Transjugular Liver Biopsy

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INTRODUCTION

Despite enormous advancement in clinical medicine, diagnostic imaging and laboratory testing, harvesting liver specimens is often mandatory to enable histopathologic characterization and staging of hepatic disease. Although percutaneous image-guided liver biopsy allows fast, safe, and adequate tissue sampling, there is a significant risk for intrahepatic and perihepatic hematoma. Transjugular liver biopsy offers well-accepted first-line alternative approach to hepatic tissue sampling in patients with contraindications to percutaneous biopsy and also allows for the collection of additional information such as portal manometry.

COMMON INDICATIONS [1–5]

To obtain samples of liver tissue in diffuse liver disease *(see Chap. 32)* associated with:

- Massive ascites *(contraindication to percutaneous biopsy)*
- Severe uncorrectable coagulopathy *(contraindication to percutaneous biopsy)*
- Failure of percutaneous liver biopsy *(e.g., massive obesity)*
- Suspected conditions associated with high risk of bleeding *(e.g., diffuse hypervascular tumor, peliosis hepatic, amyloidosis, cardiac liver, hemodialysis and chronic renal insufficiency, and hereditary hemorrhagic telangiectasia)*
- Liver transplant patients in early postoperative period with ascites and coagulopathy
- When other concurrent vascular procedures are planned *(e.g., transvenous renal biopsy, transjugular intrahepatic portosystemic shunting, venography and hepatic venous pressure gradient measurement)*

COMMON CONTRAINDICATIONS [1–3]

- Past history of allergy to intravenous contrast media and impaired renal function *(consider use of CO_2 for venography)*
- Pregnancy
- Severe uncontrolled coagulopathy *(take corrective measures)*
- Need for focal biopsy of hepatic lesion
- Absence of venous access *(i.e., thrombosis of the right internal jugular vein, inferior vena cava, or hepatic veins)*
- Suspected or confirmed hydatid cyst in the liver
- Cholangitis

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POSSIBLE COMPLICATIONS [1–4]

- Access-site related complications *(e.g., neck hematoma, inadvertent carotid puncture, transient Horner's syndrome, transient dysphonia, and pneumothorax)*
- Cardiac arrhythmias
- Abdominal pain
- Perforation of the liver capsule
- Hepatic hematoma
- Intraperitoneal hemorrhage
- Fistula formation between the hepatic vein, hepatic artery, portal vein, or biliary tree
- Hepatic artery pseudoaneurysm
- Inferior vena cava and renal vein perforation
- Death

PREPROCEDURAL ASSESSMENT AND PLANNING

- History, indications, and physical examination *(Appendix 1* in Chap. 149*)*
- Evaluation of diagnostic imaging studies to determine the relevant vascular anatomy
- Periprocedural management of coagulation status *(Appendices 2* in Chap. 150 *and 3 in* Chap. 151*)*
- Antibiotic prophylaxis: Not routinely recommended [2, 4]
- Imaging modality for guidance: Fluoroscopy, combined with ultrasound for venotomy
- Positioning: Supine
- Venous access: Right internal jugular vein *(preferred);* left internal jugular vein, external jugular veins or femoral veins are rarely used for catheterization [1–3]

PROCEDURE NOTE

Procedure: Transjugular random liver biopsy
Staff: [_]
Fellow: [_]
Resident: [_]
Clinical History and Indications: Describe history and list indications
Allergies: None known/Allergic to [specify/type of allergy]
Anesthesia: Local anesthesia with conscious sedation/general anesthesia
Medications: List any relevant medications used
Contrast Material: (_) mL of [type] contrast material
Field: Sterile
Procedure classification: Clean
Position: Supine
Monitoring: Intravenous access line was secured and vital signs were continuously monitored by nursing staff/anesthesia team throughout the procedure
Total fluoroscopy time: (_) minutes
Cumulative radiation dose: (_) mGy

Description of Procedure:

The risks, benefits, alternatives, and procedure itself were explained to the patient/patient's Power of Attorney/patient's legal guardian, and informed written/verbal consent was obtained. Time out was performed to confirm the correct patient, procedure, and site. The site of the procedure was identified and marked.

The patient was positioned supine, with the neck turned to the contralateral side. The patient's left/right cervical and upper thoracic regions were prepped and draped in the usual sterile fashion. Ultrasound examination was performed to determine the site of venous puncture. Local anesthesia was administered. The left/right internal jugular vein was punctured under ultrasound guidance using a (_)-gauge [type] needle. Once good venous flow was detected, a (_)-inch [type] guidewire was advanced through the needle under direct fluoroscopic visualization and placed in the inferior vena cava. A small skin incision was made and a (_)-French vascular sheath was advanced over the guidewire into the inferior vena cava.

Subsequently, (_)-French, multipurpose curved [type] catheter was introduced through the sheath over a (_)-inch [hydrophilic/type] guidewire and the right/middle hepatic vein was selectively catheterized. Venography was performed by the manual injection of (_) mL of contrast media and showed [specify findings].

The diagnostic catheter was then exchanged for an occlusion [type] balloon, which was placed within the hepatic vein. The balloon was

inflated with (1–3) mL of diluted contrast/air, followed by a gentle injection of a small amount of contrast to ensure adequate wedge position. Wedge hepatic venous pressure and free hepatic venous pressure were obtained and documented.

Following pressure measurement, a (_)-cm long, (_)-inch [Amplatz extra stiff/type] guidewire was inserted through the catheter into the hepatic vein to provide adequate support. Then a (_)-French, (_)-cm long [type] guiding catheter was advanced over the stiff guidewire into the selected hepatic vein. Correct position [3–5 cm from the inferior vena cava] was documented by the manual injection of (_) mL of contrast media through the catheter. The transvenous (_)-gauge [type] core biopsy needle was then advanced through the guiding catheter, the tip of the catheter was turned out of the axis of the hepatic vein and the biopsy needle was advanced into the parenchyma. (number) samples were obtained from peripheral and central locations of the liver and sent for histopathologic interpretation. Venography was performed by the manual injection of (_) mL of contrast media through the catheter and showed no evidence of hepatic capsule perforation or contrast extravasation.

The catheter and sheath were removed and adequate hemostasis was achieved at the venotomy site by compression for (_) minutes. Sterile dressing was applied and the patient was transferred to the floor/recovery room following the procedure in a stable condition. Staff was present for the entire procedure.

Intra-Procedure Findings: List all relevant findings, especially wedged and free hepatic pressures.

Immediate Complications: None encountered during or directly after the procedure. List complications if any.

Post-Procedure Plan [1–3]:

- Keep patient in complete bed rest for (_) hours *[adjust depending on the venotomy site, typically 2 h for jugular access]*.
- Check the puncture site for any bleeding or hematoma formation every 15 min for 1 h, then every 30 min for 2 h; inform interventional radiology team if any complications are observed.
- Monitor vital signs every 15 min for 1 h, then every 30 min for 2 h; notify interventional radiology team if systolic blood pressure <95 mmHg, or heart rate >110 beats/min.
- Inform interventional radiology team if any severe abdominal pain, chest pain, or shortness of breath develops.
- Resume diet and previous orders as needed and if not otherwise contraindicated.
- Continue adequate intravenous hydration and monitor fluid (intake-output) status.
- Check complete blood count, creatinine, and blood urea nitrogen on the day following the procedure or as clinically indicated.

Impression:

- Transjugular random liver biopsy, as described above.
- The patient tolerated the procedure well and left the interventional unit in stable condition.
- The patient was unstable and the procedure was canceled/terminated prematurely.
- List any other relevant or important information/finding.

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