





Review

Transjugular liver biopsy – Indications, adequacy, quality of specimens, and complications – A systematic review ☆

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Transjugular liver biopsy (TJLB) is considered an inferior biopsy, used when percutaneous liver biopsy (PLB) is contraindicated. According to recent literature, specimens with ≥ 6 complete portal tracts (CPTs) are needed for histological diagnosis of chronic liver disease but ≥ 11 CPTs to reliably stage and grade. Mean CPT number in PLB series is 7.5; more passes increase complications. Sixty-four series reporting 7649 TJLBs were evaluated for quality of specimen and safety. Major indications were coagulation disorders and/or ascites. Success rate was 96.8%. Fragmentation rate was 34.3%, not correlating with length or diagnostic adequacy. With a mean of 2.7 passes, mean CPT number was 6.8. Histological diagnosis was achieved in 96.1% of TJLBs, correlating with length ($p=0.007$) and CPT number ($p=0.04$). Tru-Cut specimens had a mean CPT number of 7.5 and, compared to Menghini specimens, were longer ($p<0.008$), less fragmented ($p<0.001$) and more diagnostic ($p<0.001$). Thinner needles (>16 -G) provided significantly longer and less fragmented specimens. Minor and major complication rates were 6.5% and 0.56%, respectively, and increased in children, but not with additional passes. In adults, mortality was 0.09% (haemorrhage 0.06%; ventricular arrhythmia 0.03%). TJLB is safe, providing specimens qualitatively comparable to PLB, and may improve further using ≥ 18 -G Tru-Cut needle and >3 passes.

Introduction

Liver biopsy (LB), mainly performed either percutaneously, without or with radiological/ultrasound guidance, or transjugularly, is the most specific test to assess the nature and severity of liver diseases [1], [2].

Transjugular liver biopsy (TJLB) was first described experimentally in 1964 [3]. In 1967, transjugular hepatic vein catheterization was used for biliary tract cholangiography [4], and 3 years later the same authors reported the first TJLBs [5].

TJLB is usually indicated when PLB is contraindicated due to coagulopathy and/or ascites [2], [6], in liver transplant recipients [7], [8], [9], [10], [11], and patients with acute liver failure (ALF) [12], [13] or congenital clotting disorders [14], [15], [16], [17], [18].

However, the quality of TJLB specimens has been questioned, because of smaller and more fragmented specimens compared to PLB. Thus, TJLB has been considered a second-class biopsy [2], [3], [19], [20]. Moreover, the role of LB has changed from solely a diagnostic to a prognostic tool, particularly in patients with chronic viral hepatitis, with grade and stage of liver damage guiding therapy [19], prompting a re-evaluation of the adequacy of biopsy samples. Currently, a LB specimen of ≥ 15 mm long and/or containing ≥ 6 complete portal tracts (CPTs) suffices for the histological diagnosis of diffuse liver disease [2], whereas at least 20mm and/or 11 CPTs are considered optimal for reliable staging and grading [19], [21]. In particular, CPT number has been considered the most appropriate parameter for evaluating adequacy of a liver specimen and comparison between different kinds of LBs or type and size of needle [2], [22]. In this regard, the quality of PLB may not be superior to TJLB [23].

We reviewed the published literature about the technique, indications, success and safety of TJLB, and the quality characteristics of TJLB specimens, in relation to the recently proposed minimum requirements for the assessment of chronic viral hepatitis.

Section snippets

Methods

Studies were identified by a MEDLINE search of English and non-English literature using the following terms: transjugular liver biopsy, needle, Menghini, Tru-Cut, complications; further relevant articles were retrieved by their reference lists. Published abstracts from European and American gastroenterology and hepatology conferences from the last 20 years were reviewed. Only studies reporting at least one of the following were evaluated: length of biopsy specimen, CPT number, achievement of...

Techniques

TJLB is performed by radiologists or hepatologists under X-ray videofluoroscopy. The procedure is relatively painless, but mild conscious sedation with benzodiazepines may be employed to relieve anxiety and minor discomfort; in particular, midazolam does not influence hepatic haemodynamics [27]. Prophylactic antibiotics are not routinely used as infectious complications are extremely rare [26]. Continuous evaluation of oxygen saturation and electrocardiographic monitoring, to detect arrhythmias ...

Clinical characteristics of patients

Sixty-four series comprised 7649 TJLBs in 7189 patients [7], [8], [9], [10], [11], [12], [13], [14], [15], [16], [17], [18], [23], [26], [28], [29], [30], [31], [32], [33], [34], [35], [36], [37], [38], [39], [40], [41], [42], [43], [44], [45], [46], [47], [48], [49], [50], [51], [52], [53], [54], [55], [56], [57], [58], [59], [60], [61], [62], [63], [64], [65], [66], [67], [68], [69], [70], [71], [72], [73] (Table 1); 2205/3502 (63%) were men; median age was 47 years (32–57) in 58 adult series...

Quality and safety of TJLB

The present review demonstrates that TJLB can provide adequate histological diagnosis of chronic liver disease but is currently inadequate for reliable grading and staging of chronic hepatitis. Longer and better diagnostic specimens were obtained using the Tru-Cut compared to Menghini needle, perhaps related to its reduced rate of fragmentation. Studies formally comparing Tru-Cut and Menghini TJLB needles [40], [42], [43], [45] and our own analysis showed similar results. However, in two...

Conclusions

The present review indicates that TJLBs should not be considered second rate biopsies compared to PLBs, only to be used in special cases. Major complication and mortality rates in adults are similar to PLB despite using more passes and worse coagulopathy. Very good specimens are obtained, particularly if 18 or 19-G Tru-Cut needles are used with at least three passes. TJLB also allows concomitant measurement of HVPG, which is assuming an increasing role in evaluating prognosis in patients with...

References (92)

M. Weiner *et al.*

[A review of transjugular cholangiography](#)

Radiol Clin North Am (1970)

G. Colloredo *et al.*

[Impact of liver biopsy size on histological evaluation of chronic viral hepatitis: the smaller the sample, the milder the disease](#)

J Hepatol (2003)

P. Bedossa *et al.*

[Sampling variability of liver fibrosis in chronic hepatitis C](#)

Hepatology (2003)

D. Lebrec *et al.*

[Transvenous liver biopsy: an experience based on 1000 hepatic tissue samplings with this procedure](#)

Gastroenterology (1982)

P. Corr *et al.*

[Transjugular liver biopsy: a review of 200 biopsies](#)

Clin Radiol (1992)

R. Banares *et al.*

[Randomized controlled trial of aspiration needle versus automated biopsy device for transjugular liver biopsy](#)

J Vasc Interv Radiol (2001)

B.J. Psooy *et al.*

[Transjugular liver biopsy with use of the shark jaw needle: diagnostic yield, complications, and cost-effectiveness](#)

J Vasc Interv Radiol (2001)

A.F. Little *et al.*

[Transjugular liver biopsy: a prospective study in 43 patients with the Quick-Core biopsy needle](#)

J Vasc Interv Radiol (1996)

M.J. Wallace *et al.*

[Transjugular liver biopsy in patients with hematologic malignancy and severe thrombocytopenia](#)

J Vasc Interv Radiol (2003)

A. Ahmad *et al.*

Transjugular liver biopsy in patients with end-stage renal disease

J Vasc Interv Radiol (2004)



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2023, European Journal of Radiology

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2022, Journal of Clinical and Experimental Hepatology

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2022, Journal of Liver Transplantation

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2022, Journal of Pediatric Surgery Case Reports

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Annals of Medicine and Surgery, Volume 28, 2018, pp. 45-48

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Digestive and Liver Disease, Volume 48, Issue 9, 2016, pp. 1066-1071

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Journal of Vascular and Interventional Radiology, Volume 33, Issue 12, 2022, pp. 1630-1631

Research article

Investigation Gone Viral: Application of the Social Mediasphere in Research

Gastroenterology, Volume 149, Issue 4, 2015, pp. 839-843

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