

CONTRIBUTION OF LIVER BIOPSY IN THE DIAGNOSIS OF CHRONIC LIVER DISEASES IN CHILDREN

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ABSTRACT :

Liver biopsy remains an essential diagnostic tool for chronic liver diseases and liver fibrosis. This prospective study conducted from december 2018 to december 2020 aimed to evaluate the use of liver biopsy in the diagnosis of chronic liver diseases in children aged 1 month to 15 years, hospitalized in the Pediatric Ward «B» of the University Hospital of Constantine. Liver biopsies were performed transcutaneously by a senior operator under local and/or sedation anesthesia. The results showed that liver biopsy is a valuable tool in the diagnosis of chronic liver diseases, especially in establishing a specific diagnosis in young infants under six months of age presenting with conjugated hyperbilirubinemia and in children with biliary atresia. The most frequent etiologies in this study were biliary atresia, cholestasis, glycogen storage diseases, and autoimmune hepatitis. No major complications were observed. The authors emphasize that liver biopsy is still essential in the diagnosis and evaluation of chronic liver diseases, but that new non-invasive methods and molecular studies are increasingly limiting the indications for this technique.

Key words: Liver biopsy, Hepatic biopsy, Chronic hepatopathies, Hepatic fibrosis, Children.

RÉSUMÉ : CONTRIBUTION DE LA PONCTION BIOPSIE DU FOIE AU DIAGNOSTIC DES MALADIES HÉPATIQUES CHRONIQUES CHEZ LES ENFANTS.

La Ponction Biopsie du Foie (PBF) reste un outil diagnostique incontournable pour les hépatopathies chroniques et la fibrose hépatique. Cette étude prospective menée de décembre 2018 à décembre 2020 avait pour objectif d'évaluer l'utilisation de la PBF dans le diagnostic des hépatopathies chroniques chez les enfants âgés de 1 mois à 15 ans, hospitalisés au service de pédiatrie « B » du Centre Hospitalo-Universitaire de Constantine. Les ponctions biopsies hépatiques ont été réalisées par voie transpariétale par un opérateur sénior sous anesthésie locale et/ou sédation. Les résultats ont montré que la PBF est un outil précieux dans le diagnostic des hépatopathies chroniques, en particulier pour établir un diagnostic spécifique chez les jeunes nourrissons de moins de six mois présentant une hyperbilirubinémie conjuguée et chez les enfants atteints d'atrésie des voies biliaires. Les étiologies les plus fréquentes dans cette étude étaient l'atrésie des voies biliaires, la cholestase, les glycogénoses et les hépatites auto-immunes. Aucune complication majeure n'a été observée. Les auteurs soulignent que la PBF est toujours incontournable dans le diagnostic et l'évaluation des hépatopathies chroniques, mais les nouvelles méthodes dites non invasives et les études moléculaires limitent de plus en plus les indications de cette technique.

Mots clés : Ponction Biopsie du Foie, Ponction Biopsie Hépatique, Hépatopathies chroniques, Fibrose hépatique, Enfants.

INTRODUCTION

Pediatric liver diseases, due to their varied etiology, present a significant diagnostic challenge. Although several non-invasive diagnostic methods have emerged, liver biopsy (LB) remains a vital tool, particularly in developing countries. The primary objective of this study is to evaluate the indications and complications associated with percutaneous liver biopsy and to underscore its ongoing importance in diagnosing pediatric liver diseases.

This two-year study, from december 2018 to december 2020, focused on children aged 1 month to 15 years who were hospitalized in the Pediatric Department «B» of Constantine University Hospital. LB procedures were performed percutaneously, under local anesthesia and/or sedation, by an experienced operator. The findings emphasize the crucial role of LB in diagnosing chronic liver diseases in this pediatric population. Major identified etiologies included biliary atresia, cholestasis, glycogen storage diseases, and autoimmune hepatitis. The absence of major complications underscores the safety of this procedure and its sustained utility in clinical practice.

While LB remains indispensable, it is important to recognize its limitations, especially considering recent advances in non-invasive diagnostic methods and molecular studies. Ongoing assessment of benefits and technological developments will enable a more precise diagnostic approach tailored to pediatric chronic liver diseases.

PATIENTS AND METHODS

1. Patients

This prospective study, conducted from december 2018 to december 2020, included all patients aged 1 month to 15 years hospitalized in the Pediatric Department «B» of Constantine University Hospital, who presented with manifestations of chronic liver diseases.

2. Methods

All liver biopsy procedures were performed by an experienced operator using a manual biopsy needle of the Héparfix® type (18G or 1.6 mm, 16G or 1.8 mm), under local anesthesia and/or sedation. Surgical biopsies were specifically reserved for diagnosing biliary atresia.

Percutaneous liver biopsies were performed either in the Pediatric Department B with local anesthesia or in the Pediatric Department of the Regional University Military Hospital of Constantine (HMRUC) if sedation was required or if the child was eligible for care at HMRUC. The child was positioned supine or in the left lateral decubitus position, with the right arm maximally abducted. Liver borders were determined by percussion and palpation, and the puncture site was located on the midaxillary line at the level of hepatic dullness. After skin disinfection, the biopsy needle was introduced into the intercostal space, passing above the lower rib, and quickly advanced into the liver to a depth of 3 to 3.5 cm. The needle was then withdrawn while aspirating. Monitoring of the child in the hospital extended over 24 hours.

Abdominopelvic ultrasound was performed before and after the procedure for all children. Contraindications, such as PT < 70%, PLT < 100,000/mm³, and ascites, were strictly observed. Parents were informed of the examination procedure, potential complications, and that participation was part of a scientific study without the disclosure of the child's personal data, and their informed and voluntary consent for LB was obtained. Approval from the local ethics committee of CHUC was obtained to conduct this study.

RESULTS

Data were collected from 74 children, with a median age of 38.12 months and a sex ratio of 1.57. Percutaneous LB was performed in 89.18% of cases (66 patients), while surgical LB was performed in 10.8% (8 patients). No major complications were observed; minor complications included pain at the puncture site (16.66%) and vomiting (6.06%).

A single-pass biopsy was performed in 95.45% of children, while 4.54% (3 children) required a second pass. Interpretable liver fragments were obtained in 95% of cases, with an average size of 16.52 mm. Most patients received local anesthesia (79.73%), while 20.27% received sedation, mostly those eligible for care at HMRUC or uncooperative adolescents (Table 1). The predominant etiologies were cholestatic syndromes (Table 2).

Table I. Distribution by type of anesthesia.

Type of Anesthesia	Local	Sedation	Total
Number	51	15	66
Percentage (%)	79.73	20.27	100

Table II. The main etiologies of liver diseases.

Etiologies	n (%)
Progressive familial intrahepatic cholestasis	25 (28.4)
Biliary atresia	21 (23.8)
Cholangitis	7 (7.9)
Deficiency in bile acids	6 (6.8)
Glycogen storage disease type 1	6 (6.8)
Alagille syndrome	5 (5.6)
Autoimmune hepatitis	4 (4.5)
Wilson's disease	4 (4.5)
Undetermined etiologies	3 (3.4)
Cystic fibrosis	2 (2.2)
Tyrosinemia	2 (2.2)
Budd-Chiari syndrome	1 (1.1)
Fructose intolerance	1 (1.1)
Chanarin-Dorfman syndrome	1 (1.1)

DISCUSSION

Liver biopsy remains an essential tool in evaluating diffuse liver diseases, providing a comprehensive assessment of liver anatomical lesions, and offering both diagnostic and prognostic value by assessing the severity of liver disease [1]. In this study, percutaneous LB was preferred for all patients without the need for ultrasound guidance. The cohort, consisting of children aged 1 month to 15 years, showed a predominance of percutaneous LB (89.18%) compared to surgical LB (10.8%), with no major complications reported. We observed that patient age might influence the risk of complications, particularly those related to sedation, corroborating previous findings [2].

Previous studies, including those by Farrell RJ and al. [3] and Papini and al. [4], highlight the advantages of ultrasound-guided biopsies, which are associated with a significant reduction in pain and complications. Ultrasound use allows for avoiding punctures of adjacent organs and enables precise localization, facilitating complete local anesthesia.

The evaluation of different needles used for liver biopsy, such as the TruCut® needle, has demonstrated significant advantages in terms of sample size and cirrhosis diagnosis [5]. Automatic needles, particularly the automatic TruCut®, show superior sample quality compared to manual needles. Our findings in-

dicating that a single pass of LB is usually sufficient, although additional passes may be necessary to obtain adequately sized fragments. These results align with previous studies that have highlighted the increased risk of complications after the second pass [6].

The sample size obtained in our patients, with an average of 16.52 mm, aligns with generally accepted criteria for satisfactory liver biopsy, particularly for diffuse diseases [7,8]. Our results confirm that LB remains a preferred tool for the etiological diagnosis of liver diseases in children, especially for cholestatic syndromes.

Overall, this study reinforces the importance of percutaneous LB in evaluating liver diseases in children. Despite advances in ultrasound-guided biopsy, LB remains a reliable procedure, providing valuable diagnostic information with an acceptable risk of complications. Future research could further explore optimization of LB techniques to enhance clinical practice in children.

CONCLUSION

Liver biopsy continues to be an essential tool in evaluating chronic liver diseases, providing a comprehensive assessment of liver anatomical lesions and the severity of hepatic fibrosis. Its practice in outpatient settings, with strict adherence to contraindications and accurate ultrasound guidance, is safe, and severe complications are rare if necessary precautions are taken. However, with the advancement of non-invasive methods such as liver elastography or FibroScan, and molecular studies capable of detecting genetic mutations responsible for certain liver diseases, the indications for liver biopsy are becoming increasingly limited. Therefore, it is crucial to recognize the limitations of this method and adapt it to the specificities of pediatric chronic liver diseases.

ACKNOWLEDGEMENTS:

The authors would like to thank the following services for their contribution to this study:

- Regional Military University Hospital of Constantine
- Pathology Department of Constantine University Hospital
- Medical Imaging Department of Constantine University Hospital
- Pediatric Surgery Department of Mansourah Hospital.

The authors are grateful for the contributions of these services, without which this study would not have been possible.

Conflict of Interest : None.

DATE DE SOUMISSION : 26/03/2024.

DATE D'ACCEPTATION : 10/09/2024.

DATE DE PUBLICATION : 29/01/2025.

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