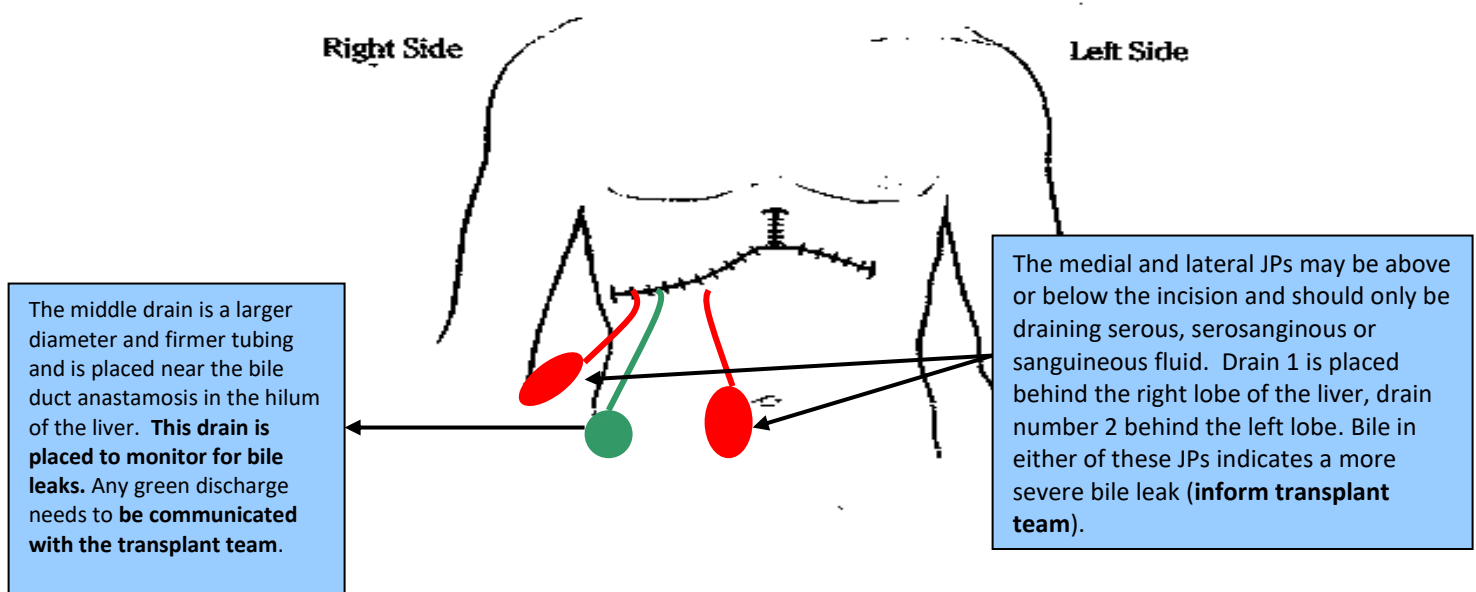


POST OP CARE OF A LIVER TRANSPLANT

A Patient status post liver transplant will arrive with a bilateral subcostal incision (sometimes also with midline extension towards the xyphoid: Mercedes incision) and usually 3 JP drains. See diagram below. The patient may or may not come up intubated.

The Surgical Incision



In caring for the patient with a liver transplant it is important to monitor Liver Function Tests (AST/ALT, bilirubin, INR) every 4 hours for 24 hours minimum as well as check CBC every 6 hours. Even in a well functioning graft, one can expect to see a dramatic spike in liver functions (sometimes into the thousands) but these tests should begin to trend down well within the 24 hour time frame in a well functioning allograft. It is common to see a drop in the patient's hematocrit post transplant and it is very common that they require blood products. Continuous hourly monitoring of the JP output is necessary, but these drains could clog and bleeding might not be easily seen other than by cardiovascular parameters (BP, HR).

While assessing liver function it is important to have a basic understanding of what each of the lab values mean.

- **Aminotransferases (AST, ALT):** intracellular enzymes released secondary to necrosis and /or inflammation. ALT is more specific for liver.
- **LDH** is an indication of ischemic or toxic hepatitis. It has a short half-life and will go up quickly but also come down more quickly than AST and ALT.
- **Alkaline Phosphatase (AΦ):** enzyme released from injured bile duct epithelium. Increase levels are seen in biliary obstruction or intrahepatic cholestasis.
- **Albumin:** marker of liver protein synthesis. Slowly dropping in liver failure ($t_{1/2} \sim 20$ d). Always low after liver transplantation.
- **INR - Prothrombin time (PT):** depends on the synthesis of coag factors; because $t_{1/2}$ of some of these factors (eg V, VII) is short. \uparrow in the PT can occur within 1 hour of liver dysfunction

- **Bilirubin:** product of heme metabolism in liver: unconjugated (indirect) or conjugated (direct) conjugated can increase secondary to bile duct obstruction (intra/extra-hepatic)

Post op Liver Transplants Complications

The most significant complications for the post op liver transplant are:

1. **Bleeding**** which presents as:
 - a. ↑ sanguineous out put from the JP drains and/or
 - b. ↑ increased abdominal girth, and/or
 - c. ↑ bladder pressures
 - i. Can be continuously monitored using an abvisor
 - ii. Watch for trend, anything over 20 needs to be addressed immediately (**inform transplant surgeon**)
 - d. Significant hypotension that is responsive to volume resuscitation.

******In the case of significant bleeding - defined by the individual surgeon - the patient is taken to the OR for a “wash out” and to localize the bleeding source. Bleeding sources are typically located wherever an anastomosis was created, but after liver transplantation equally common are bleeders from resection surfaces, in particular in case of coagulopathy. Sometimes the quality of blood in the drains and the location of bleeding can give an idea regarding where the bleeder is located.

The preferred method of volume resuscitation in liver transplants if not related to bleeding is the use of the use of albumin. Whether albumin or FFP is given depends on the INR (INR >1.5, give FFP).

Living liver donors should never receive blood products (PRBC, FFP) unless approved by the primary surgeon. Exception to this rule of course would be a resuscitation situation.

- 5% Albumin is used for volume resuscitation
- 25% Albumin is used in conjunction with a diuretic to help pull of fluid. This is usually not given before three days after liver transplantation, since the patient is still third-spacing and intravascular dry.
- FFP can also be used for volume replacement if the patient has coagulopathies (INR > 1.5).

2. **Hepatic Artery Thrombosis (HAT)** – clotting of the hepatic artery leads to necrosis of the transplanted liver. **A clotted hepatic artery IS AN EMERGENCY.** If HAT is not addressed immediately this will result in the patient requiring a re-transplant.

Timely recognition is important, hence the daily vascular US of the liver in the early postoperative period. If the LFTs (AST/ALT) do not trend down or there is a sudden increase in the AST/ALT this is a result of occlusion of the hepatic artery which would result in the patient returning to the OR for a thrombectomy.

- a. A Doppler ultrasound is performed at the bedside a few hours after arrival to ensure that the HA remains patent
- b. LFTs are monitored every 6 hours (at minimum) to ensure downward trend. This downward trend can be patient specific as well as organ specific. Concerns should be immediately addressed

3. **Biliary Obstruction** – can be related to stenosis or “kinking” of the bile ducts
 - a. Monitored by measuring the Alkaline Phosphatase (Alkphos or AΦ)
 - b. Lab interpretation of a biliary obstruction would be:
 - i. ↑↑ AΦ and bilirubin, +/- AST/ALT

- c. Continuous assessment of function of the transplant liver is done by assessing biliary drainage in the JP (or T tube if done)
 - i. No biliary drainage is concerning for obstruction or primary graft failure
 1. if a patients bilirubin or AST continue to increase an ERCP is performed and a stent is usually placed (days after the transplant procedure)
 2. A Doppler ultrasound, cholangiogram and/or liver biopsy may be considered
 3. If a T tube is present (rare) a diagnostic cholangiogram can be performed.

Patterns of specific liver injury

- **Hepatocellular:** ↑↑ AST/ALT, +/- ↑ bilirubin or AΦ
- **Cholestasis:** ↑↑ AΦ and bilirubin, +/- AST/ALT
- **Isolated hyperbilirubinemia:** ↑↑ bilirubin, norm AΦ and AST/ALT
- **Infiltrative process:** ↑ AΦ, +/- bili or AST/ALT

Immunosuppression (for liver or liver/kidney)

Cellcept – 750 or 1000mg twice daily

Prograf- weight based but usually start low and increase. It is also dependant on patients creatrine

Prednisone – but prednisone is minimized and potentially eliminated in patients with Hep C cirrhosis due to the significant risk of increasing the viral load and damaging the newly transplanted allograft

****In the case of a liver/kidney transplant, liver will prioritize the immunosuppression regiment****

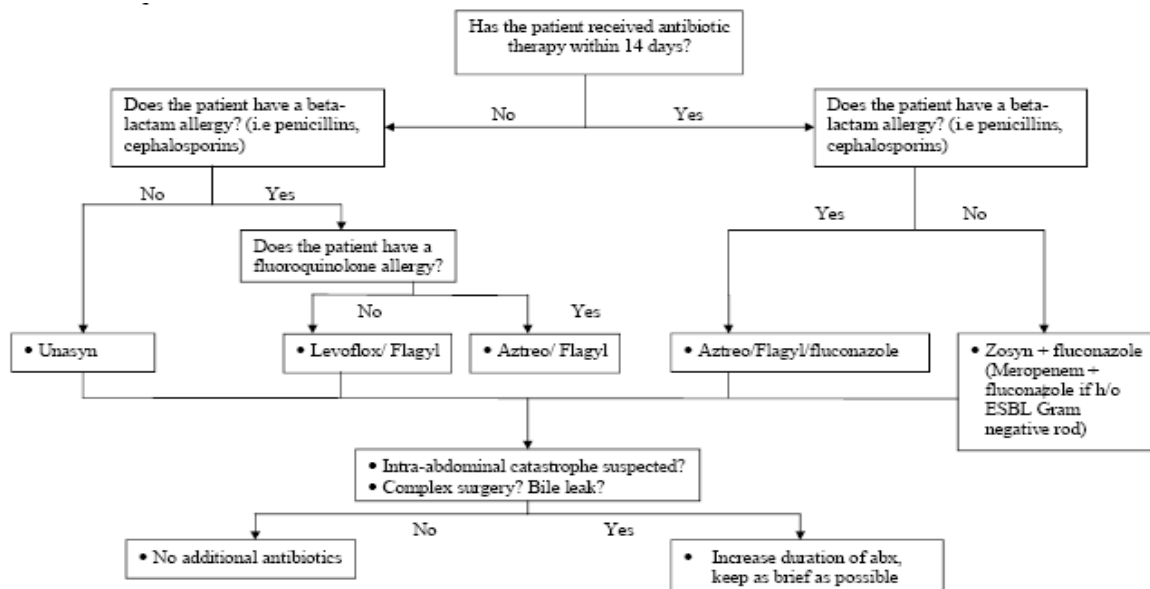
Anti-virals for Liver only patients

Donor		Recipient	
Negative	→	Negative (low risk)	Acyclovir for 3 months
Negative	→	Positive (intermediate risk)	Ganciclovir for 3 months
Positive	→	Postive (intermediate risk)	Ganciclovir for 3 months
Positive	→	Negative (high risk)	Ganciclovir for 6 moths

Yes	+	+	Valcyte x 6 mos	If clinically indicated by symptoms
	-	+		
	+	-		
	-	-	ACV/Famvir/ValACV x 6 mos	
No	+	+	Valcyte x 3 mos	q month x 3 months from 3-6 mos
	-	+		
	+	-		
	-	-	ACV/Famvir/ValACV x 3 mos	If clinically indicated

Antibiotic Prophylaxis in Liver Transplants

Because of the high risk of infections that liver transplants face, the Transplant infectious disease department created the following prophylactic antibiotic algorithm



In general, use prophylaxis for 36 hours perioperatively.

Consider use of linezolid in patients with history of significant infection with VRE (not just colonization).