

Navigating the Freeze on the Hot Seat: What We Have Learned in GI Intraoperative Consultations



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Introduction

Frozen sections (FS) of the gastrointestinal (GI) and hepatobiliary system play a crucial role in improving diagnostic accuracy and guiding surgical interventions



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INDICATIONS OF FROZEN SECTIONS



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LIVER

Primary lesions

Evaluate a mass lesion:

- surgeon examines the surface of liver during abdominal surgery
- intraoperative ultrasound performed for deeper lesions

PMID: 29751885



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LIVER

Primary lesions FS

Purpose is to

- Provide a **diagnosis** for histologic confirmation
- Assess surgical **margins**

PMID: 29751885



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LIVER

FS for Metastatic lesions

- Liver metastasis is a **contraindication** of surgical resection of pancreatic, gastric and esophageal tumors
- For colorectal and gynecological malignancies; FS on metastatic tumor deposits are used to **guide post operative therapy**
- If a mass lesion is seen on surface or on US by the surgeon and initial sections are not diagnostic, **cut deeper sections**

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LIVER

Diagnostic dilemmas... some helpful tips

- Is **the liver cirrhotic?...** **don't mistake FNH for cirrhosis**
- Noncirrhotic liver: **Most likely metastasis or benign**
- Cirrhotic livers: hepatocellular lesion likely malignant

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LIVER

Diagnostic dilemmas... some helpful tips

- Do **NOT** diagnose Hepatocellular adenoma in the setting of cirrhosis

Resection of a **known** unilateral lobe can unexpectedly be found to have a **previously undetected lesion** on the contralateral side



PMID: 28932768

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LIVER

FS most commonly requested to rule out **metastasis**

Bile duct hamartoma: **commonest lesion that surgeon questions as metastasis**

Interactive Microscopy Session: Common and Challenging Diagnostic Dilemmas on Frozen Section Service
Intraoperative Diagnostic Issues in GI Pathology, John A. Hart, MD

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Other indications for FS in GI:

Intraoperative evaluations

- Pancreas
Refer to Dr. Cartwright's presentation ©
- Luminal

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Other indications for FS in GI:

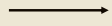
LUMINAL (GEJ, esophageal, gastric, intestinal) FS

- Confirm radiologic lesion has been removed; (Small lesion meant for resection)
- Confirm adequate tissue for diagnosis has been sampled in case of an **unresectable** but no diagnosis; open biopsy performed to **assess for diagnostic material**

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Other indications for FS in GI:

LUMINAL (GEJ, esophageal, gastric, intestinal) FS



Assessment of **margins**



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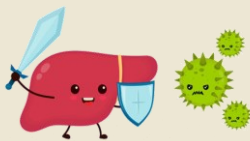
When **NOT** to do a FS

- Appendiceal lesions (to determine **adenocarcinoma vs LAMN vs HAMN**)
- Medical liver



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Let's review some challenging cases

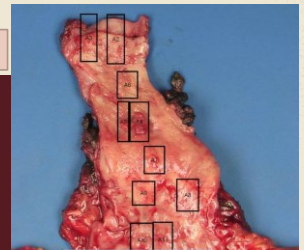


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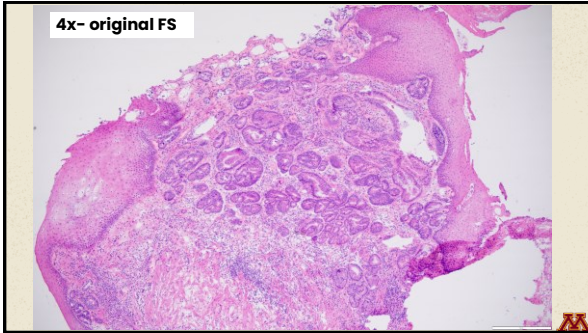
CASE #1

FS requested for proximal margin

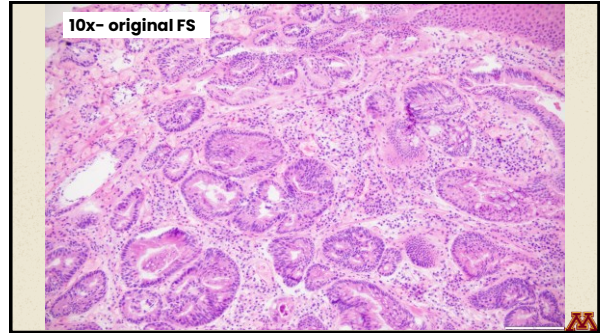
62-year-old man with a known esophageal adenocarcinoma s/p neo-adjuvant chemoradiation now for resection



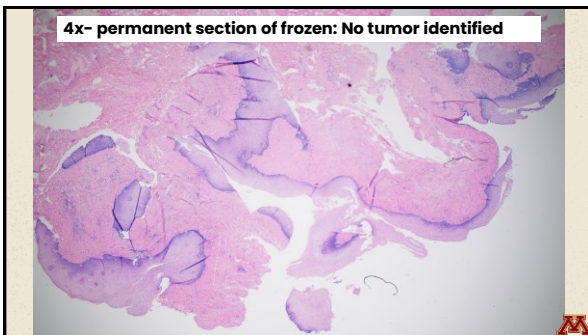
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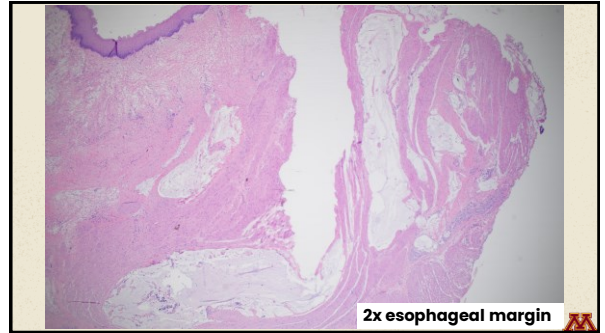
<p>FS: Barrett's esophagus with high grade dysplasia</p>	<p>Final report: Esophageal margin in part B is deemed to be high-grade based on a cribriform morphology (identified only on the original frozen section slide)</p>
<p>Remember: Your FS/Permanent QA should always be what the real FS showed</p>	<p>But margin was revised intraop</p>

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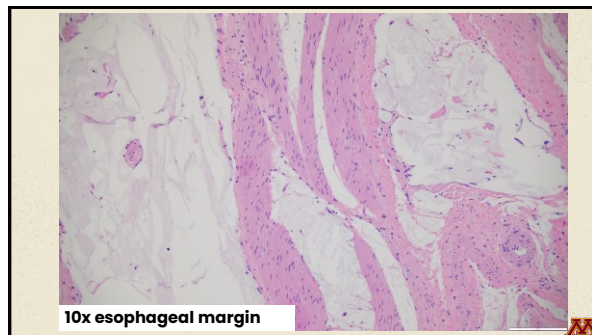
CASE #2

46-year-old man with adenocarcinoma of lower esophagus undergoing resection; surgeon requested for esophageal margin

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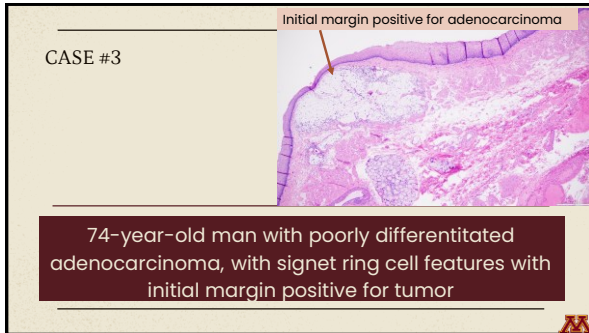


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<p>FS: Negative for in situ or invasive (viable cells) carcinoma</p> <p>Acellular mucin does not count as invasion</p>	<p>Final report: Acellular mucin identified in proximal margin without any evidence of viable tumor cells</p>
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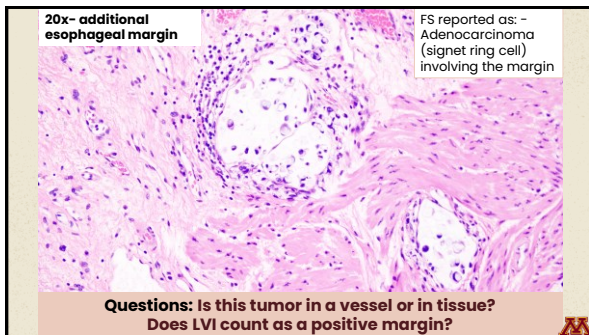
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How to interpret lymphovascular invasion (LVI) in a margin?

- Significance of a margin is - local recurrence
- Significance of LVI - systemic spread
- LVI in margin is not reported as positive
- Another way to report can be tumor present in lymphatic space at the margin

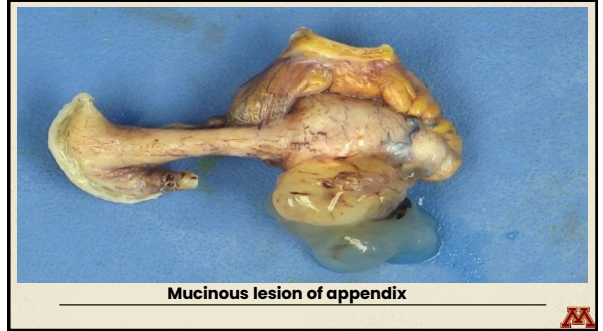
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CASE #4

40-year-old woman with peritoneal carcinomatosis and adnexal cysts and a 5 cm appendiceal mass

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A(1). Omentum, Omentum:

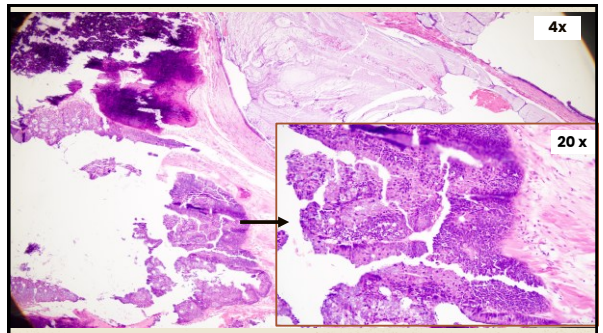
A1FS: Omentum:
Involved by low grade mucinous neoplasm

G(7). Other, PERIGASTRIC NODULE:

G1FS: Perigastric nodule:
-Involved by mucinous neoplasm, favor low grade adenocarcinoma

Surgeon requested a FS on appendiceal lesion for diagnosis : LAMN vs. HAMN vs. adenocarcinoma; which was denied by us

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Final report:

High-grade appendiceal mucinous neoplasm (HAMN), arising in the distal half of the appendix
- Widespread involvement to omentum, falciform ligament, multiple peritoneal abdominal wall surfaces, uterus, vesicouterine peritoneum, bilateral ovaries, and bilateral fallopian tubes

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Why we did not do FS:

- Prognosis of appendiceal adenocarcinoma and LAMN/HAMN are different
- Important criteria is **invasion or not**
- Frozen distortion **WILL** alter this architecture
- Presence of omental lesions do not help
- Important to have **well-fixed and intact appendix**

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Table 6.62 Histological criteria for grading appendiceal mucinous neoplasms and adenocarcinomas and their peritoneal metastases

Tumour grade ^a	Histological criteria	
	In the appendiceal primary tumour	In the peritoneal metastasis
1	Low-grade cytology with a pushing margin (low-grade appendiceal mucinous neoplasm)	Hypocellular mucinous deposits Neoplastic epithelial elements have low-grade cytology No infiltrative-type invasion
2	High-grade cytology with a pushing margin (high-grade appendiceal mucinous neoplasm) Invasive mucinous adenocarcinoma without a signet-ring cell component	Hypocellular mucinous deposits as judged at 20 \times magnification High-grade cytological features Infiltrative-type invasion characterized by jagged or angulated glands in a desmoplastic stroma, or a small mucin pool pattern with numerous mucin pools containing clusters of tumour cells
3	Signet-ring cell adenocarcinoma, with numerous signet-ring cells in mucin pools or entrapping tissue	Mucinous tumour deposits with signet-ring cells ^b

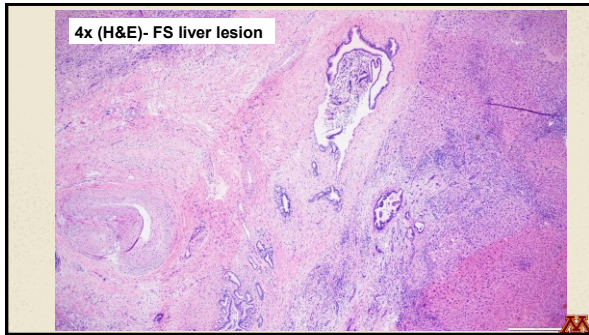
WHO Classification of Digestive Tumours, 5th edition

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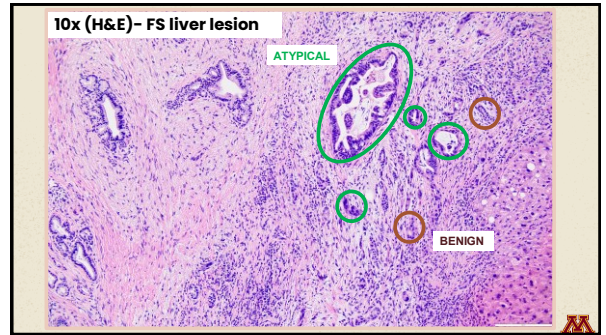
CASE #5

79-year-old man with segment 2 liver lesion during Whipple resection for pancreatic ductal adenocarcinoma –

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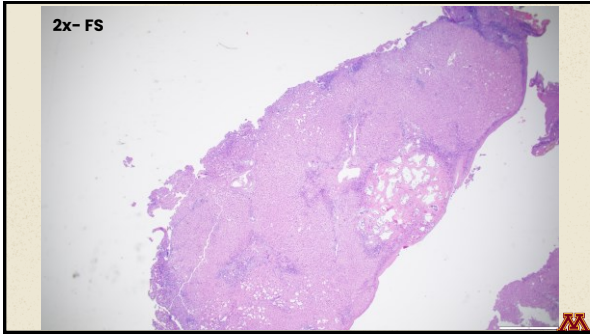
<p>FS:</p> <p>Adenocarcinoma</p> <ul style="list-style-type: none"> Go high power to distinguish between benign and malignant glands Intraoperatively; not possible to distinguish between intrahepatic cholangiocarcinoma and a metastatic adenocarcinoma 	<p>Final report:</p> <p>Positive for adenocarcinoma, compatible with metastasis from the pancreas</p>
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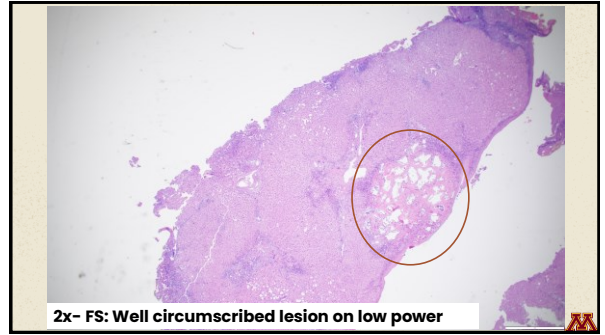
CASE #6

73-year-old man with an incidental **right** liver lobe lesion during resection of intrahepatic cholangiocarcinoma in **left** lobe of liver

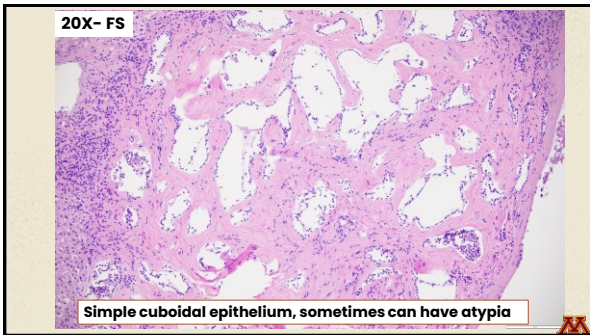
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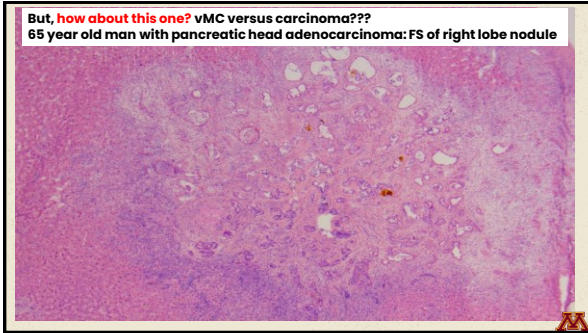
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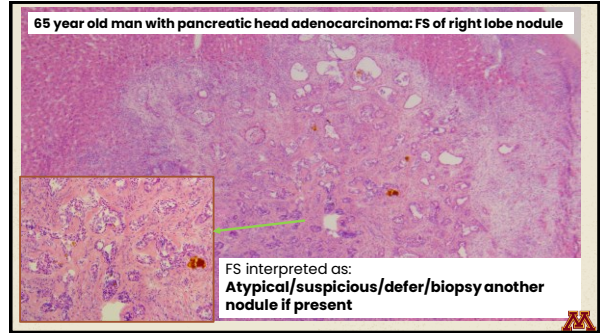
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FS: Benign - bile duct hamartoma	Final report: Bile duct hamartoma
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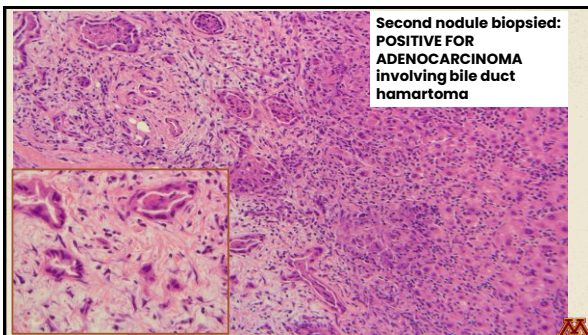
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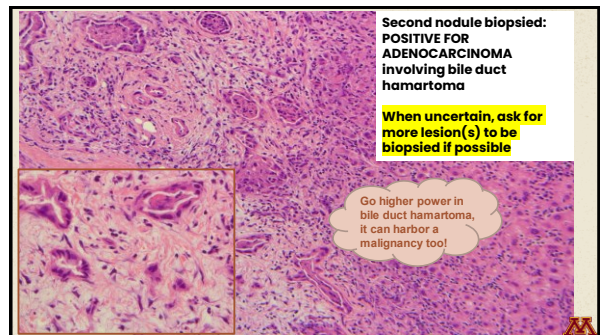
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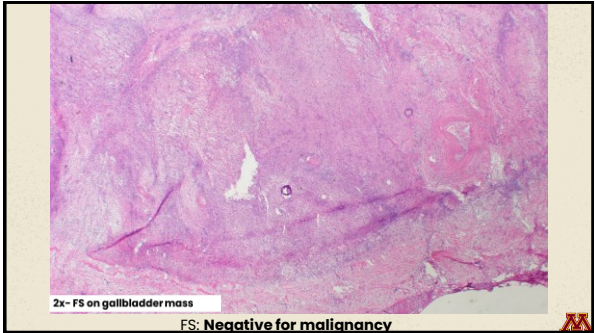


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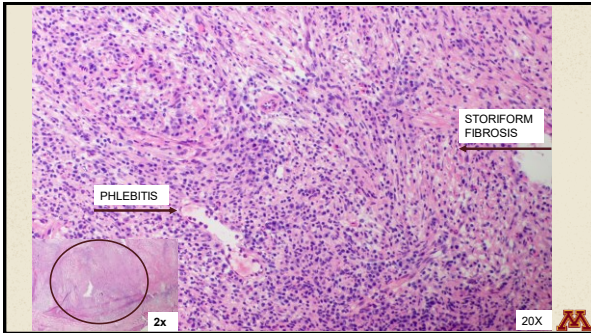
CASE #7

79-year-old man with cirrhosis and LIRADS 5 hepatocellular lesion; intraoperatively lesion with a mass effect seen in gallbladder

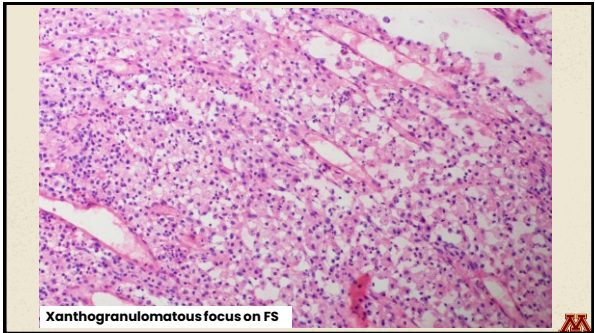
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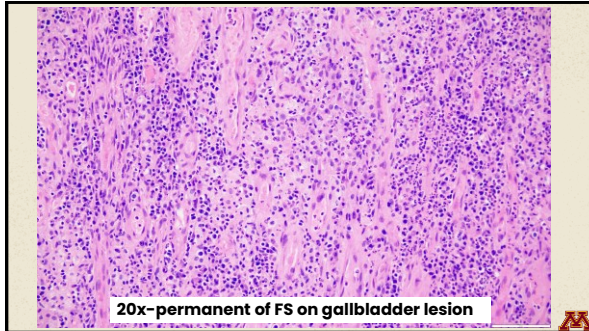
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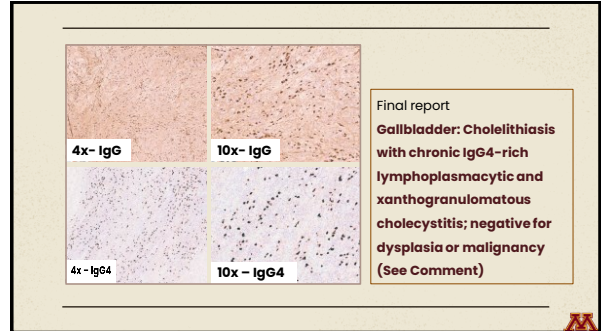
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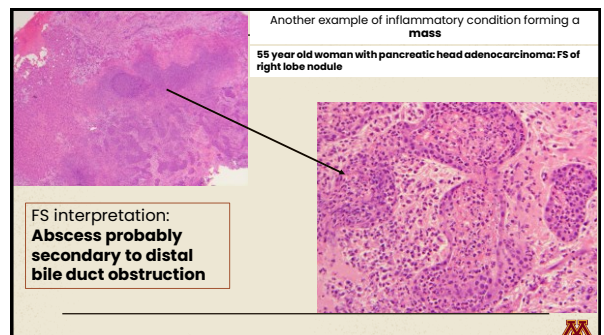
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Beware of inflammatory/sclerosing lesions that mimic mass lesions, especially **IgG4**

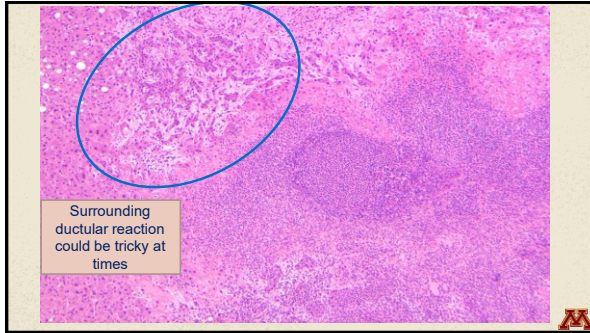
A few other examples include:

- Ascending cholangitis due to obstruction in patients with carcinoma of head of pancreas
- Liver abscess with fibroinflammatory capsule
- Amyloidoma

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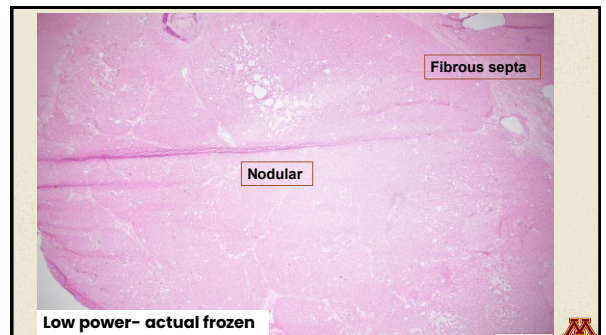
Question: **metastatic versus other**
 Metastatic tumor = stage 4 = don't proceed with Whipple
 If negative, proceed with Whipple resection

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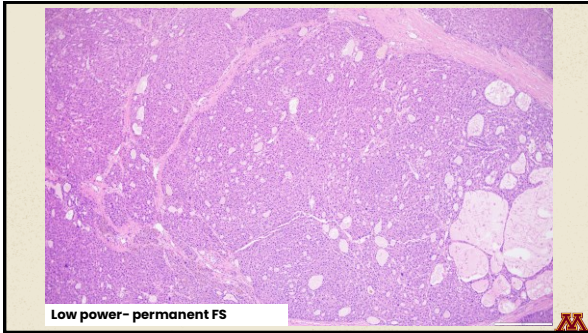
Bonus case

38-year-old woman with a 6.5 cm liver mass

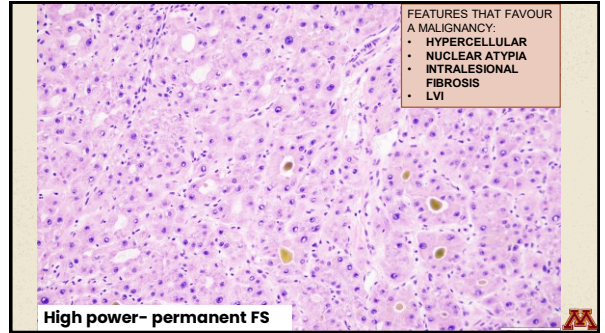
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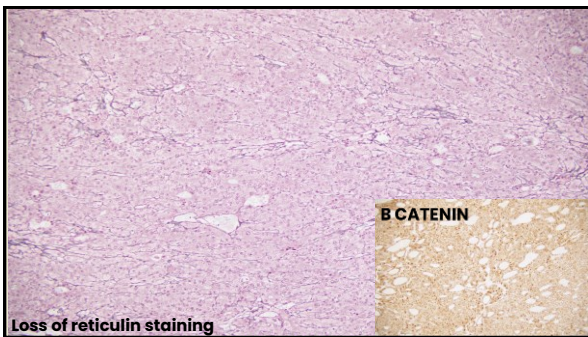
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<p>FS: Benign lesion. Favor focal nodular hyperplasia</p>	<p>Final report: Hepatocellular carcinoma, well to moderately differentiated, beta-catenin mutated</p>
<p>This case illustrates how challenging it is to diagnose HCC on a FS; important to communicate this to the surgeons</p>	

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Take home message

1. **Margins: positive versus negative**
 - o Call negative if acellular mucin
 - o What to do with LVI at margin??...we discuss and note negative mucosal or wall margins
2. **Tricky staging, liver mets**
 - o Beware of von Meyenburg complexes are common
 - o Atypia alone is insufficient, when uncertain, ask for more
3. **Inflammatory masses can and often mimic malignancies**
 - o IgG4, abscesses, xanthogranulomas, etc.
 - o Reactive ductulosis associated with these benign lesions...beware
4. **Not every request for frozen section has to be fulfilled: Decline if**
 - o Doing FS jeopardizes documenting important diagnostic features
 - o FS findings have no impact on intraop decisions



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Acknowledgments

- Khalid Amin
- Dina El-Rayes
- Rayan Sibira

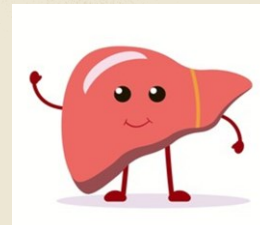


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Thank you! Any questions?



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