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Editorial

Transjugular liver biopsy: The Tru-cut needle might be better for stiffer livers

Deciding which needle to use when performing transjugular liver biopsy (TJLB) is still debated, as no clear-cut indication has yet been provided. There are several reasons why it is difficult to provide adequate guidelines on this topic, including the lack of a reference standard to define an adequate liver sample, very heterogenous populations with different patient and liver characteristics, and a lack of randomized controlled trials (RCTs) comparing different needles.

Liver biopsy specimens represent approximately 1/50,000 of the liver. In chronic liver disease, both a minimum length of liver specimen and a minimum number of portal tracts has been established to obtain an optimal histological evaluation. From a diagnostic point of view, a specimen of >15 mm length with more than 6 portal tracts is considered sufficient [1], while a specimen of 20–25 mm length or >11 complete portal tracts is deemed necessary to reliably assess grading and staging [2]. It is clear that a long and not fragmented specimen is best, in order to obtain a correct diagnosis. Unfortunately, this goal is rarely obtained by TJLB, especially in fibrotic liver, in which fragmentation of the specimen is quite common and the number of portal tracts is low due to architectural distortion of the liver. The increased number of passages can partially remedy this pitfall, but it is still hard to define which is the best needle to use in order to minimize these biases. The aspiration needle and the Tru-cut needle are the most commonly used needle types in TJLB.

The largest metanalysis of all papers on TJLB was published more than 10 years ago and it included 7649 procedures (3). It reported a success rate in providing adequate liver samples in 96.1% of the patients, with a mean number of passes per procedure 2.7, a fragmentation rate of sample 34.3%, a median specimen length 12 mm (range 3.3–28), and a median number of portal tracts 6.5 (range 2.7–11). The specimens obtained with the Tru-Cut needle were more adequate for histological diagnosis than those obtained with a Menghini needle ($p < 0.001$) using a similar number of passes. In cirrhotic patients, the Menghini needle specimens were significantly more fragmented than the Tru-cut (35.2% *vs.* 11.4%) ones and significantly longer specimens were achieved using the Tru-Cut needle median (14.5 mm vs 9.5 mm, p=0.008). This result is in line with a previous study comparing Menghini and Tru-Cut needles, which reported the superiority of the Tru-Cut in cirrhotic patients undergoing percutaneous liver biopsy [4] and is also in line with the results of a small RCT, comparing two semi-automated needles for TJLB [5]. More recent devices have made the procedure easier and quicker, but have not substantially impacted the quality of the liver specimen obtained with TJLB. Overall, despite many attempts to compare the needles used to perform TJLB, it is difficult to determine the best needle to be used when performing TJLB, due to the lack of RCTs. The paper by Stift et al., published in this issue [6], introduces a relevant new variable, linking the choice of the needle to the grade of fibrosis expected, depending on portal hypertension and liver stiffness (LS). This policy is in line with previous observations which have reported less fragmented specimens using the Tru-cut needle in cirrhotic patients and longer specimens using the aspiration needle in patients without severe fibrosis [3]. The recent possibility to measure the stiffness of the liver with non-invasive techniques is a valuable tool which makes this strategy achievable.

In the study by Stift et al. [6], the authors suggest stratifying patients undergoing TJLB according to hepatic venous pressure gradient (HVPG), in order to choose the best tool (aspiration *vs.* Tru-cut needle) for obtaining adequate and less fragmented liver specimens. HVPG is the measure of portal hypertension and one of the strongest predictors of clinical decompensation in patients with compensated cirrhosis [7]. Stift et al. [6] show that in patients with clinically significant portal hypertension (CSPH), defined as HVPG of at least 10 mmHg, in whom fibrous septa are mostly thick [8,9], the Tru-cut needle performs better, in terms of a lower proportion of fragmented liver samples (more than 6 out of 10 not fragmented with Tru-cut needle *vs.* 2 out of 10 not fragmented specimens with aspiration needle; p=0.01). By contrast, in patients with mild or absent portal hypertension (HVPG <10 mmHg), in whom fibrous septa are more frequently thin [8,9], the aspiration needle performs better, in terms of greater sample length and proportion of liver specimen equal or longer than 2 cm (more than 5 out of 10 liver samples ≥2 cm obtained with aspiration needle *vs.* 1 out of 10 obtained with tru-cut needle; p=0.02). Furthermore, LS measured by vibration-controlled transient elastography (VCTE) is an emerging tool that could guide the decision on which needle type is best for TJLB: aspiration needles perform better for TJLB when the liver tissue is softer (LS <20 kPa) and Tru-cut needles are superior in terms of diagnostic quality in the presence of stiffer livers (LS>40 kPa). This finding is not unexpected since LS is a predictor of hepatic fibrosis and an accurate non-invasive surrogate measure of portal hypertension. The diagnosis of CSPH is made possible by VCTE, with an accuracy greater than 80%, when using a binary cut-off approach [10]. LS >20 kPa is the cut-off useful to rule-in CSPH, defining the group of patients at risk of having endoscopic signs of portal hypertension. The vast data available regarding the

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relationship between LS and CSPH led the Baveno VI consensus conference on portal hypertension to suggest a simple combination of LS measured by VCTE (<20 kPa) and platelet count (>150,000/mcl) in order to identify patients with viral-related advanced chronic liver disease at low risk of varices needing treatment and in whom endoscopic screening could be safely avoided [11]. However, every clinical algorithm including a LS cut-off as a watershed can be safely applied only if clinicians take into account any possible influencer or confounder of LS on an individual basis and on the etiology of the liver disease at hand. For instance, when using LS as a tool for stratifying patients, caution should be paid in patients with acute flares of transaminases, since necroinflammatory activity is an influencer of LS [12,13], and it is likely due to tissue oedema accompanying liver cell necrosis and swelling of liver cells occurring in the course of the inflammatory process. Thus, keeping this in mind when planning a TJLB is useful since knowing at an earlier stage whether the liver is stiff or soft might be of help in choosing the best needle to use to obtain better specimen quality: aspiration needles for softer livers, and Tru-cut needles for stiffer livers. However, at this point, large prospective RCTs comparing TJLB techniques are needed before any recommendation can be made.

Conflict of interest

None declared.

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