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Short Communication

Transjugular liver biopsy

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ABSTRACT

Biopsy of the liver is considered the 'gold standard' and is often necessary for histopathological characterization of hepatic disease processes.

The techniques to obtain liver specimen are percutaneous liver biopsy, transjugular liver biopsy and mini-laparoscopic liver biopsy. Percutaneous route is the preferred method for its simplicity, ease and safety. Transjugular biopsy of the liver has become an accepted alternative method of obtaining hepatic tissue in patients with an established contraindication to percutaneous liver biopsy viz. coagulopathy, ascites, extreme obesity, small shrunken liver etc.

A total of 67 transjugular liver biopsies were performed between January 2004 and February 2012 in a tertiary care hospital. The procedure was performed on in patient basis after thorough pre procedure work up with jugular puncture under ultrasonography guidance and fluoroscopy guided liver biopsy using LABS 100 liver access and biopsy set.

The commonest indication for liver biopsy was work up for indeterminate chronic liver disease and the most common contraindications for percutaneous biopsy that led to biopsy by transjugular route were coagulopathy and ascites. Technical success of the procedure was achieved in 96% cases and no major complications were encountered in this group.

Transjugular liver biopsy is a valuable tool for clinical decision making in a specific sub set of patients in whom percutaneous biopsy is contraindicated. Transjugular approach with jugular access under real time USG guidance and liver biopsy using automated core biopsy needle is safe, well tolerated, effective and provides adequate tissue for histological assessment.

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Introduction

Despite phenomenal developments in fields of clinical medicine, diagnostic imaging and laboratory techniques, biopsy of the liver is considered the 'gold standard' and is often necessary for histopathological characterization of hepatic disease processes.

Liver biopsy has the following roles: to confirm the diagnosis of chronic hepatitis, to assess the necro-inflammatory activity (grading) and severity of fibrosis (staging), to exclude another hepatopathy or an associated disease and to certify the diagnosis of cirrhosis (when present).¹

The techniques to obtain liver specimen are percutaneous liver biopsy, transjugular liver biopsy and mini-laparoscopic liver biopsy.² Percutaneous route is the preferred method for its simplicity, ease and safety.

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Transjugular biopsy of the liver has become an accepted alternative method of obtaining hepatic tissue in patients with an established contraindication to percutaneous liver biopsy viz. coagulopathy, ascites, extreme obesity, small shrunken liver etc.³

Materials and methods

The study was carried out in a tertiary care hospital.

The procedure was performed as an in patient procedure. The clinical work up was done including USG abdomen for liver morphology and Doppler studies for hepato-portal system. Laboratory parameters including platelet count, PT, aPTTK, INR and serum creatinine were obtained. Any severe coagulopathy (platelets < 50,000/ μ L) was corrected prior to the procedure. Written informed consent was taken. Patient was kept fasting 6 h prior to the procedure.

Equipment used

Interventional radiology suite with DSA machine.

USG machine with 7.5 MHz transducer.

18 G access needle with 5 cc syringe.

0.035 inch guide wire.

LABS 100 liver access and biopsy set (Fig. 1) (Cook Inc, Bloomington, IN) comprising:

- 7 Fr Hoffman sheath fortified with 14 G transjugular cannula
- 5 Fr straight catheter
- 5 Fr multipurpose catheter
- 18 G quick core needle

In the interventional radiology suite the patient was positioned supine with head turned to left side with ECG leads and pulse oximeter probe attached. The neck was first cleaned and draped and under aseptic precautions the right internal jugular vein was visualized with real time USG and a site for puncture was selected appx 2 inches superior to clavicle. The site was infiltrated with local anesthetic (2% Lignocaine, 2–5 ml). The vein was then punctured under USG guidance using single wall technique using 18 G needle connected to a saline filled syringe. Using Seldinger technique a guide wire

Fig. 1 – Transjugular biopsy set.

(0.035 inch) was passed through it into the right internal jugular vein followed by a 9 Fr sheath.

The combination of 5 Fr headhunter catheter and guide wire was then negotiated inferiorly through the superior vena cava into the right atrium then into the inferior vena cava and finally maneuvered into the right hepatic vein (Fig. 2). A hepatic venogram was obtained to confirm the position of the catheter (Fig. 3). The correct position was considered to be 3–4 cm from the IVC. The catheter was exchanged for the 7 Fr Hoffman sheath which would later provide support for the biopsy needle. The biopsy needle was primed and then passed through the stiffening cannula so that the tip projected just beyond the sheath within the right hepatic vein (Fig. 4). The sheath was wedged anteriorly and stabilized and the biopsy device was advanced into the liver parenchyma. The patient was asked to hold his/her breath and the biopsy gun was fired. The needle was pulled out of the sheath and specimen collected in a formalin bottle. Further passes were attempted based on the size of the tissue obtained. A cylinder of 15 mm or more was regarded as sufficient for the histological diagnosis of diffuse liver disease. Hepatic venogram was repeated post biopsy to exclude capsular injury and contrast extravasation.

Hemostasis at puncture site was obtained by manual compression. The patient was kept in supine position and BP and pulse charting was done half hourly for 6 h following biopsy. Abdominal girth and patient symptoms were also noted. If the patient was hemodynamically stable, the patient was discharged the next day.

Results

A total of 67 transjugular liver biopsies were performed between January 2004 and February 2012. Thirty-six (54%)

Fig. 2 – Headhunter catheter in right hepatic vein.

Fig. 3 – Right hepatic venogram to confirm catheter position.

patients were male; 27 (40%) patients were serving personnel and the median age was 34 (range 11–60). The commonest indication for liver biopsy was work up for indeterminate chronic liver disease ($n = 24/36\%$). Most common contraindications for percutaneous biopsy that led to biopsy by transjugular route were coagulopathy ($n = 46/69\%$), ascites ($n = 8/12\%$) and both ascites and coagulopathy ($n = 7/10\%$). The same procedure was followed for all patients.

Technical success of the procedure was achieved in 64 (96%) patients with inability to negotiate acutely angled hepatic vein, narrowed suprahepatic IVC and small hepatic vein ostium in one case each.

Fig. 4 – Tru-cut biopsy needle extruding out from transjugular cannula.

Table 1 – Comparison of results.

S. no	Study	Number of cases	Success rate (%)	Complications (%)
1	Smith et al	410	89	2.4
2	Beckmann et al	102	82	2.9
3	Rathod et al	145	95	1.3
4	Present study	67	96	5.0

In two (3%) cases the tissue obtained was judged insufficient for complete histopathological evaluation. Multiple passes had to be made in four (6%) patients to obtain adequate tissue sample.

No major complications were encountered in this group. In three (5%) cases minor complications were encountered with pneumothorax in one and fever in two patients. Pneumothorax was likely due to accidental pleural puncture during the procedure and being a small pneumothorax was managed conservatively and did not require any intercostal drainage procedure.

Discussion

The size of a biopsy specimen varies between 1 and 4 cm in length and between 1.2 and 1.8 mm in diameter and represents 1/50,000 of the total mass of the liver.⁴

Smith et al did a retrospective review of 410 transjugular liver biopsies and found that the most common indications were coagulopathy, ascites or a combination of both in 81% cases. Adequate biopsy samples were obtained in 89% cases and complications occurred in 2.4% cases.³

Beckmann et al studied 102 transjugular liver biopsies and found coagulopathy and ascites to be the indication in all cases. Minor complication rate of 2.9% was observed and 82% technical success was achieved.²

Rathod et al studied 145 patients who underwent transjugular liver biopsy and found a technical success rate of 95% and minor complications in 1.3% cases.⁵

Experience of transjugular liver biopsy in the present study showed similar results and correlates well with various other studies on the subject as illustrated in Table 1. The complication rate in our series was higher due to the fact that two patients who developed fever post procedure were included as minor complications.

Conclusion

Transjugular liver biopsy is a valuable tool for clinical decision making in a specific sub set of patients in whom percutaneous biopsy is contraindicated. Transjugular approach with jugular access under real time USG guidance and liver biopsy using automated core biopsy needle is safe, well tolerated and effective and provides adequate tissue for histological assessment.

Conflicts of interest

All authors have none to declare.

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