**Purpose**

To establish a procedure on how to describe, dictate and gross liver explants and resections for both neoplastic and non-neoplastic diseases.

**Procedure**

***For Non-Neoplastic Liver Explants***

* **Check radiology to make sure no mass lesions were found prior to surgery**. If there are focal masses or nodules on imaging, cut thin sections as below to find them and then follow “FOR TUMOR” protocol for sections. See attached diagram for describing the masses per what segment they are in.
* Remove the gallbladder. In general, you only need a single section unless unusual pathology (such as mass, thickening, polyp) is seen. Then take additional sections and the cystic duct margin.
* Weigh and measure the liver explant. Measure gallbladder and note any hilar or pericystic nodes.
* Evaluate the capsular surface. Examine porta hepatitis structures and determine patency of hepatic artery, portal vein, and common hepatic duct.
  + If patient has had a previous Kasai procedure (portoenterostomy) for biliary atresia, note appearance of extrahepatic biliary anatomy (things like strictures, tumors, fibrosis).
  + Explanted cirrhotic livers often contain a metallic intravascular stent, the result of a prior transjugular intrahepatic portosystemic shunt (TIPS) procedure, typically located near the porta hepatis. Pieces of wire projecting from the ends of the shunt may be very sharp. In order to minimize the possibility of injury, check the hilum for a metal TIPS shunt. If one is present, try to extract it using forceps. If the shunt is too firmly embedded, remove it by cutting around it.
* Make front to back sections, every 5 mm, beginning at the dome (superior to inferior). As safely as you are able, try to section with long, sweeping cuts once through (no sawing) so as to avoid irregular cut marks and have optimal sections for photos.
* Examine each section carefully for any unusual masses and nodules, such as those that have different colors than the rest, those that are softer, and those that are larger. Take photographs to document and see “FOR TUMOR” sections below. If the nodule bulges from the cut surface in contrast to the background liver parenchyma, has a distinctly different color compared to the surrounding liver, appears to have “nodule within nodule” growth pattern, or appears to have a growth advantage (pushing borders on majority of circumference, against the other nodules), these are the nodules you should pay attention to.
* If liver explanted for fulminant failure, note what percentage of the liver grossly is necrotic or collapsed.
* Please take photos liberally (fresh or after adequate fixation (no ‘raw’-looking mottled areas if post-fixation), especially of nodules or abnormally sized segments.

***Sections for Histology***

* Minimum sections (if the liver is not well fixed, please try and take sections from the better fixed areas; usually these are under the capsule)
  + 2 sections from the right lobe
  + 2 sections from the left lobe
  + 1 section from the hilum to include the portal vein, hepatic artery and common bile duct (unless it is a PSC patient, see below)
  + 1 section of gallbladder and any nodes (hilar or pericystic)
  + Hilar margin, shaved
  + Don’t forget to order special stains!
* Additional sections
  + **If masses or tumors are present, see “FOR TUMOR” section below**
  + Biliary atresia: take 2-3 additional sections through the structures at the hilum
  + Primary sclerosing cholangitis cases: take as much hilum as possible, to look for occult carcinoma.
  + Failed allografts take an additional section from hilum and look for thrombi

**\*\*Please take care that adequate fixation has occurred before the sections are further processed.**

***Special stains to order at the time of grossing \*\*\*Please use green cassettes on sections designated for special stains\*\*\*See Chart on Page 4.***

***Liver Explants and Resections FOR TUMOR***

* Weigh and measure the liver explant or resection. Measure gallbladder and note any hilar or pericystic nodes (if present).
* Measure overall dimensions of tumor(s); distance of tumor from resection margins and from Glisson's capsule.
* Photograph specimen intact and cut surfaces.
* Ink surgical margins of resection (including vascular and bile duct margins, if present). Leave gallbladder attached on any explants in case there’s suspected involvement.
* See above on how to section intact explant. If the specimen is a resection, bread loaf perpendicular to margin.

**Description**

* Type of resection (lobectomy, trisegmentectomy).
* Measurements - see above.
* If there are tumor(s):
  + Note number of masses.
  + **Describe the location of the mass by segment, not right or left lobe (see diagram on page 4). Correlate what you see with previous radiology reports.**
  + Note color, shape, size, and consistency of each mass
  + Note percent necrosis if applicable. Also note hemorrhage and central scar if present.
  + Note the distance of the mass from the hilum/margin.
  + Note relationship between tumor and major vessels and/or bile ducts.
  + Note if you can see gross evidence of vascular invasion
* Background liver - general appearance (color and consistency), cirrhosis, nodularity, congestion, necrosis, retraction of capsule. Other incidental lesions?

***Sections for Histology***

* Tumor, at least 4 sections, including non-tumor areas at periphery. Include a sections of mass closest to capsule if applicable. If multiple masses, all must be sampled with a designation of what segment they are in.
* Margins, including parenchymal and vascular/bile duct, if present
* Non-tumor parenchyma: one section
* If the tumor is a known or suspected cholangiocarcinoma, sample the hilar ducts to look for dysplasia.
* One section of gallbladder and any nodes (hilar or pericystic)
* Don’t forget to order special stains!

For HCC that are resected after ablation procedures:

* Measure the distance from the tumor to the resection margin.
* Measure the greatest diameter and estimate the gross percent of necrotic and viable tumor.
* Two or three sections to demonstrate the relative amounts of viable and necrotic tumor. Comment on the percent of viable tumor in the report.
* One section of the non-tumorous liver
* One section of the hilar vessels.
* Margins (parenchymal and vascular/bile duct margins, if present)
* 1 section of gallbladder and any nodes (hilar or pericystic)
* Don’t forget to order special stains and make those specific cassettes are green!

***Special stains to order at the time of grossing \*\*\*Please use green cassettes on sections designated for special stains\*\*\****

|  |  |  |  |
| --- | --- | --- | --- |
| **Trichrome stain** | **PAS/D** | **Copper and CK7** | **Iron** |
| All explants | Patients with Alpha one antitrypsin deficiency | Patients with known biliary disease such as primary biliary cholangitis or primary sclerosing cholangitis | Patients with known iron storage disorders |
|  | Patients with cryptogenic cirrhosis |  |  |
| Pick one representative block hepatic parenchyma | Pick one representative block hepatic parenchyma | Pick one representative block hepatic parenchyma | Pick one representative block hepatic parenchyma |

**Please consult the GA attending or fellow if you have any questions!!!**

***Diagram of Liver Segments***

