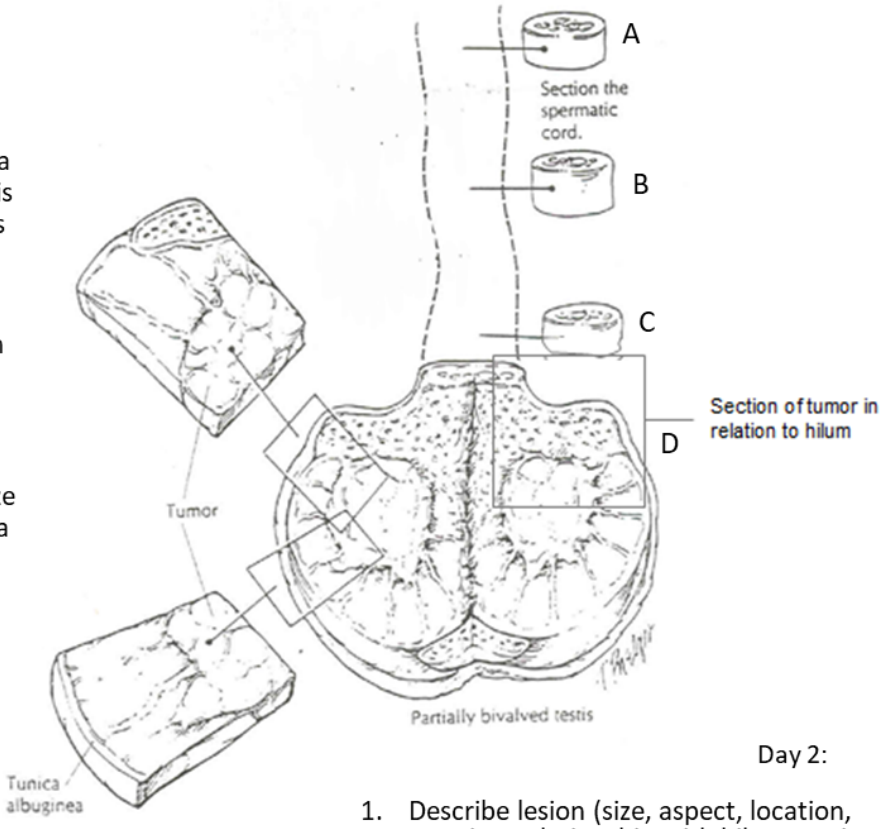
TESTIS

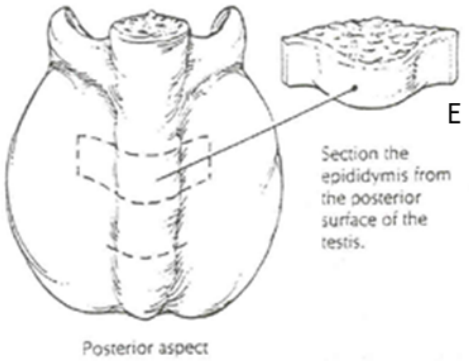
TESTICULAR NEOPLASMS

Testis should be bivalved, photographed and fixed overnight; spermatic cord should be handled first (see below).

Day 1:

1. Orient specimen using epididymis as a landmark; epididymis is C shaped and cups the testis along its posterior aspect
2. Take a shave section of spermatic cord margin (A)
3. Bivalve testis along its long axis; note size of any nodule, take a photo, and then fix specimen overnight



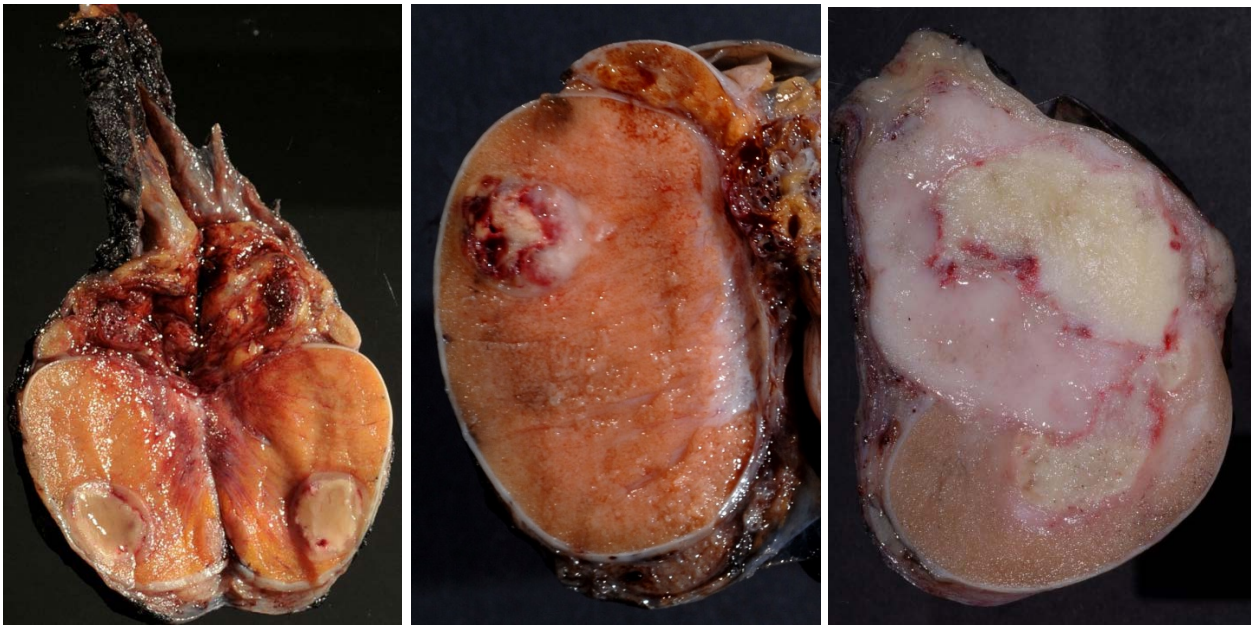


Day 2:

1. Describe lesion (size, aspect, location, margins, relationship with hilum, tunica albuginea, rete testis and epididymis)
2. Take a section of mid spermatic cord margin (B)
3. Take a section of spermatic cord at hilum (C) and/or a section of tumor in relation to hilum (D)
4. Section testis and carefully inspect sections
5. Section epididymis from posterior aspect of specimen (E)
6. Submit sections of tumor showing its relationship with tunica albuginea, rete testis and epididymis

Gross: The specimen consists of a testis with enveloping tunica and attached epididymis and spermatic cord. The specimen measures ___x___x ___cm and weighs ____gms.
The spermatic cord is ___cm in length. The testis weighs ___ gms and measures ___ x ___ x ____ cm and (does, does not) contain a mass located (yes/no) _____(in proximity to the hilum). The mass is firm and measures ___cm in greatest dimension. On section, the mass replaces approximately ____% of the testicular parenchyma. The mass is (solitary, multinodular) and is ____ (color) and ____(consistency). The mass is (uniform, variegated). Hemorrhage (is, is not) present. Necrosis (is, is not) present. The tumor (does, does not) contain cystic spaces. The neoplasm (does, does not) involve the tunica albuginea and (does, does not) extend into paratesticular structures. The epididymis, hilar fat, and rete testis (is/are, is/are not) involved by neoplasm. Neoplasm (does, does not) involve the spermatic cord. A photograph is taken.

Sections of testis should be obtained to demonstrate neoplasm and non-neoplastic testis. As a rule of thumb, one section per centimeter of maximum dimension should be obtained. If lesion is small (≤2 cm), entire tumor should be processed.
Sections should be taken to demonstrate invasion of tunica albuginea, epididymis, rete testis, spermatic cord and hilar fat (see figure). **Spermatic cord margin should be sectioned before testis is sectioned to avoid tumor contamination, and even if grossly negative, a section of distal spermatic cord should be obtained.** Two additional sections of spermatic cord should be submitted: one section from mid cord and one section in proximity to attachment of the cord to testis.



PARTIAL ORCHIECTOMY

Rarely, partial orchiectomy specimens may be submitted from patients undergoing organ conserving surgery for neoplasm. These specimens should be weighed, measured, oriented, and carefully photographed. Any mass should be described with relationship to testis and inked resection margin. Resection margins usually will have a frozen section performed. Additional margins for permanent sections should be obtained in the specimen after initial frozen section. Additional section should be taken. Discuss this case with a staff pathologist before dissection.

OTHER ORCHIECTOMY SPECIMENS

The testis is usually resected with the epididymis and a segment of spermatic cord. Testes are usually resected for mass lesions, maldescent, putative infarction usually associated with torsion, and in patients with prostate cancer. Gonads are resected in surgical procedures for intersex and anorchia. In 2004 and after, conservative surgery (i.e. partial orchiectomy) may be performed in selected cases.

In cases of intersex, orient the specimen with the surgeon and the staff pathologist. A good gross photograph of the oriented specimen is mandatory. The sections should be obtained of gonads, gonaducts, and uteri indicating right and left on all specimens. The specimen should be stored in or oriented fashion so that the prosector can return to it.

In cases of suspected undescended testes (possible anorchia) the specimens are usually small and contain combinations off vas deferens, epididymis, and testis. The entire specimen should be submitted. These are usually in infants and young children and can usually be put into one or two blocks.

In cases of torsion and/or infarct the specimen should be carefully weighed, measured and photographed both undissected and bisected. It should be indicated whether spermatic cord or epididymis is identifiable. The spermatic cord is measured, described, and sectioned. (Is the cord grossly twisted?). A sagittal section through the hilus of the testis of the testis should be made and the color and consistency of the testis noted. At this time the organ should be re-photographed. Sections of cord, epididymis and testis should be submitted. The duration of testicular torsion and the host response to infectious agent are best determined at the periphery of the lesion. Therefore, some sections should be at the periphery of the lesion including the testis, the tunica albuginea, the epididymis, and paratesticular tissues. In infants, submit entire testis. In older males, one section per centimeter of maximum dimension.

TESTIS FOR PROSTATE CARCINOMA (BILATERAL ORCHIECTOMY)

Gross: Received (fresh, fixative) is a testis with attached coverings and a ____ cm length of spermatic cord. The entire specimen weighs ____ grams. The tunica

vaginalis and spermatic cord are free of nodules or areas of induration. The testis itself measures ____ x ____ x ____ cm. The tunica albuginea appears normal. Appendix epididymis and appendix testis (are, are not) present. On cut section the testis is soft and tan-brown. No mass or lesion is encountered. One representative section is submitted.

NOTE: Take the routine section by cutting on either side of the epididymal attachment. This section will contain seminiferous tubules, rete testis, ductus efferentes and epididymis.

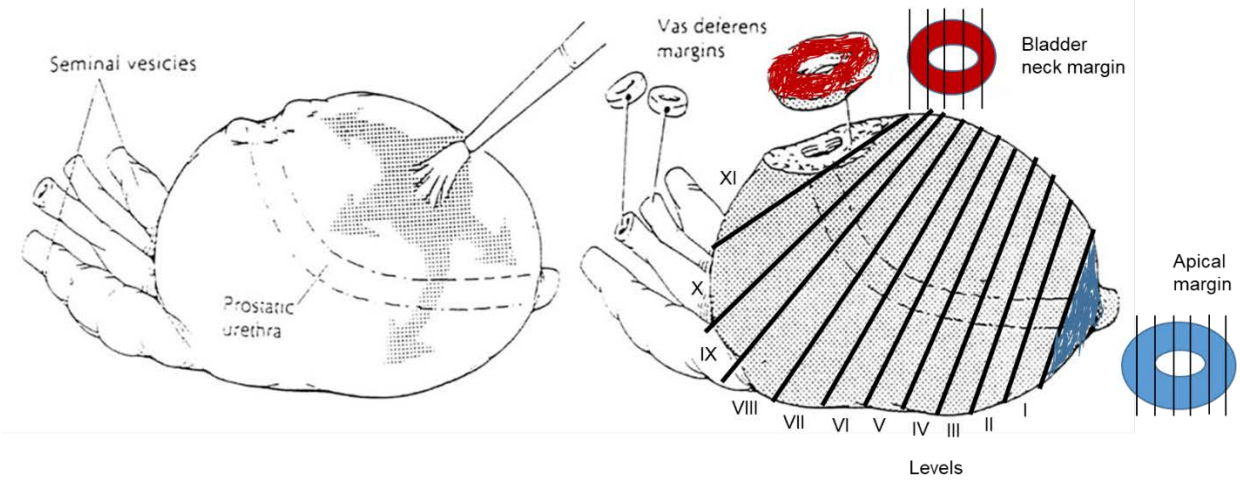
Make sure to cut, palpate, and carefully examine the spermatic cord.

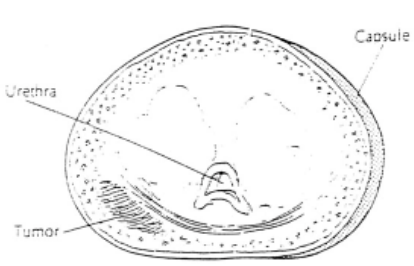
PROSTATE

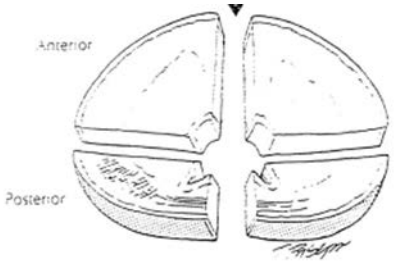
RADICAL PROSTATECTOMY

Gross: The specimen consists of a prostate gland with attached seminal vesicles and portions of vas deferens. It measures ____x____x____cm craniocaudally, ____cm anteroposteriorly, and ____cm transversely. It weighs ____gms with attached seminal vesicles and ____gm without seminal vesicles. The apex of the gland is (conical, inverted). The capsular surface is (smooth, irregular, ____). *Note and measure any areas where the capsule is incomplete or absent.* On palpation an area of firmness (is, is not) identified in the ____ portion of the gland. The gland is inked green on the right and black on the left. The gland is fixed in formalin overnight. After fixation, sections of the apex and bladder neck are obtained and the gland is cut from apex to base at 3 mm intervals, perpendicular to the urethra. The cross sections (do, do not) reveal a mass lesion measuring ____ cm in greatest dimension in level _____. The mass (does, does not) extend to the periphery of the specimen in the ____ (R, L, anterior, posterior, basal, mid, apical) portion of the gland. No other firm masses are noted. Rubbery nodularity (is, is not) present. The seminal vesicles are (unremarkable, absent or dilated). Segments of vas deferens are unremarkable.

The apical and base sections are bread loafed. Label the apical section as apical margin, perpendicular, and the base section as bladder neck margin, perpendicular. The prostate levels are divided in quadrants and entirely submitted in a consistent manner (see diagram attached). One complete section of the base of each seminal vesicles should be obtained.



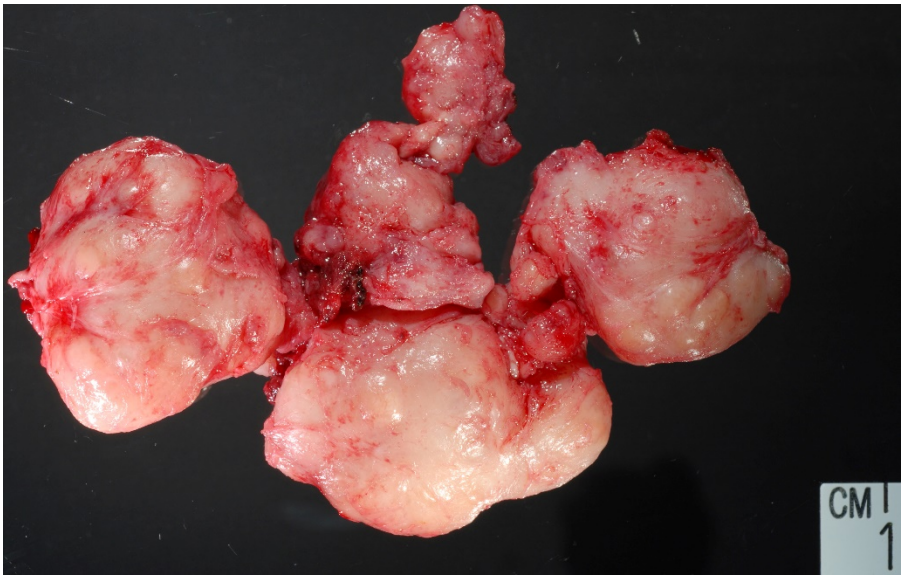




SUPRAPUBIC PROSTATECTOMY (NON-RADICAL, FOR BPH)

Gross: The specimen is submitted fresh and consists of _____ (number) irregular, nodular masses of tissue with an aggregate weight of ____gms. The largest tissue segment measures ___x___x___cm, and the smallest measures ___x___x___cm. These appear to be from the periurethral portion of the prostate gland, and a smooth surface is consistent with prostatic urethra. The masses are formed of nodules of rubbery, firm (gray, tan, _____) tissue which, on section measure in cross-diameter up to ____cm. and bulge from the cut surface. The nodules are supported by pink-gray to gray-white intervening tissue. Firm areas (are, are not) present in the specimen.

It is important to completely section the prostate for gross examination. Note and describe infarcts if they exist. They may be red or yellow. We do not, however, totally submit the sections instead we take representative portions from each piece of tissue including the median bar if that is recognizable. Five to six tissue blocks are recommended of the entire specimen. This type of specimen is <u>not</u> to be handled as a radical prostatectomy.



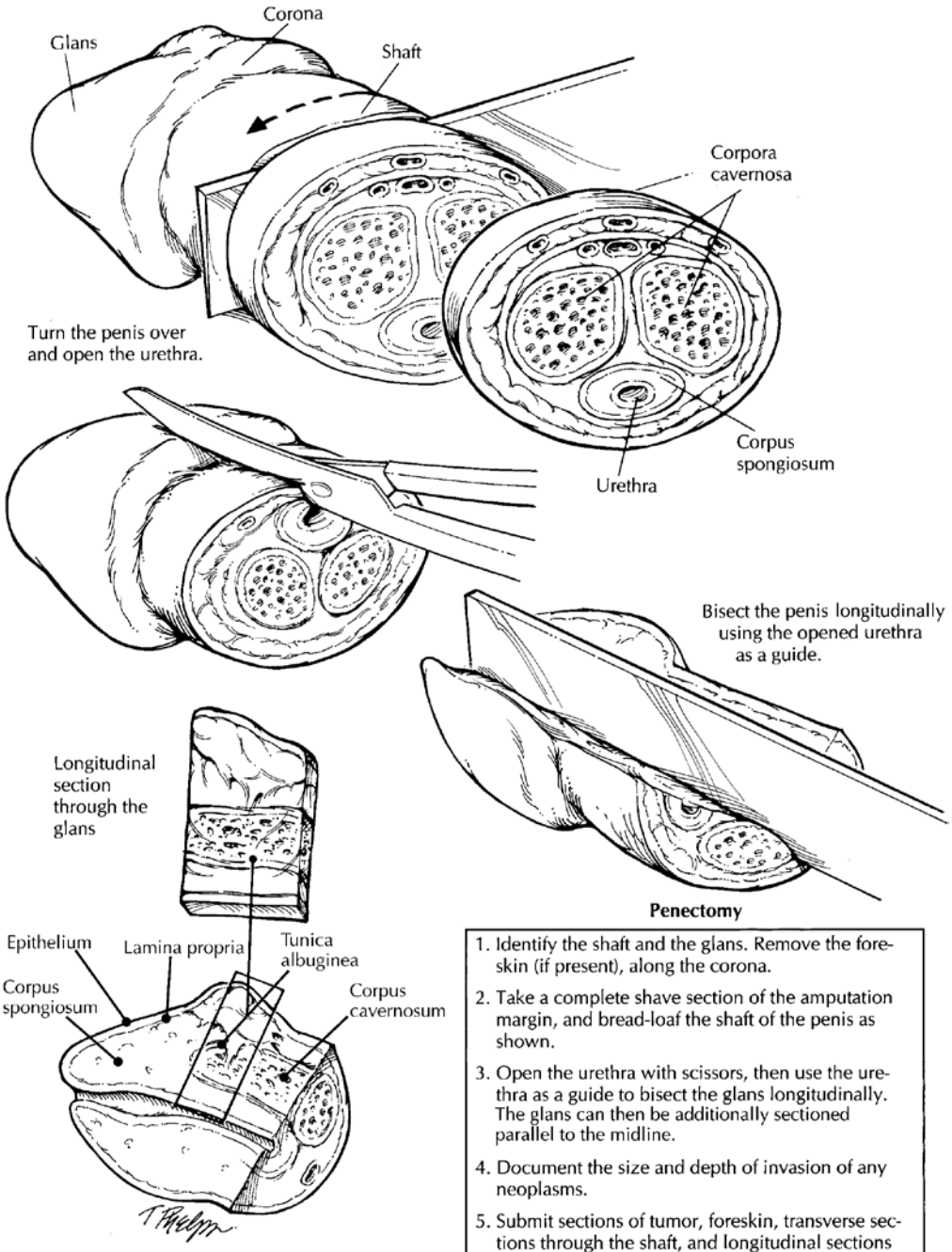
TRANSURETHRAL RESECTION, PROSTATE

Gross: The specimen is received (fresh, fixed in ____) and consists of multiple, irregular fragments of tissue averaging approximately ____cm. in greatest dimension with an aggregate weight of ____gms. The fragments are (gray, white, tan) and rubbery. _____gms. of prostate are submitted.

If any of the fragments are hard or yellow, they should be described and selected for sectioning. In the likely event that all fragments are similar, we submit all the tissue **up to 10 cassettes**.

PENIS – PENECTOMY

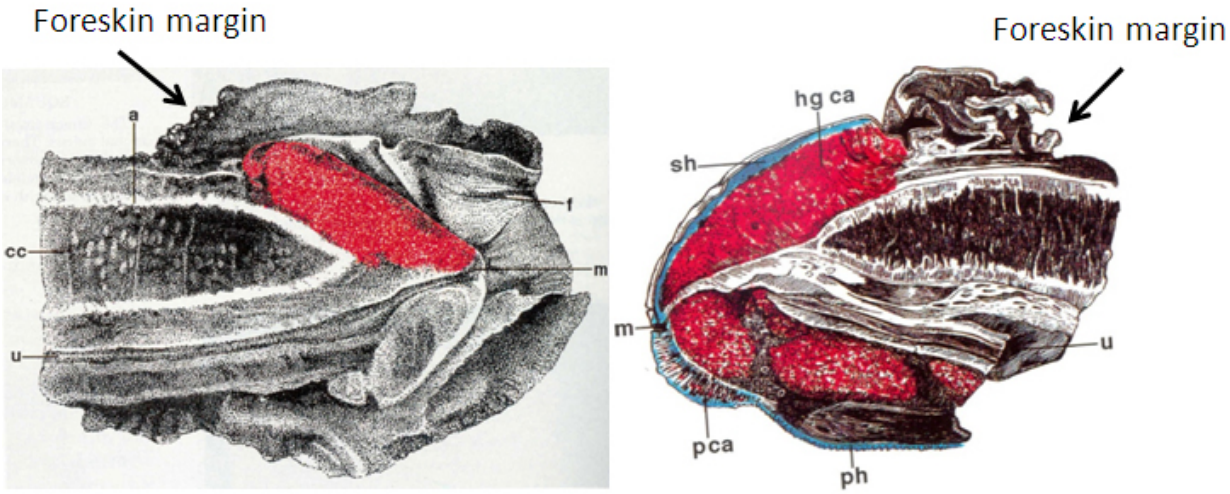
General



Penectomy

1. Identify the shaft and the glans. Remove the foreskin (if present), along the corona.
2. Take a complete shave section of the amputation margin, and bread-loaf the shaft of the penis as shown.
3. Open the urethra with scissors, then use the urethra as a guide to bisect the glans longitudinally. The glans can then be additionally sectioned parallel to the midline.
4. Document the size and depth of invasion of any neoplasms.
5. Submit sections of tumor, foreskin, transverse sections through the shaft, and longitudinal sections through the glans. Submit the amputation margin as a shave section.

1. All penectomy specimens are to be fixed in formalin before grossing. They should be opened along the urethra then pinned in a wax container.
2. Obtain a photograph of the gross specimen demonstrating the lesion



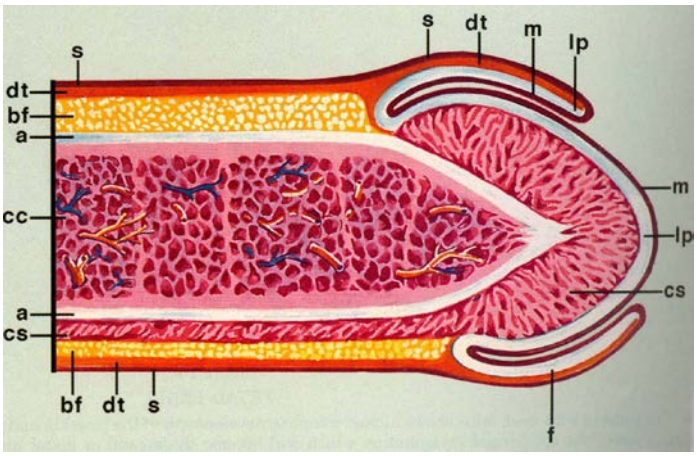
3. Take a complete cross section of the amputation margin.

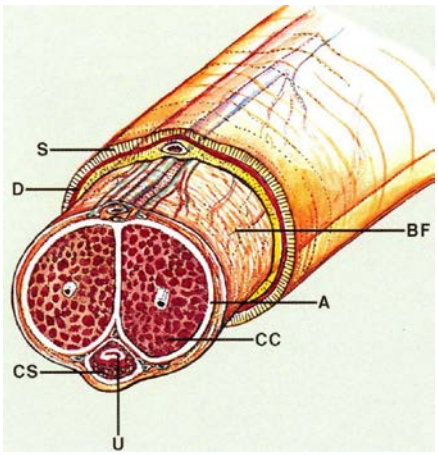
4. Bivalve the penis through the urethra. Open the urethra ventrally in the midline to urethral orifice. Using the urethra as a guide to bisect the glans longitudinally.

5. Photograph of the glans penis and distal shaft demonstrating the gross lesion. This will be a photograph of the bisected specimen.

6. Broadleaf the shaft of the penis at 3 mm intervals beginning distally and stopping 1.2 cm from corona.

7. Document the size and depth of any invasive neoplasm. Indicate the invasion of subepithelial tissue (m) including the corpus spongiosum (cs), urethra (u), and corpus cavernosum (cc), tunica albuginea (a), Buck's fascia (bf). Indicate the gross extent of the neoplasm.



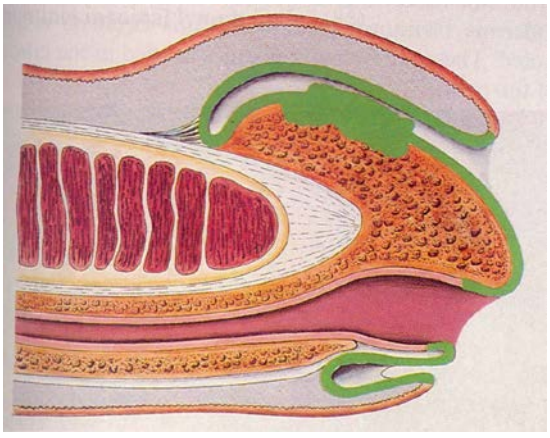


8. Submit sections of:
    a. tumor
    b. foreskin (perpendicular to the inked margin)
    c. transverse section through shaft
    d. longitudinal sections through glans demonstrating extent of neoplasm.
    e. A section should include tumor and adjacent unremarkable epithelium
    f. amputation margin should be submitted as a shave margin

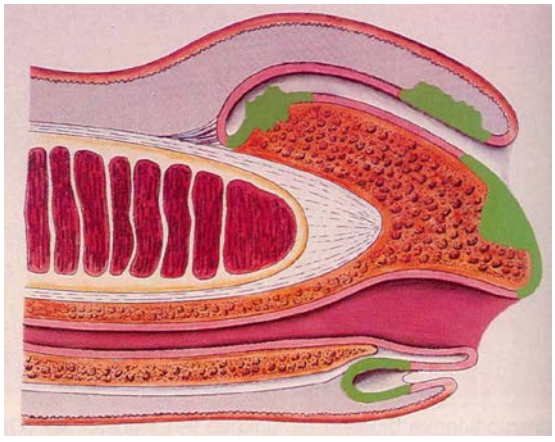
9. For tumors involving the urethra, indicate the extent of gross involvement and submit sections to indicate this.

The description should indicate whether the specimen is circumcised (it may or may not be possible to tell, if the tumor obliterates the glans and/or the coronal sulcus). The dimensions of the specimen should be recorded including the foreskin, glans, and shaft. The size, number, color and distribution of the lesion or lesions should be indicated as well as the growth pattern (ulcerative, nodular, infiltrative, verrucous, or flat).

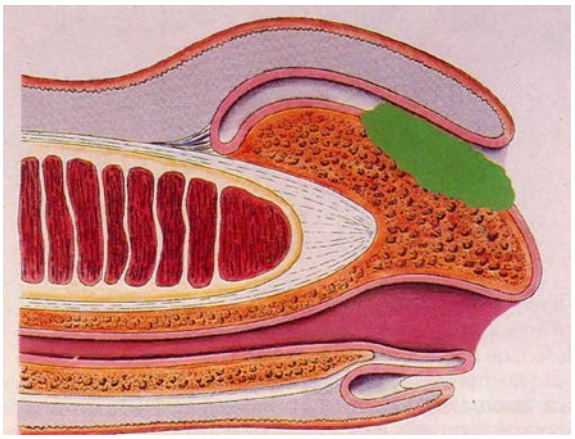
GLANS TUMORS



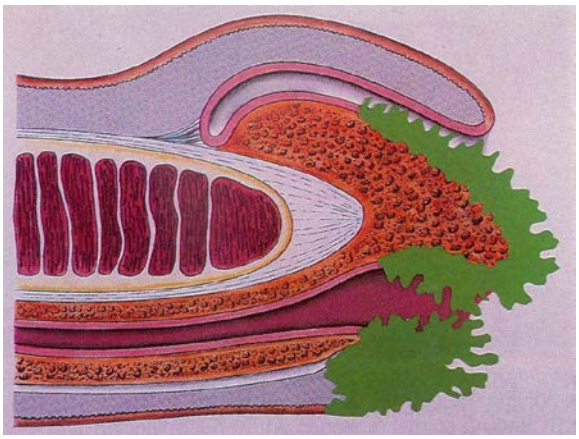
Superficial spreading



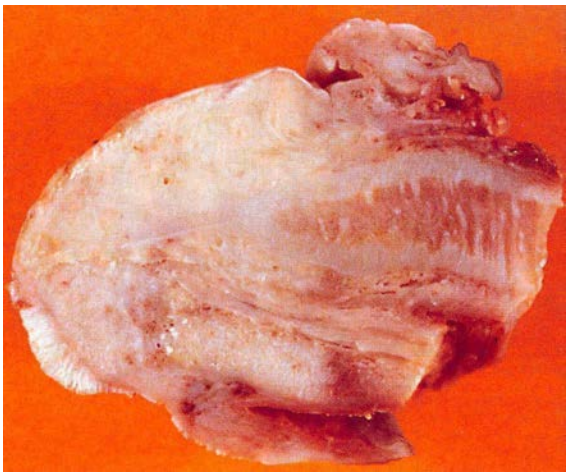
Multicentric



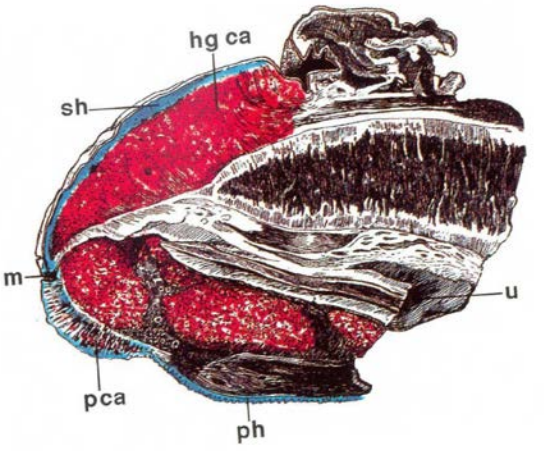
Vertical growth

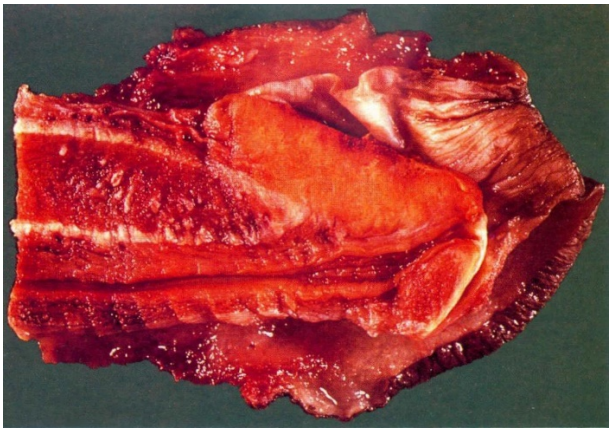


Verrucous growth

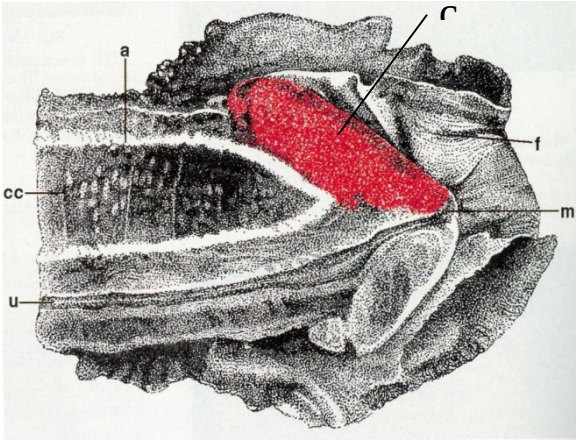


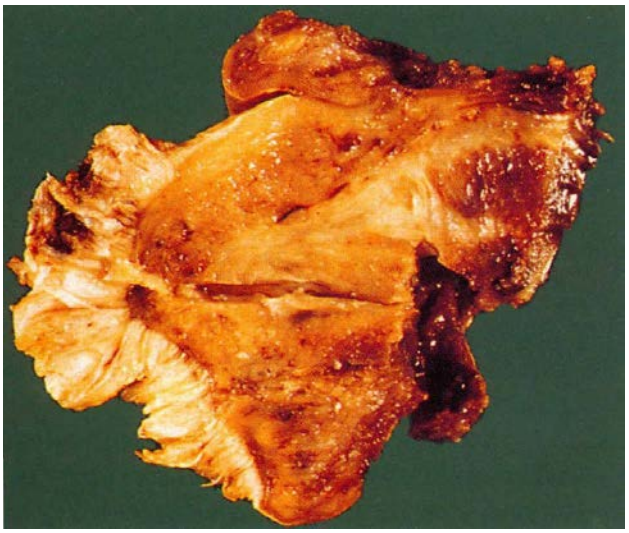
Corpus spongiousum is replaced by tumor

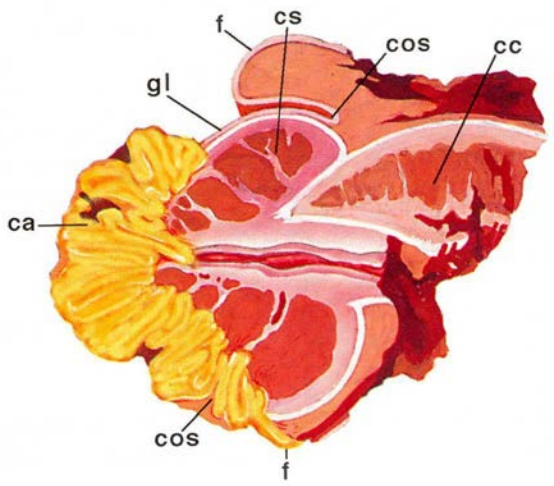




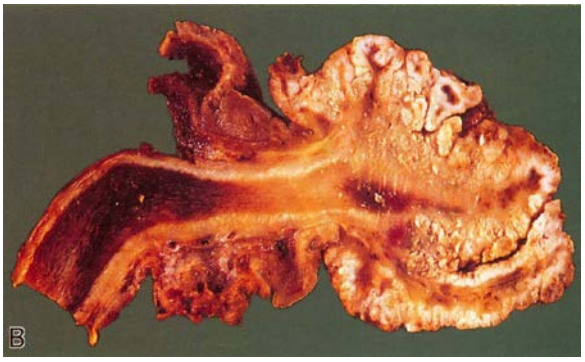
Corpus spongiousum is replaced by tumor

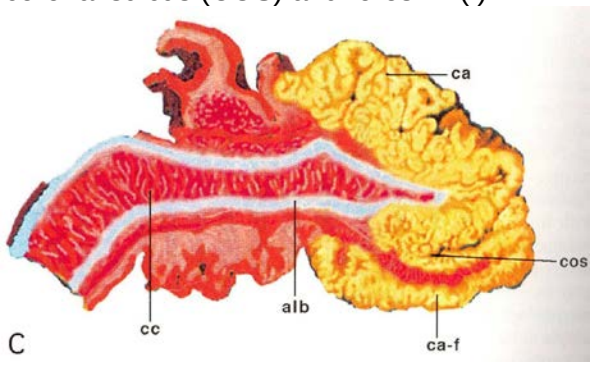






Papillary lesion involving glans with extension to coronal sulcus (COS) and foreskin (f)



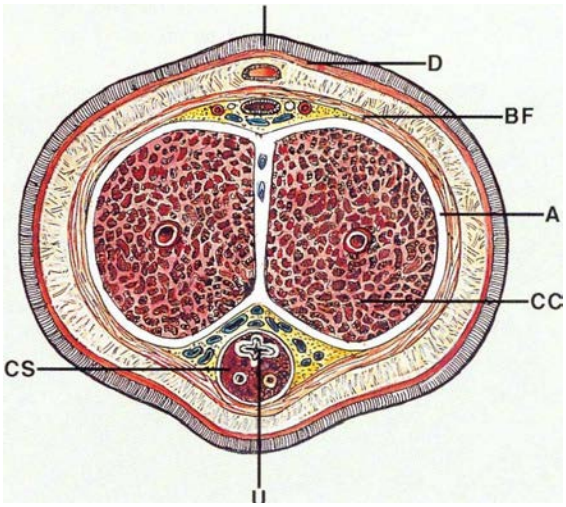


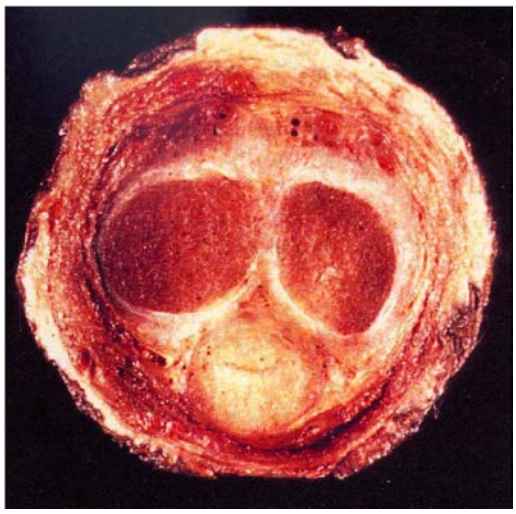
Exophytic lesion replacing entire glans and extending to foreskin; base infiltrates corpus spongiosum and coronal solcus (COS) and tunica albuginea (alb).

SHAFT TUMORS

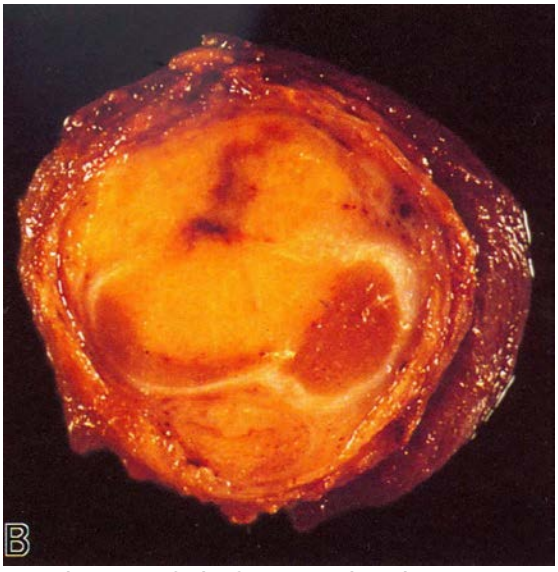
The body (shaft) of the penis is composed of 3 cylinders of firmly adherent erectile tissue:

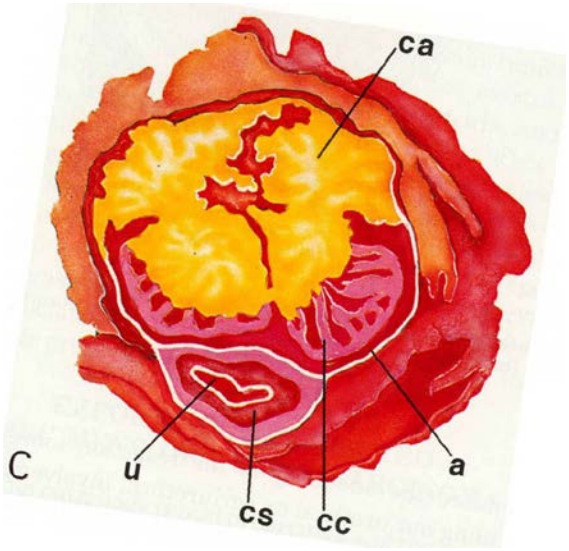
•





Normal Shaft





Carcinoma of shaft; tumor involves corpora cavernosa (ca) and tunica albuginea (a). Urethra (u) is not involved

SOFT TISSUE TUMOR RESECTION SPECIMEN HANDLING

Shi Wei, MD, PhD
Department of Pathology
University of Alabama at Birmingham

This chapter focuses on the specimens from surgical resections performed for primary malignant soft tissue tumors, including designated intralesional resection, marginal resection, wide resection, and radical resection. Evaluation of tumor type, histologic grade, margin and pathologic stage are the key components of pathologic evaluation. In addition, neoadjuvant radiotherapy (RT) and chemotherapy have been increasingly used for large, high-grade extremity soft tissue sarcomas to treat metastatic disease earlier, sterilize margins to perform margin-negative (R0) surgery, and limit loss of function after wide surgical excision, with the ultimate aim of improving patient survival. Thus, the evaluation of treatment effect is crucial in providing prognostic and predictive information.

Key Points:

- Prior to grossing, review the patient's pertinent history, including the radiology report, previous biopsy pathology report and medical/surgical interventions such as surgical resection, radiotherapy and chemotherapy, if any.

- Review the surgeon's operative procedure note, if available.

- Review the surgeon's instruction on the requisition form for specimen orientation (usually indicated by suture or clips) or other specific instructions, if any.

- For complex specimens such as ambiguous orientation, unusual gross appearance or those that might be difficult to interpret/reconstruct once sectioned, inform the pathologist who will be ultimately responsible for the specimen. Communication with the surgical team is always useful for any query regarding the specimen.

- Obtaining a cross-sectional photograph with at least one patient's identification (i.e., pathology accession number) is always helpful for documentation purposes and educational aide (such as tumor board).

- Specimens resected after neoadjuvant therapy require submission of representative tumor bed and respective margins even in the absence of grossly viable residual tumor. In fact, macroscopic assessment of post-treatment residual tumor is challenging and often impossible.

Indications for Resection of Soft Tissue Tumors

Primary malignant soft tissue tumors warrant limb-sparing resection or, rarely, amputation. Large-sized, high-grade sarcomas that are sensitive for chemotherapy are typically subject to neoadjuvant chemotherapy in order to treat any early metastasis and sterilize margins to perform R0 resection. Neoadjuvant radiotherapy has been used in extremity sarcomas where upfront limb-conserving surgery is deemed difficult. If shrinkage of the sarcoma could facilitate conservative surgery then radiotherapy may be utilized. Early surgery with wide negative margin is typically applied to the sarcomas that have poor response to neoadjuvant therapy. Thus, comprehensive evaluation of the pathological materials obtained from the biopsy is crucial in providing accurate diagnosis to guide the subsequent treatment-decision making.

Examples of intralesional resection include partial debulking or curettage. These procedures may leave macroscopic or microscopic tumor behind, thus staging is not always applicable. Marginal resection refers to removing the tumor (and its pseudocapsule, if present) with a relatively small amount of surrounding tissue. The margin is grossly negative for tumor; however, it may be positive by microscopic examination. The latter renders a procedure intralesional resection. Note that an "excisional" biopsy may effectively accomplishes the same outcome as a marginal resection. With a wide resection, the tumor is removed with a cuff of surrounding normal tissue, but not an entire muscle group, compartment, or bone, thus is also known as an intracompartmental resection. Lastly, radical resection is to remove an entire soft tissue compartment (i.e., anterior compartment of the thigh) or bone, or the excision of the adjacent muscle groups if the tumor is extracompartmental.

Therefore, perceiving an adequate clinical history is necessary (and must be provided by submitting physician) before gross examination of a specimen. Pertinent clinical history include (but not limited to): prior diagnoses, prior or current treatment, and the type of specimen (as aforementioned).

Macroscopic and Microscopic Parameters Essential for Soft Tissue Sarcoma Staging

The most commonly used staging system in the United States is the American Joint Committee on Cancer (AJCC) Cancer Staging system, also known as TNM Staging system. While tumor site and tumor size are essential parameters in the macroscopic examination, histologic type, histologic grade, mitotic rate, the extent of necrosis, regional lymph node and distant metastasis are required elements in the CAP Cancer Protocols based on the AJCC Cancer Staging Manual.

Histological type. Soft tissue sarcomas are largely classified into adipocytic (liposarcoma), fibroblastic/myofibroblastic, fibrohistiocytic, smooth muscle (leiomyosarcoma), pericytic (perivascular), skeletal (rhabdomyosarcoma), vascular (angiosarcoma), peripheral nerve, chondro-osseous, tumors of uncertain differentiation, and undifferentiated sarcomas based on the current World Health Organization Classification of Tumors of Soft Tissue and Bone.

It is important to note that molecular and cytogenetic analyses play a crucial role in the classification of soft tissue tumors. In addition, some treatment protocols require fresh tissue for correlative studies. Thus, it is critical to snap freeze a small portion of tumoral tissue, whenever possible, for potential future use.

Histologic grade. Histologic grading is the most important prognostic factor and the best indicator of metastatic outcome in soft tissue sarcomas (1). The most commonly used sarcoma grading systems are the French Federation of Cancer Centers Sarcoma Group (FNCLCC) and the National Cancer Institute (NCI) systems. Both are 3-tier grading systems based on differentiation, tumor necrosis, and mitotic activity (1, 2). The FNCLCC system (Table) may be slightly better in predicting distant metastasis than the NCI system (3), thus is adopted by the 8th edition of the AJCC Cancer Staging Manual. It is important to note that accurate grading requires an adequate sample of tissue, which is not always available from fine needle aspiration or core needle biopsy specimens or in tumors following neoadjuvant radiation or chemotherapy.

Table. FNCLCC Grading System (4)

Parameters	Definition
Differentiation	Score 1: Sarcomas closely resembling normal, adult mesenchymal tissue and potentially difficult to distinguish from the counterpart benign tumor (eg, well-differentiated liposarcoma, well-differentiated leiomyosarcoma)
	Score 2: Sarcomas for which histologic typing is certain (eg, myxoid liposarcoma, myxofibrosarcoma)
	Score 3: Embryonal sarcomas and undifferentiated sarcomas, synovial sarcomas and sarcomas of doubtful tumor type
Mitotic count	Score 1: 0-9 mitoses per 10 HPF*
	Score 2: 10-19 mitoses per 10 HPF
	Score 3: ≥20 mitoses per 10 HPF
Tumor necrosis	Score 1: no necrosis
	Score 2: <50% tumor necrosis
	Score 3: ≥50% tumor necrosis
Histologic grade	Grade 1: total score 2, 3
	Grade 2: total score 4, 5
	Grade 3: total score 6, 7, 8

*HPF: high power field (0.1734 mm^2), X40 objective, most mitotically active area, away from areas of necrosis.

Pathologic Stage Classification. In the 8th edition of the AJCC Cancer Staging Manual, the anatomic site is integrated into the TNM stage classification of soft tissue sarcomas (5). This is due to the fact that smaller and anatomically confined sarcomas are prognostically favorable than larger and more extensively involved sarcomas. Head and neck, trunk and extremities, abdomen and thoracic visceral organs, retroperitoneum, and orbit each have a separate pathologic tumor stage (pT) classification. As an example, the cutoffs for pT1 an pT2 are 2 cm for sarcomas of the

head and neck including the orbit, 5 cm for those occurring in trunk/extremities/retroperitoneum, and whether or not organ-confined for abdominal and thoracic visceral tumors. Note that although size criteria currently vary by anatomic site, emphasis should be placed on providing accurate size measurements. Tumor size should be regarded as a continuous variable, with the centimeter cutoffs as arbitrary divisions. Regional lymph node status is categorized as pN0 or pN1 (presence of regional nodal metastasis regardless of the number of nodes involved). Distant metastasis (pM) is required to be recorded only if confirmed pathologically in the case.

Gross Examination and Dissection

Each specimen should be approached with specific plans in mind based on the type of specimen. For example, resection of retroperitoneal sarcoma may be accompanied by adherent or entrapped other organs such as kidney or segment of colon, whereas excision of soft tissue sarcoma of the extremity may include fascial compartments. Thus, identification of all anatomic structures present is essential as the first step of gross examination. A step-by-step approach is described as follows.

1. Orientation markers (i.e., sutures) must be identified as they are the "landmarks" for subsequent reporting of the margins. If a procedure is unclear or if there is conflicting information about orientation, the clinician should be contacted before proceeding. Review of operative notes, if available, may be of help at times in this regard.

2. Measurement of the specimen dimensions utilizing international unit (typically centimeter with one decimal point) should be taken on intact specimens prior to dissection. Measurement of tumor dimensions should be performed after dissection for large resections.

3. The tissue edges (margins) should be inked aiding in the identification and correct orientation of the tissue pieces during embedding and histologic examination. The surgical margins are commonly designated by sutures or staples. The sutures and staples should be carefully removed prior to inking. A note in gross description should be included indicating that a new margin underlying the staple line is taken. However, for large, complicated specimens with grossly negative margins, inking may be delayed until the closest areas of the tumor to the margins are identified after dissection, so that the anatomic landmarks are not obscured by the ink. Care must be taken not to artificially introduce ink into tissue that is not present at margin. The following are some inking tricks for beginners.

    1) Blot specimen dry with a paper towel or gauze before inking. Pat ink on surface with a sponge, gauze or cotton applicator. Do not pour ink over the specimen.

    2) Un-oriented specimens should be inked one color (e.g. black or blue), while oriented specimens with margins should be inked multiple colors. The application

color and location will typically be dictated into the gross description. Change gloves if necessary to avoid introducing ink into the interior of the specimen.

3) Apply ink fixative to prevent it from dissolving in formalin. Section the specimen after it thoroughly dries (i.e., a paper towel or gauze).

4. The specimen should be completely dissected and serially sectioned while keeping the orientation in mind. The specimen orientation should remain recognizable even after a thorough dissection (Figures 1&2). Once the pathologic process (i.e., tumor) is identified, the gross examintion/description is directed towards following key elements:

    1) Size (nearest mm)

    2) Consistency (i.e., firm, hard, rubbery, gelatinous, etc.)

    3) Growth pattern (i.e., well-circumscribed, infiltrative, etc.)

    4) Necrosis (and % if present)

    5) Relationship with adjacent structures (i.e., invasion into adjacent organ/compartment/vasculature)

    6) Distance from resection margins

    7) Previous biopsy cavity (if present)

    8) Identification of regional lymph nodes, if applicable

5. Histologic sections are taken to best demonstrate the pathologic process. They should not be simply random sections. Small tumors can be entirely submitted, while larger lesions may be representatively submitted (one section/cm tumor). The margins should be taken at the sites most likely to show tumor at (or closest to) the margin. When the tumor demonstrates a heterogeneous gross apperance, sections from different-appearing tumor must be taken. For assessment of treatment response after neoadjuvant therapy, submitting an entire slice of tumor is required. Spatial mapping of histologic sections is crucial in order to provide accurate information and to avoid errors (Figures 3-5).

6. Sampling of the tumor to access chemotherapy response is needed for some specimen types (i.e., Ewing sarcoma). This is typically performed by taking one full cross-sectional slab of tumor at its greatest cross-sectional area, along with appropriate specimen photograph and mapping (Figure 6). The percentage of viable tumor estimation by microscopic examination is calculated by the sum of all areas divided by the total cross-sectional tumor.

7. Given the increasingly utilized molecular genetic analysis in the diagnosis of soft tissue tumors, it is important to triage fresh tumor tissue for ancillary studies. While formalin-fixed paraffin-embedded tissue can be utilized for many molecular analysis including,

FISH, RT-PCR and next generation sequencing, fresh frozen tissue remains ideal for most cytogenetic analyses, high throughput genomic studies, and long-term storage for potential future studies (following institution's biospecimen repository protocols).

8. Some specimens requires fixatives other than formalin. For example, gouty crystals are water-soluble thus should be submitted in alcohol. Lymphoma may rarely present as a soft tissue mass. Thus, when in doubt, a portion of lesional tissue can be submitted in Roswell Park Memorial Institute (RPMI) medium for flow cytometry analysis.

References:

1. Coindre JM. Grading of soft tissue sarcomas: review and update. Arch Pathol Lab Med. 2006;130(10):1448-53.

2. Costa J, Wesley RA, Glatstein E, Rosenberg SA. The grading of soft tissue sarcomas. Results of a clinicohistopathologic correlation in a series of 163 cases. Cancer. 1984;53(3):530-41.

3. Guillou L, Coindre JM, Bonichon F, Nguyen BB, Terrier P, Collin F, et al. Comparative study of the National Cancer Institute and French Federation of Cancer Centers Sarcoma Group grading systems in a population of 410 adult patients with soft tissue sarcoma. J Clin Oncol. 1997;15(1):350-62.

4. Fletcher CDM, World Health Organization., International Agency for Research on Cancer. WHO classification of tumours of soft tissue and bone. 4th ed. Lyon: IARC Press; 2013. 468 p. p.

5. Amin MB, American Joint Committee on Cancer., American Cancer Society. AJCC cancer staging manual. Eight edition / editor-in-chief, Mahul B. Amin, MD, FCAP ; editors, Stephen B. Edge, MD, FACS and 16 others ; Donna M. Gress, RHIT, CTR - Technical editor ; Laura R. Meyer, CAPM - Managing editor. ed. Chicago IL: American Joint Committee on Cancer, Springer; 2017. xvii, 1024 pages p.

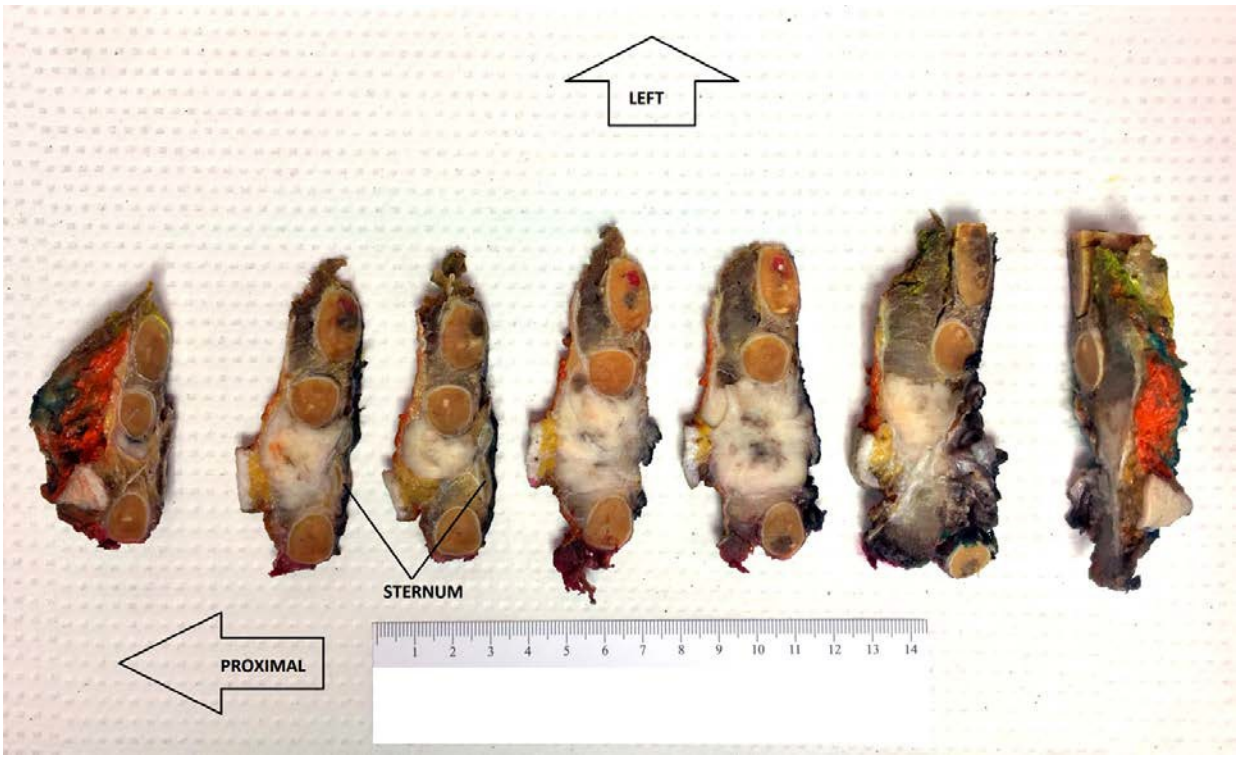


Figure 1. Dissection of chest wall sarcoma. Serially sectioning of the tumor to demonstrate its relationship to adjacent anatomic structures (sternum and ribs) and margins as desginated by different inks.

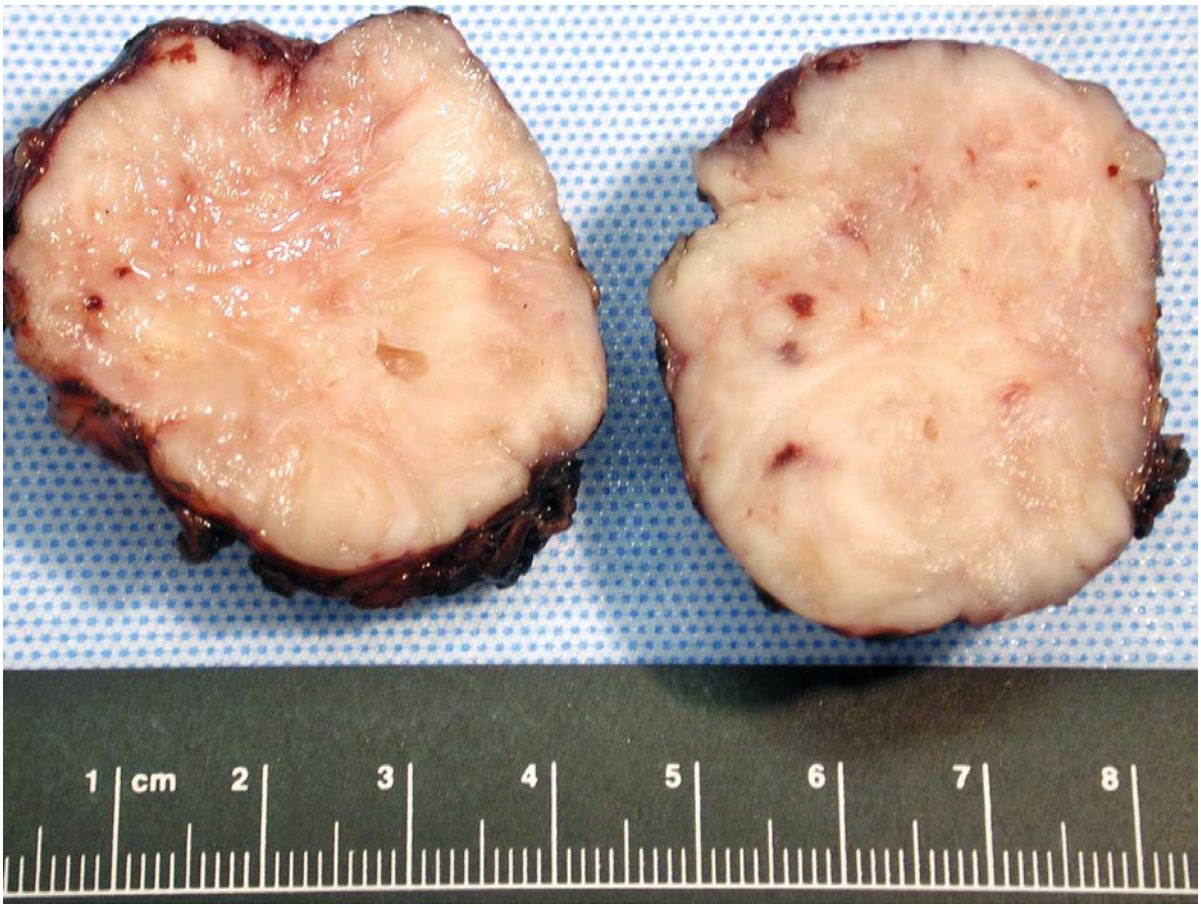


Figure 2. Cross sections of retroperitoneal mass. The tumor is grossly present at undesignated inked margins.

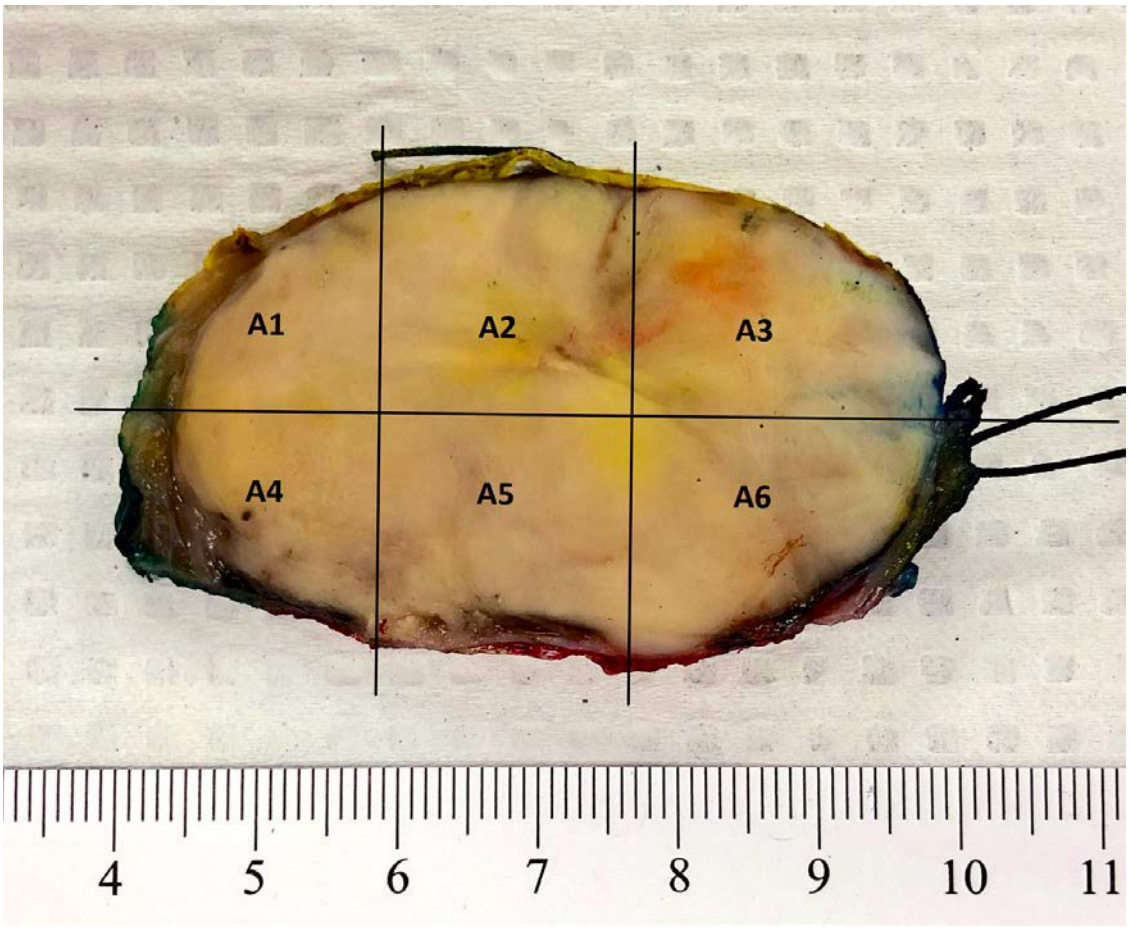


Figure 3. Marginal resetion of recurrent soft tissue sarcoma. A slice of tumor is entirely submitted with mapping of histologic sections.

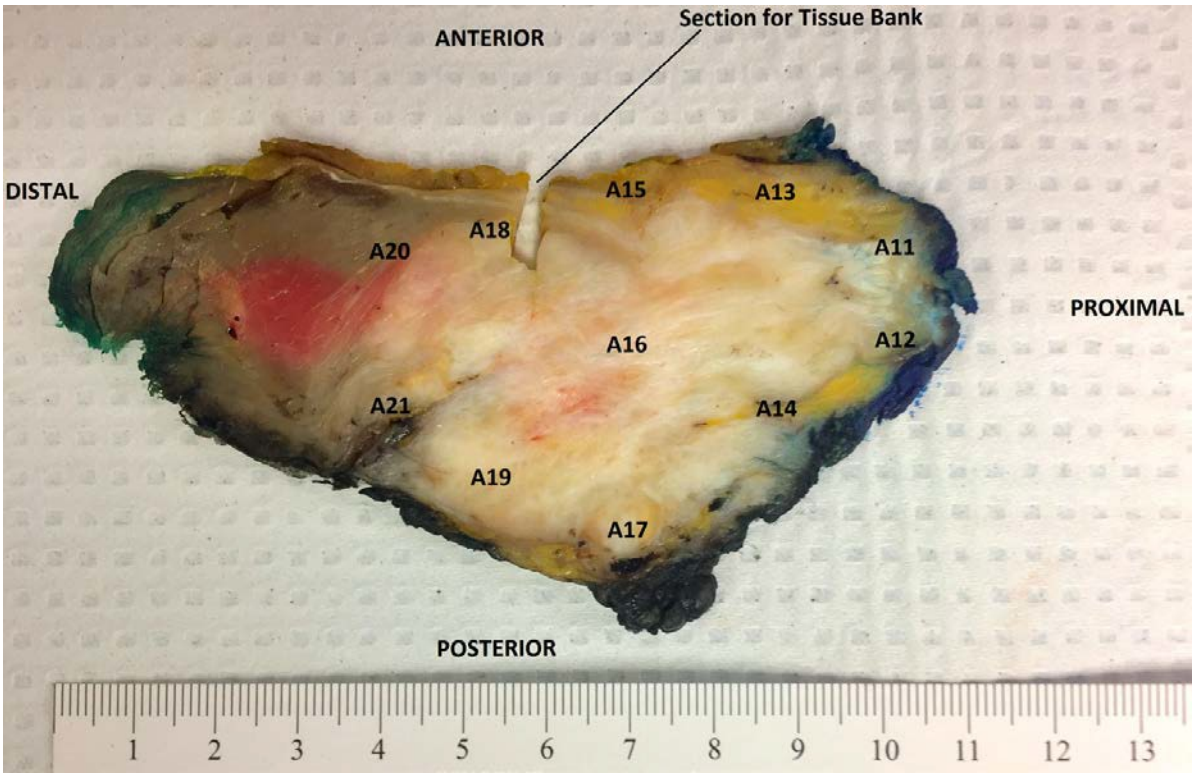


Figure 4. Cross section of soft tissue sarcoma. The cut surface demonstrates a homogeneous consistency. Representative sections with mapping of histologic sections.

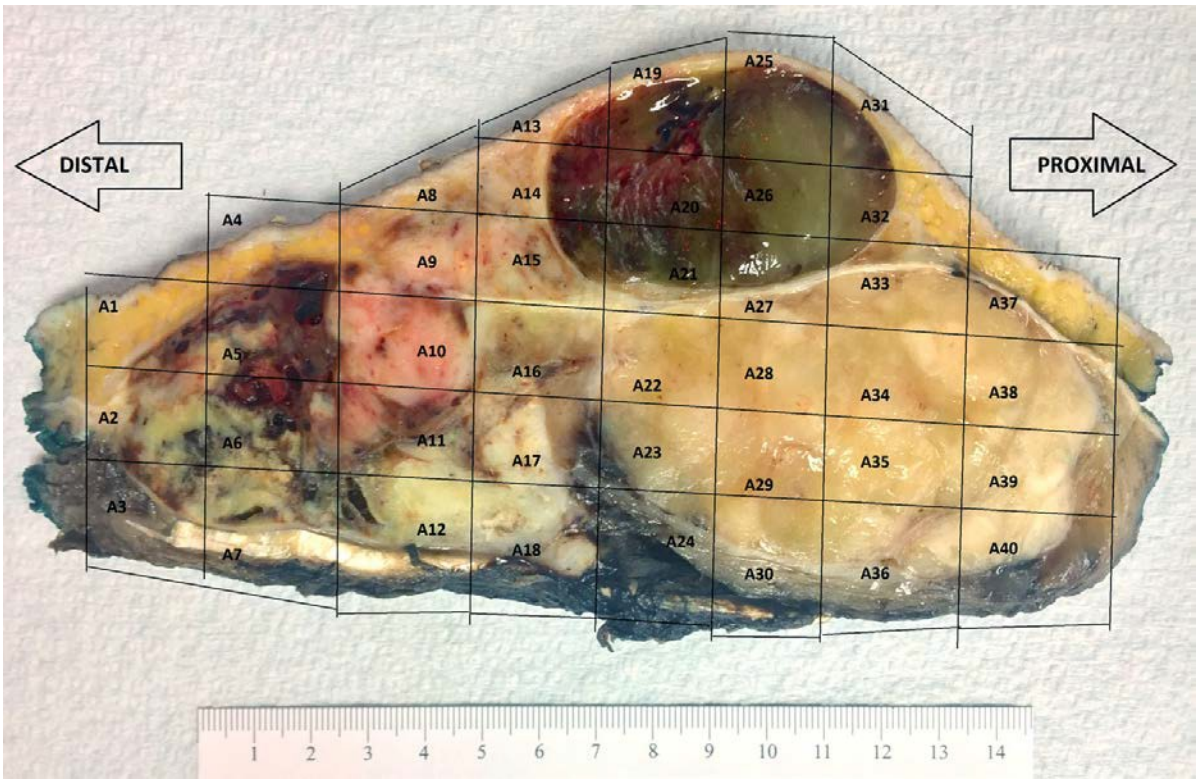


Figure 5. Cross sections of a large soft tissue sarcoma with heterogeneous appearing cut surface. An entire slice is submitted with mapping of histologic sections.

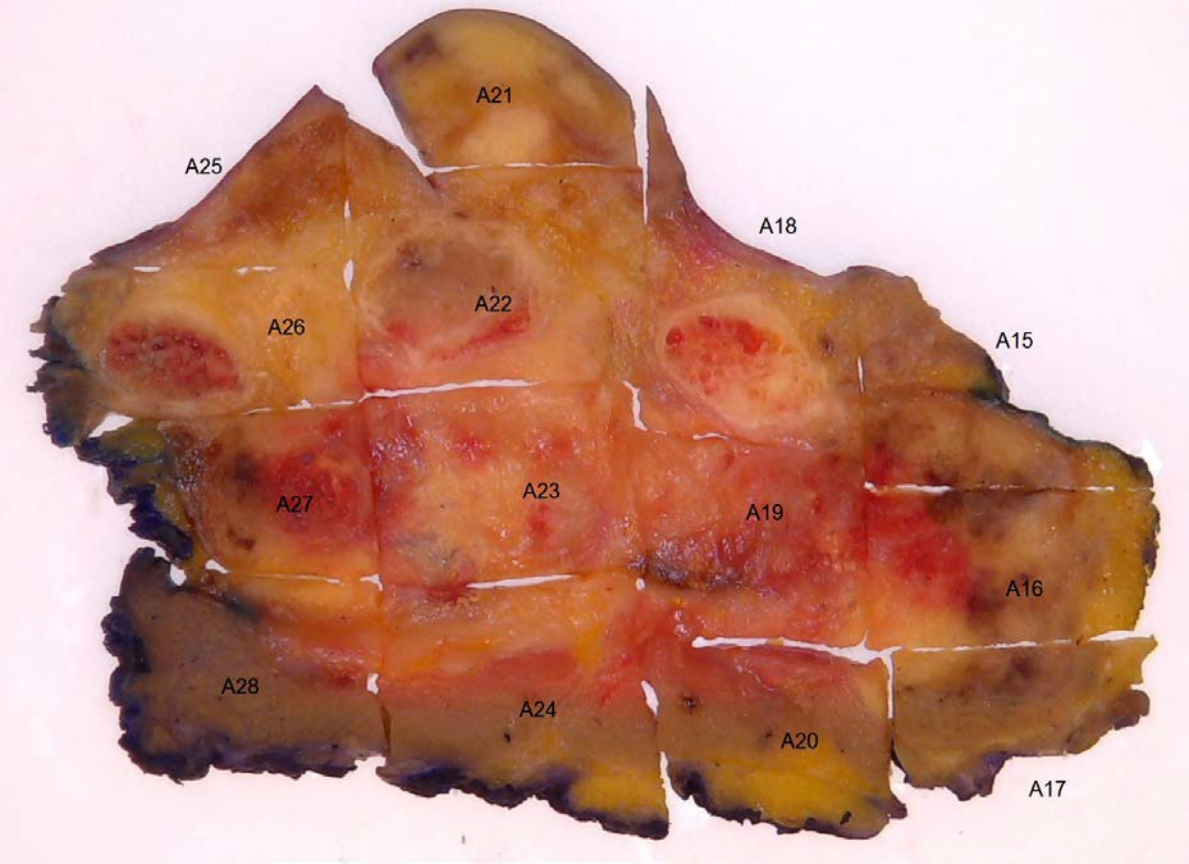


Figure 6. Cross section of Ewing sarcoma after neoajuvant chemotherapy. A slab of tumor is entirely submitted with mapping of histologic sections.

PLACENTAL GROSS EXAMINATION

Umbilical Cord

1. Color
2. Measurements – length, average diameter
3. Insertion type (eccentric, marginal, velamentous) – if velamentous, measure length of intramembranous vessels and evaluate for integrity/thrombus
4. Distance from insertion site to nearest margin
5. Average number of coils/10cm: Hypercoiled cords (defined as >3 coils/10 cm), describe coiling pattern (undulating, ropelike, segmented, linked); Measure the most representative area, if there is variation along the cord then dictate as such)
6. Helical twisting direction (as it twists toward disc) – leftward most common
7. Number of vessels (normal is 3)
8. Knots:
    - False knot = varices (usually not clinically significant)
    - True knot – note whether it is tight, and whether up or downstream congestion is present in adjacent vessels
9. Note any marked changes in caliber, thrombosis or necrosis
10. Trim ~5 cm above placental disc
11. Look carefully for cord lesions – if you see punctate white superficial cord lesions this is characteristic of Candidal infection (see photo below)

******Notify perinatal attending if you see these cord lesions******
On the weekend, if the perinatal attending is unavailable, notify the RNICU clinician caring for the baby that you see cord lesions that might indicate Candidal infection

Membranes

Extraplacental membranes

1. Note color and character (yellow, green, white, brown; translucent, opaque)
2. Insertion type (marginal, circummarginate, circumvallate)
3. Look for and sample amnion nodosum (small white-yellow punctate lesions on membranes or chorionic plate)
4. Membrane roll: cut a strip of membrane a few inches wide, roll it to the margin using forceps, pin, cut – also take a small “bite” of the placental margin where it connects to the membranes (see photos below)

Chorionic plate

1. Color/character
2. Vessels
    - Arteries cross over veins
    - Demonstrate patency (firm, white regions of vessels may be thromboses – sample these);
    - Describe if unusually dilated or tortuous
3. Subchorionic fibrinoid deposition (eg, minimal, mild, moderate, marked)

Placental Disc

1. Measure in 2 dimensions, give thickness as an average and a range
2. Describe shape (ovoid, elliptical, band-like, bilobed)
3. If accessory (smaller) lobe(s) present, measure and describe – measure length and describe integrity of intramembranous connecting vessels
4. Weigh after trimming cord and membranes
5. Serially section, keeping disc intact
6. Examine for lesions – give % of total parenchymal volume; common examples:
    a. Infarcts (dark maroon villous tissue = early; white firm = late)
    b. Intraparenchymal hemorrhage (often round, lamellated clots within the parenchyma)
    c. If anything looks very different from "normal" examples below, take photographs and consult perinatal attendings as needed
7. Take at least 2 transmural sections, including chorioamnion and decidua basalis
8. Sample any lesions representatively as additional sections (one section of infarction or hemorrhage is enough)

Multiple gestations

1. **Ask for help** if you have not grossed several of these with supervision
2. Do **all of the same things as above for singleton**, with additional considerations below:
3. Determine placentation, describe dividing membrane (see below for photos/diagrams)
    - Diamniotic/dichorionic separate discs ("Di/Di", separate bags, separate placentas, **opaque** dividing membrane)
    - Diamniotic/dichorionic fused discs ("Di/Di", separate bags, fused **not shared** placentas, **opaque** dividing membrane)
    - Diamniotic/monochorionic ("Di/Mo", separate bags, **shared** placenta, **translucent** dividing membrane)
    - Monoamniotic/monochorionic ("Mo/Mo", **shared** bag, **shared** placenta, **translucent** dividing membrane)
4. Membrane rolls: sample one from each domain, and one from dividing membrane
5. Weigh placenta after trimming (do **not** cut apart fused discs; can weigh separate discs together)
6. For Di/Mo and Mo/Mo, look for vascular anastomoses (**Ask for help with this**)

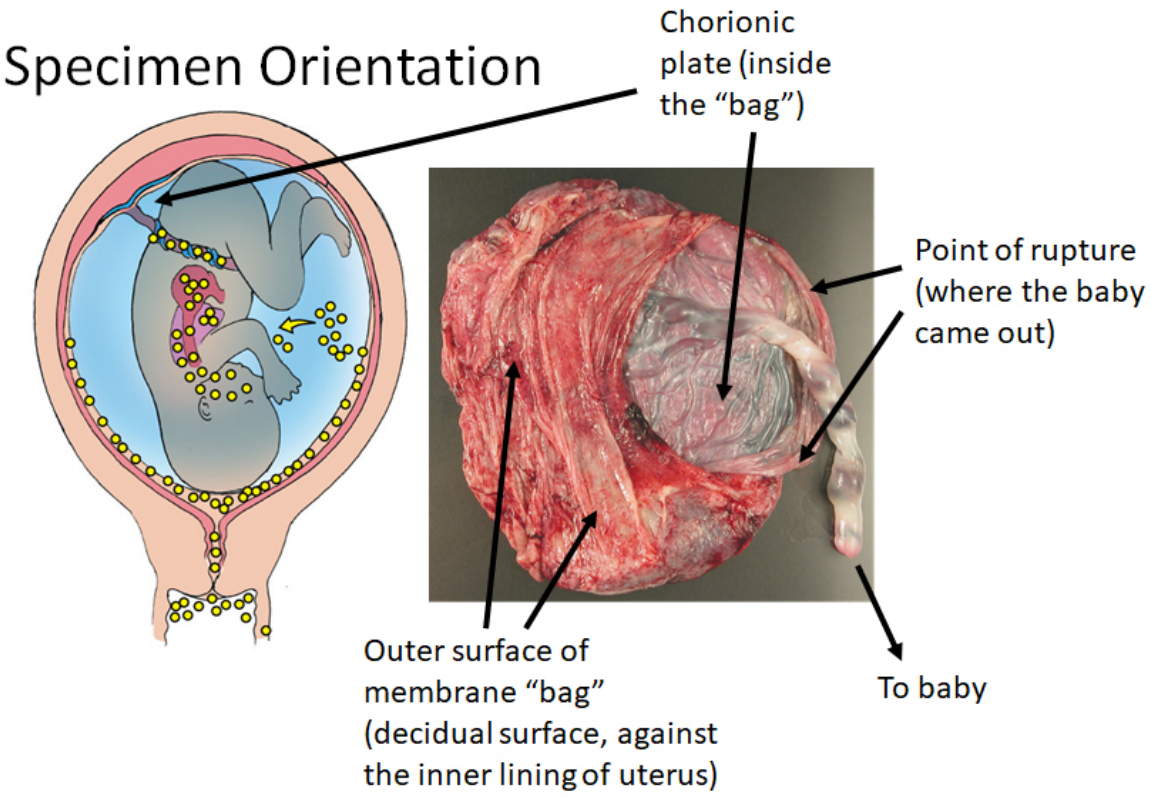
Examples of situations to call the attending:

1. Umbilical cord lesions characteristic of Candida (this is the big one! Always call)
2. History of amniotic band syndrome (findings can be subtle)
3. Request for genetics testing
4. Very large placenta, especially with enlarged vessels and/or hydropic or cystic looking villi (this could be a molar pregnancy and is very important to retain fresh tissue)
5. Really any markedly abnormal findings (eg, large masses of cord or disc)

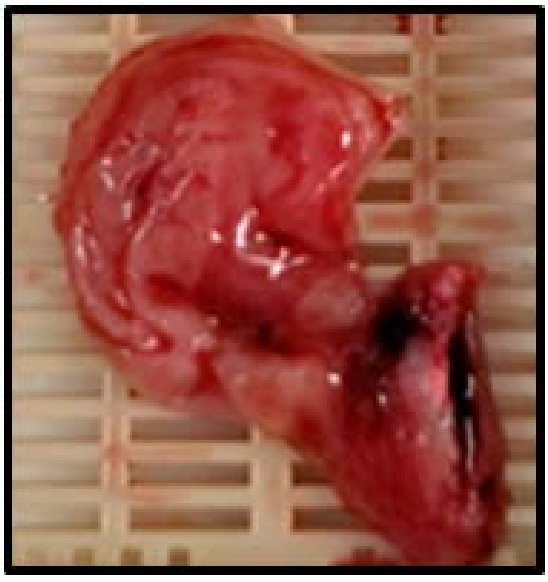
PLACENTAL GROSSING ATLAS

"Typical" Membrane and Cord Color Associations	
Clear/translucent	Normal
Green	Meconium
Brown	Hemorrhage
Yellow/dull	Infection

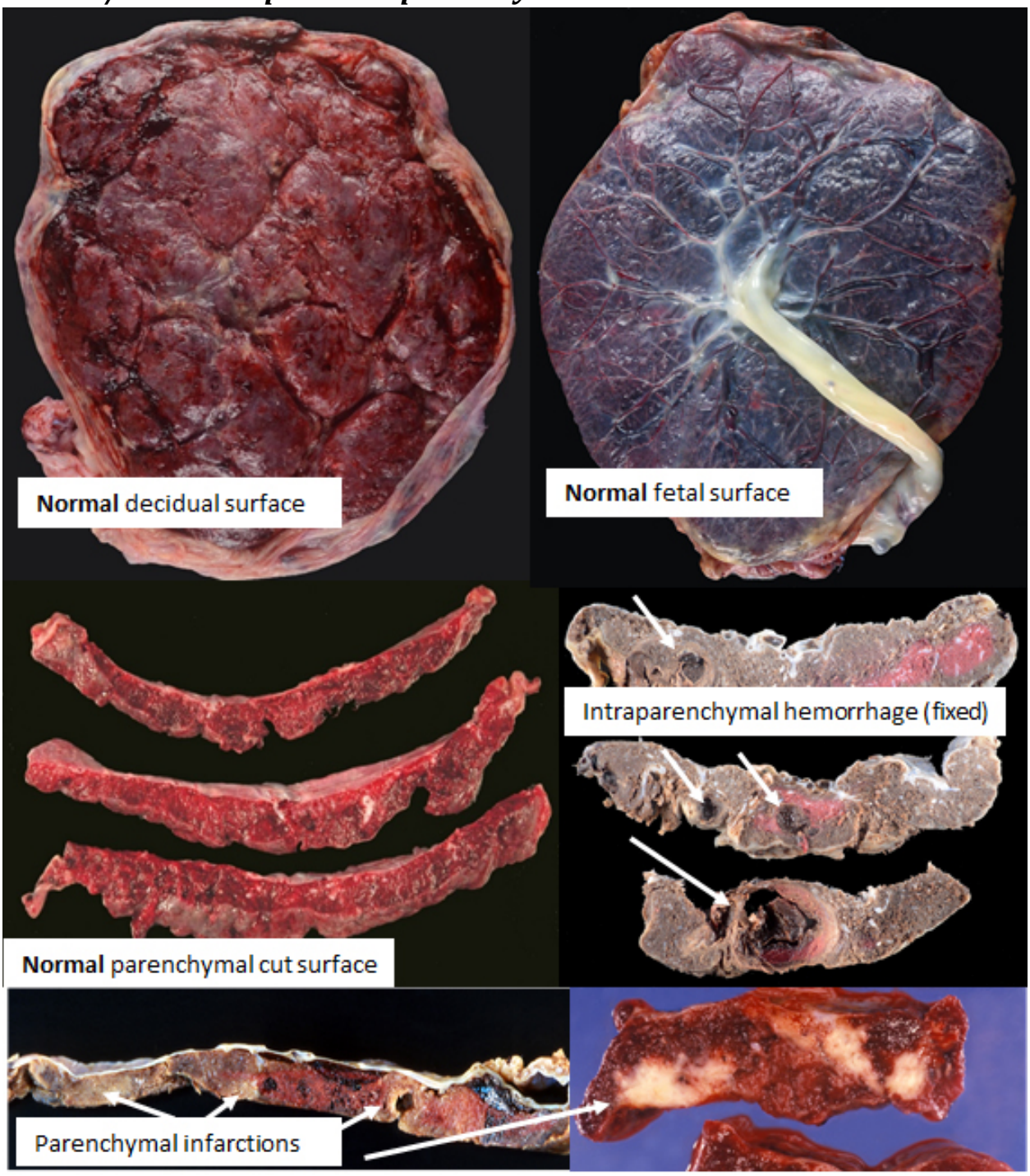
Specimen Orientation



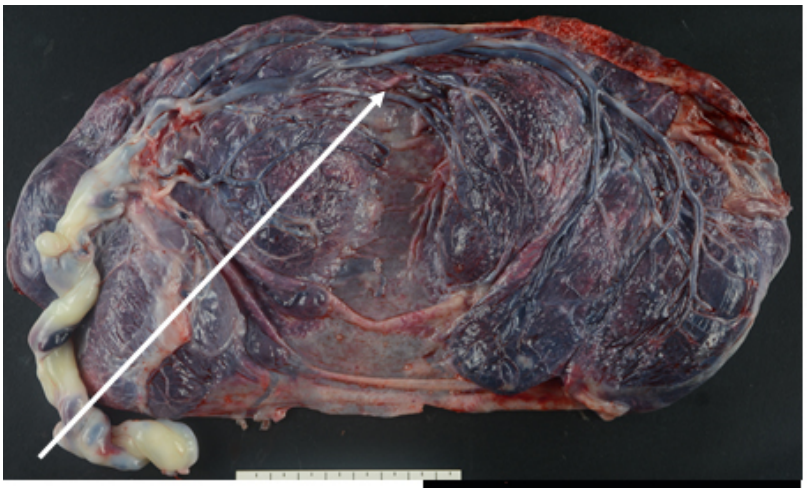
Cutting a Membrane Roll



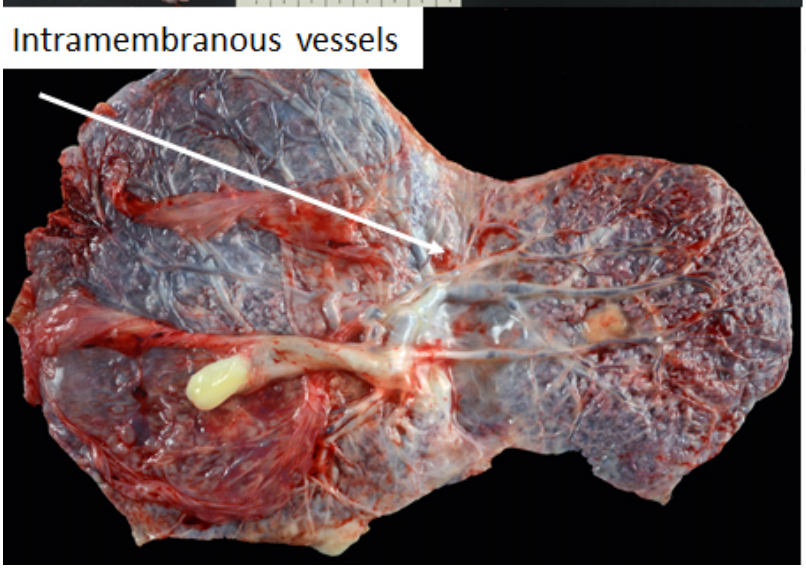
Normal/Abnormal placental parenchyma



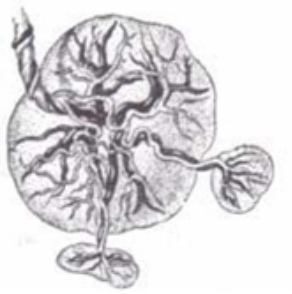
Placental Lobation



Intramembranous vessels

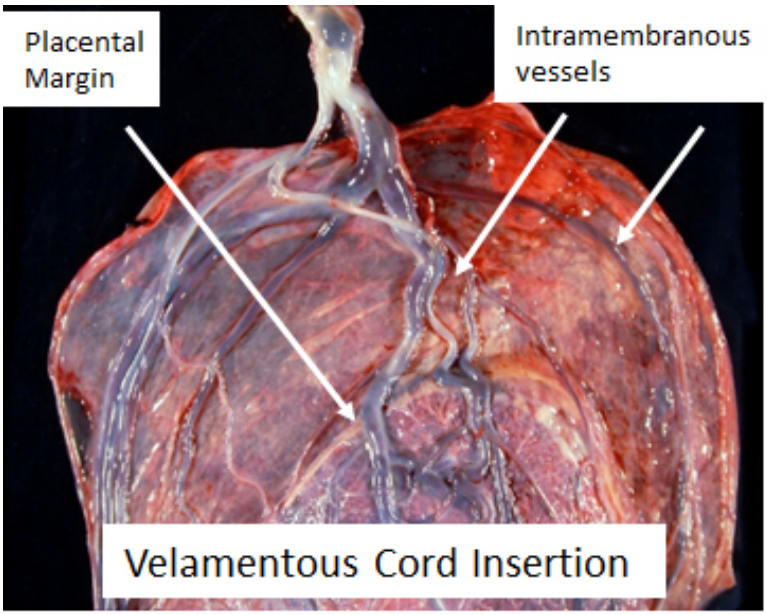


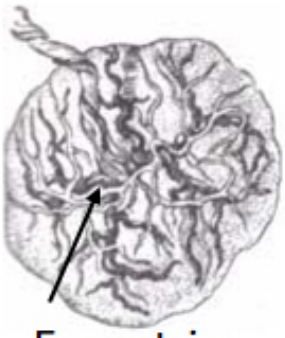
Bilobate (equal lobes)



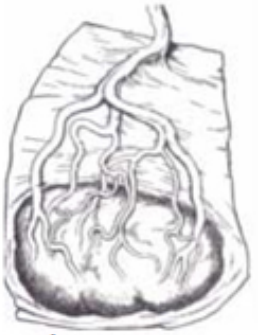
Accessory Lobe (smaller)

Umbilical Cord Insertion Patterns



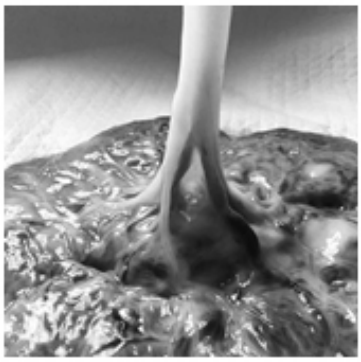


Eccentric



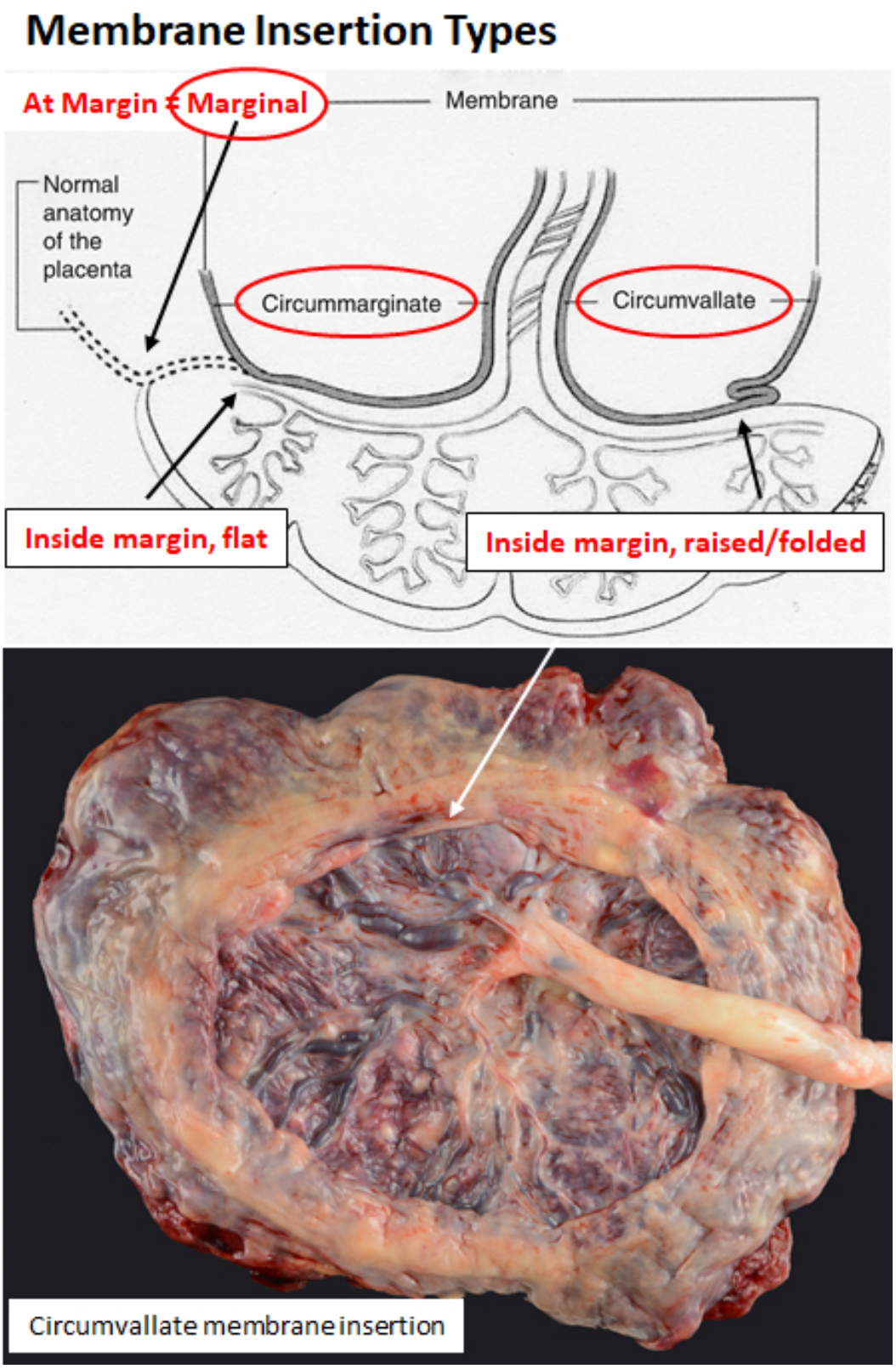
Velamentous

Marginal

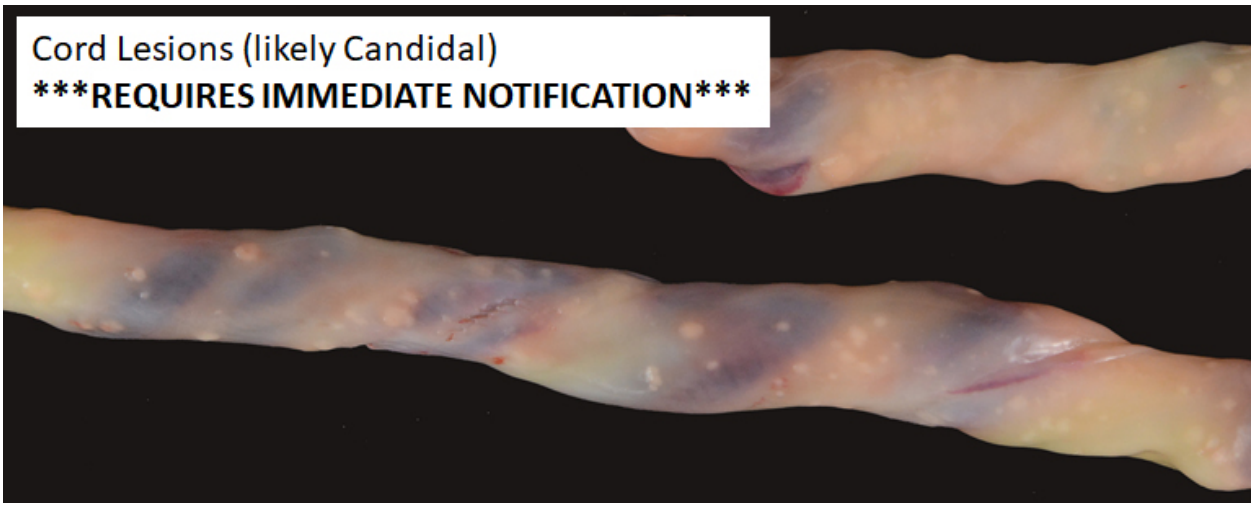


Furcate

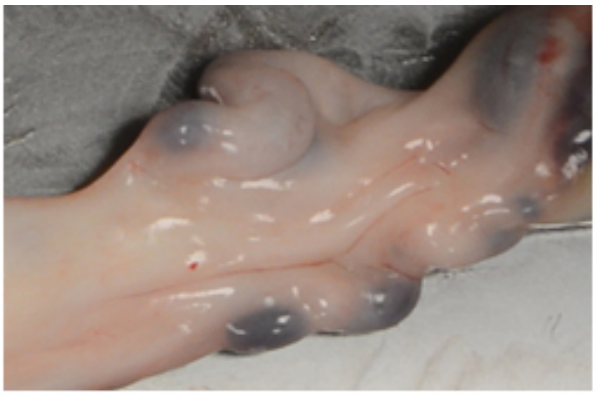
Membrane Insertion Patterns



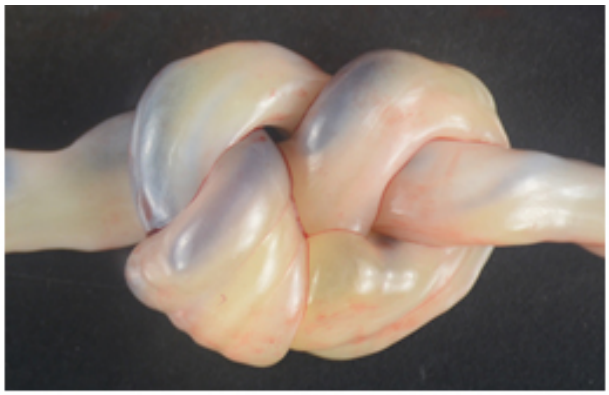
Umbilical Cord Lesions



Umbilical Cord Knots



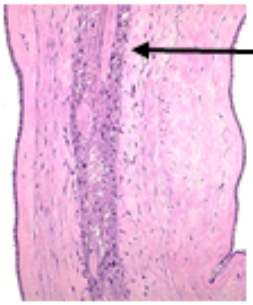
False Knot (varix)



True Knot (complex, loose)

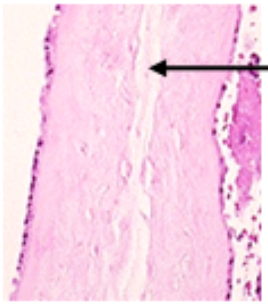
Multiple Gestation

Twin Placentation



Di/Di
Opaque dividing membrane (decidual layer between)

Dichorionic/Diamniotic



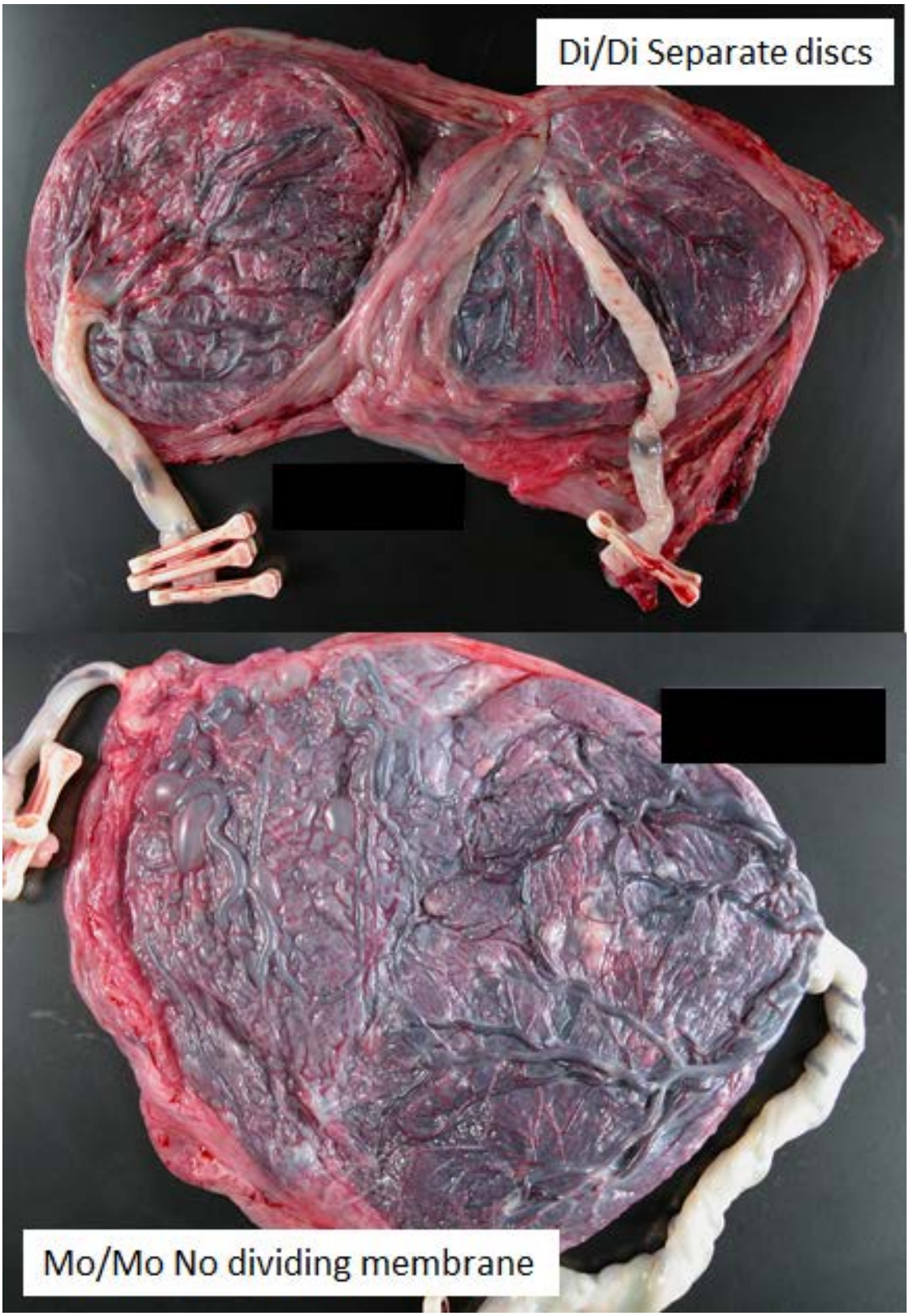
Di/Mo
Translucent dividing membrane (only chorion, no decidua between)
Risk for twin-twin transfusion syndrome (TTTS)

Monochorionic/Diamniotic

Mo/Mo
No dividing membrane (share the "bag")
Risk TTTS, cord entanglement, conjoined twinning

Monochorionic/Monoamniotic

Twin Placenta Examples



SAMPLE DICTATION/TEMPLATE

Singleton placenta gross description:
The specimen is received fresh, labeled with the patient's name, medical record number, and "[]". It consists of an [intact/partially disrupted/fragmented], singleton, [] g (trimmed weight), [_ x _] cm, [ovoid/irregular/triangular] placenta with a [3 (2)]-vessel umbilical cord. [An additional, _x_x_cm accessory lobe with [intact appearing (discolored, yellowish green/brown)] intramembranous vasculature, [] cm from the nearest placental margin.]

Umbilical cord: The attached umbilical cord is [glistening white/yellowish/greenish/pink-tan/red-brown] and shows [eccentric/marginal = ≤1 cm from nearest margin/velamentous)] insertion, [] cm away from the nearest placental margin. [Intramembranous segments range from _cm to _ cm in length and appear intact and patent; the surrounding membranes are/are not brown yellow discolored. There are additional, _ cm intramembranous branches that course along the placental margin.] It is [] cm in length and [] cm in diameter. The cord shows [] coils/10 cm and a leftward twist direction. [The hypercoiled cord shows an/a undulating, rope-like segmented/linked pattern.] Cord vessels are patent. True cord knots are not identified. No cord lesions are seen. A separate, [] cm long, [] cm in diameter segment of similar-appearing umbilical cord is present in the container.

Placenta: The membranes display [marginal (_% circummarginate/circumvallate)] insertion, are [_]% complete, and [translucent (olive-green/yellow-green/and opacified)]. The chorionic vessels ramify [evenly] from the cord insertion site and are [patent (Possible venous/arterial thrombi are seen in proximal/distal vascular branches)]. The fetal surface shows a [minimal (moderate, marked)] amount of subchorionic fibrinoid deposition [(plaques, nodules, subchorionic thrombohematomas affect _% of fetal surface)]. The maternal surface displays [intact (disrupted)] cotyledons, and a [thin layer] of adherent decidua. Maternal surface infarctions are not noted. [Infarctions/gritty calcifications affect _% of the maternal surface.] No retroplacental hematoma is identified. [A margin-associated, retroplacental acute blood clot is seen; it is [] cm, affects []% of the maternal surface, and does/does not dissect into the adjacent parenchyma. (This blood clot is adjacent to the marginal cord insertion site.)] Serial sectioning of the placenta reveals a [spongy, red-brown (pale/congested, firm, gritty, variegated)] cut surface with a mural thickness of [_-_] cm with most showing a [_] cm thickness. [Describe regions of mural thinning, location, and dimensions/% of parenchyma affected] Parenchymal infarctions are not identified. [Recent appearing reddish, pale and/or firm, basal/mid-zonal/subchorial/transmural parenchymal infarctions are noted in the paracentral/peripheral regions and affect []% of the total parenchymal volume.]

PLACENTAL WEIGHT NORMS BY GESTATIONAL AGE

SINGLETON PLACENTAS		TWIN PLACENTAS		TRIPLET PLACENTAS	
WK G	**Expected wt (5th - 95th centiles)**	**WK G**	**Expected wt (5th - 95th centiles)**	**WK G**	**Expected wt (5th - 95th centiles)**
11	**13.3 – 17.0 g**	**19**	**161 – 263 g**	**20**	**226 - 285 g**
12	**27.2 – 30.4 g**	**20**	**166 – 270 g**	**21**	**257- 320 g**
13	**41.1 – 43.8 g**	**21**	**176 – 286 g**	**22**	**289 - 345 g**
14	**54.8 – 57.3 g**	**22**	**191 – 310 g**	**23**	**331 - 400 g**
15	**68.4 – 71.0 g**	**23**	**210 – 343 g**	**24**	**371 - 445 g**
16	**81.8 – 84.8 g**	**24**	**232 – 382 g**	**25**	**408 - 498 g**
17	**95.2 – 98.6 g**	**25**	**257 – 426 g**	**26**	**444 - 558 g**
18	**108.5 – 112.5 g**	**26**	**284 – 475 g**	**27**	**480 - 630 g**
19	**121.8 – 126.6 g**	**27**	**314 – 528 g**	**28**	**516 - 697 g**
20	**135 – 140 g**	**28**	**345 – 584 g**	**29**	**553 - 772 g**
21	**114 – 172 g**	**29**	**377 – 641 g**	**30**	**591 - 849 g**
22	**122 - 191 g**	**30**	**409 – 700 g**	**31**	**631 - 925 g**
23	**133 – 211 g**	**31**	**441 - 758 g**	**32**	**674 -1000 g**
24	**145 – 233 g**	**32**	**472 – 815 g**	**33**	**719 - 1072 g**
25	**159 – 256 g**	**33**	**503 - 870 g**	**34**	**768 - 1139 g**
26	**175 - 280 g**	**34**	**531 – 923 g**	**35**	**821 - 1200 g**
27	**192 – 305 g**	**35**	**558 – 971 g**	**36**	**878 - 1253 g**
28	**210 – 331 g**	**36**	**582 – 1014 g**	**37**	**940 - 1297 g**
29	**229 – 357 g**	**37**	**602 – 1051 g**	**38**	**1007 - 1330 g**
30	**249 – 384 g**	**38**	**619 – 1082 g**		
31	**269 – 411 g**	**39**	**631 – 1105 g**		
32	**290 - 438 g**	**40**	**639 – 1118 g**		
33	**311 – 464 g**	**41**	**642 – 1123 g**		
34	**331 – 491 g**				
35	**352 – 516 g**				
36	**372 - 542 g**				
37	**391 – 566 g**				
38	**409 – 589 g**				
39	**426 - 611 g**				
40	**442 – 632 g**				
41	**456 - 651 g**				

REFERENCES:

1. Dimmick JE, Kalousek DK. Developmental Pathology of the Embryo and Fetus. Philadelphia PA: JB Lippincott Co; 1992:823.

2. Pinar H, Sung CJ, Oyer CE, Singer DB. Reference values for singleton and twin placental weights. Pediatr Pathol Lab Med. 1996;6:901-907.
3. Pinar H, Stephens M, Singer DB, Boyd TK, Pflueger SM, Gang DL, Roberts DJ, Sung CJ. Triplet placentas: reference values for weights. Pediatr Dev Pathol. 2002;5:495-498.
4. Lester, S. Manual of Surgical Pathology. 3rd ed. Philadelphia, PA. Elsevier Inc. 2010.
5. Hereema-McKenney A, et al. Diagnostic Pathology: Placenta. Philadelphia, PA. Elsevier Inc. 2015.

PRODUCTS OF CONCEPTION

No Fetal Parts grossly identified

1. These can be dictated to GYN attending
2. Look for villous tissue (white/pinkish, spongy)
3. Submit minimum of 3 cassettes
4. What to watch out for: Hydropic villi (small, grape-like, vesicular enlargement of villi): this could be a molar pregnancy -> **If you see this, consult perinatal attending BEFORE FIXATION (special studies may be needed; refrigerate overnight or over weekend if necessary)**

Fetal Parts identified, <13 weeks

Approach these specimens like an external-only autopsy

1. Consult with perinatal attending/MDL technicians on all of these cases
2. Dictate the case to perinatal attending and put in queue
3. Photograph fetal parts (arrange parts in roughly anatomical position, arranged for maximum visibility of important features)
4. Take standard measurements of available fetal parts if possible (crown-rump, foot length, hand length – you can nearly always get at least a foot length)
5. Separately weigh aggregates of placental/decidual and fetal tissues
6. Evaluate for development using table:

GESTATIONAL AGE (WEEKS)	FOOT LENGTH	CHARACTERISTICS
6		Digital rays in hand plate, paddle limbs
7		Retinal pigment, foot plates
8		Digital rays in feet, elbow
9		Fingers
10		Toes, gut herniation (physiologic omphalocele)
11	7 mm	Eyes closing/closed
12	9 mm	Intestines in abdomen, fingernails
14	14 mm	Gender identifiable by external examination
16	20 mm	Toenails

7. Describe in detail what fetal parts are present (see sample dictation below)
8. Careful examination for anomalies – some examples that can be seen in fragmented fetuses:
    a. Limb defects (digit abnormalities, radial abnormalities, contractures/webbing, fractures)
    b. Craniofacial defects (palatal defects, scalp defects, eye abnormalities, ear abnormalities)
    c. Midline thoracoabdominal defects
    d. Neural tube defects (encephalocele, anencephaly, spinal dysraphism)
    e. Visceral organ abnormalities (multicystic/dysplastic kidneys, cardiac defects)

    ****Consult perinatal attending if anomalies found or if you're not sure****
9. Describe placental parts in as much detail as possible (see sample dictation below, and you may consider using a variation of the standard placental dictation template/instructions)

Fetal specimens >/=13 weeks: give the specimen to the MDL technicians for processing (Residents may request to participate if desired; if the fetus is intact, this will fulfill one of your 3 required previable fetus evaluations)

Sample gross description template:

The specimen is received [fresh], labeled with the patient's name, medical record number, and "[ ]" Received is a [vacutainer] containing fragments of fetal and placental tissue.

Measurements:
Fetal tissue aggregate weight: [ ] g
Fetal tissue aggregate measurements: [ ] x [ ] cm
Fetal Foot length = [ ] cm
Placental tissue aggregate weight: [ ] g
Placental tissue aggregate measurements: [ ] x [ ] cm

Fetal tissue: Multiple fragments of fetal tissue are present, consisting of [choose from options below, and describe accordingly]

- Skin: [red and translucent/red-tan and partially opaque/tan and opaque/macerated]
- Head: [normocephalic/misshaped/collapsed/skull defects/scalp defects]
- Eyes: [present/disrupted, iris, sclerae]
- Nose: [present/disrupted, patent nares, patent choanae]
- Mouth: [present/disrupted, tongue, oral cavity]
- Palate: [present/disrupted, hard palate intact/disrupted, soft palate intact/disrupted]
- Ears: [present/disrupted, normally set/low set/pits/polyps/creases]
- Neck: [disrupted] Chest: [disrupted, other] Abdomen: [disrupted, other]
- Ribs: fragmented, [abnormalities]
- Vertebral column: fragmented, [] cm in aggregate length
- Extremities identified: [#], [No polydactyly or syndactyly/ or describe abnormality]
- Palmar creases: [normal/single palmar crease -which hand]
- External genitalia: [male/female/other] Internal genitalia: [male/female/other]
- Loose organs: [list organs identified]
- Other fetal findings: [ ]

Placental tissue: Multiple fragments of pink-tan villous and decidual tissue [without gross lesions/or describe]

- Umbilical cord: [ ] cm in length, [ ] cm in diameter, [Cut surface shows # vessels.], [type of insertion, if you can tell], [coiling]
- Membranes: [Thin, pink-gray, translucent] [Thickened, green-gray, opaque] Chorionic plate: Largest recognizable fragment [] x [] x [] cm
- Other placental findings: []

Cytogenetics sampling: [Not performed/Performed prior to pathology examination]
Gross photographs: [Taken]

REFERENCES:

1. Dimmick JE, Kalousek DK. Developmental Pathology of the Embryo and Fetus. Philadelphia PA: JB Lippincott Co; 1992:823.
2. Ernst LM, Gawron L, Fritsch MK. Pathologic examination of fetal and placental tissue obtained by dilation and evacuation. Arch Pathol Lab Med. 2013 Mar;137(3):326-37.
3. Lester, S. Manual of Surgical Pathology. 3rd ed. Philadelphia, PA. Elsevier Inc. 2010.

LYMPHOMA PROTOCOL

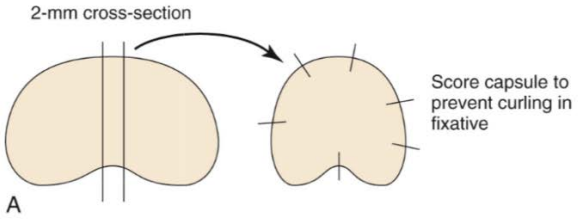
Specimen Handling

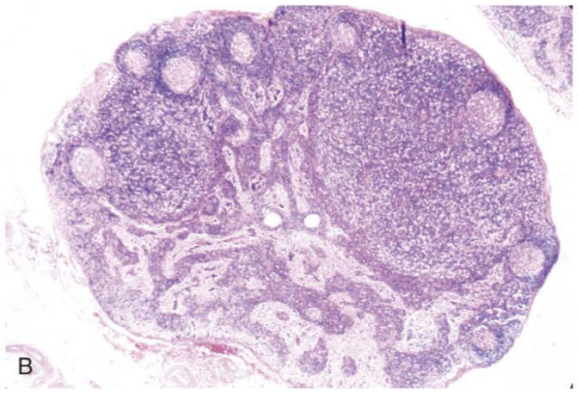
Accessioning Staff will receive the specimen in NP3501, generate labels, attach labels to Surgical Pathology (SP) and Flow Cytometry (FC) requisitions, inform PAs on the specimen arrival (fresh unfixed excisional or needle biopsy). Fresh biopsies from OR/Clinic must be processed in the gross room within 20 minutes of arrival.

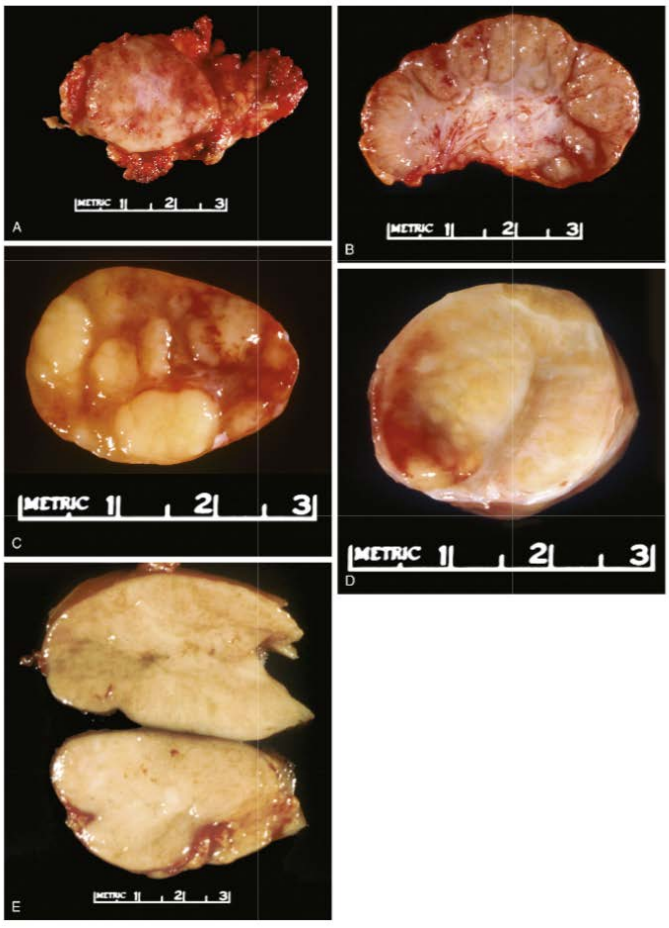
If PAs have any questions on the specimen, they should contact or page Hematopathology fellows or attendings (Drs. Reddy or Peker).

Excisional Biopsy

1. Determine if the specimen is received fresh (i.e. in saline or formalin). Only fresh tissue can be used for flow.
2. Determine if you will have enough tissue for both flow cytometry analysis and permanent section
    a. Optimal amount for flow is the size of a pencil eraser* (0.4-0.8 cm).
    *a smaller piece is ok (yield of viable cells is only known after the specimen is processed by flow lab).
    b. *If there is not enough for both, then always submit tissue for permanent section only*, none to flow (H&E sections and immuno stains will help in diagnosis)
3. Gross the specimen like any other surgical specimen, reserving the fresh portion for FC.
4. Label a FC tube with the patient's name, MR# (or attach label), and specimen site/type.
5. Place FC specimen in the tube and fill the tube with Hank's solution (HBSS bottle, clear fluid in fridge by extremity freezer).
6. Complete the pre-labeled FC requisition (specimen source and check the appropriate box).
7. Handover the FC specimen and FC requisition to the Accessioning staff, who will notify FC lab (4-5615. Specimen will be placed in hallway fridge NP3501 (bin is labelled "Flow Cytometry"). **If it is after hours, leave the flow specimen and form in the fridge bin labelled "flow cytometry", and inform Accession Staff to notify Flow Lab first thing the following morning*


2-mm cross-section
Score capsule to prevent curling in fixative
A


B

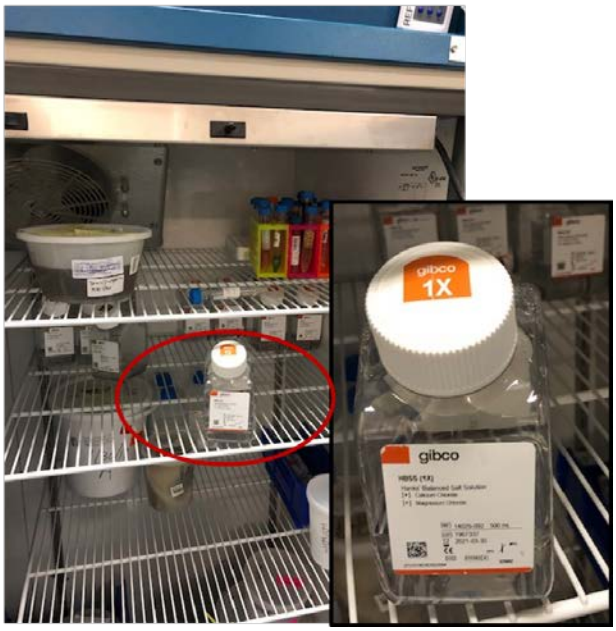

A
B
C
D
E

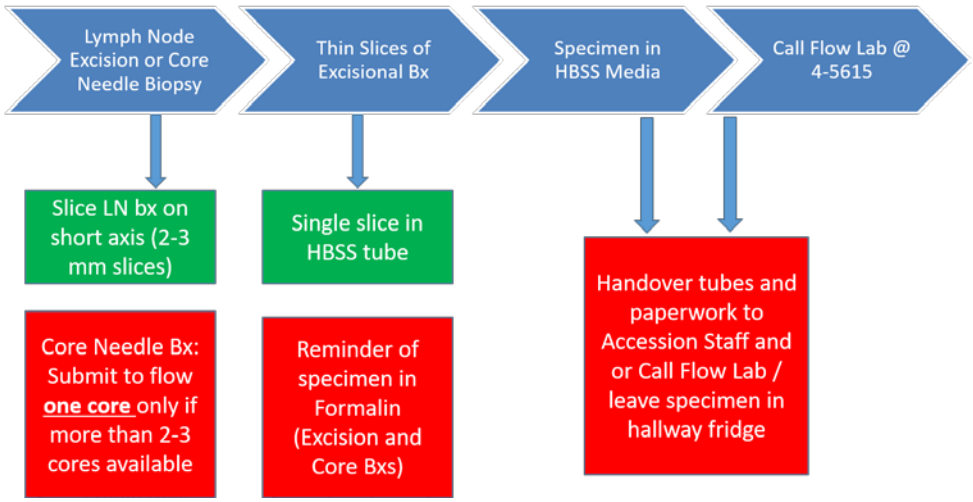
Needle Biopsies

1. Depending on the number of cores, at least 1-2 cores may be submitted for FC (always more for permanent sections and follow the same procedure as above).
2. If core biopsies are small or minimal, then always submit tissue for permanent sections only, none to FC lab.

Note: *The Flow Cytometry Lab (W294) is only staffed from 7:30 AM- 5 PM M-F and does not have a scheduled pickup in NP. Accessioning Staff will notify FC lab @* ***4-5615*** *and notify there is a specimen for pickup in Surg Path. FC staff will pick up the specimen*.

Hank's solution (HBSS) Bottles and Holding Tubes





OTHER SPECIAL HANDLING

Suspected Gout Specimens

All gout or suspected gout cases should be handled and processed in an anhydrous fashion. This means that the specimen should never be placed in formalin or saline. The cassette should be placed in 100% ETOH or Flex 100 and taken to histology for them to process separately from the rest of the specimens. Check with your attending to see if they desire this to be done for the specimen. This creates a lot of extra work for the histotechnologists, so the attending may not always request it.

Submission for Immunofluorescence Studies

Most of these cases are sent as biopsies (most are oral path, dermatology, or renal biopsy specimens) and do not require the attention of the resident. These cases are usually received in Zeus fixative and need to be taken to the Immuno lab. If you see on the permanent request form that IF is requested, ask for help in routing this specimen for appropriate handling.