CODEN [USA]: IAJPBB ISSN: 2349-7750

INDO AMERICAN JOURNAL OF
PHARMACEUTICAL SCIENCES

SJIF Impact Factor: 7.187
http://doi.org/10.5281/zenodo.3988763

Available online at: http://www.iajps.com *Research Article*

IMPORTANCE OF NEEDLE BIOPSY IN THE ANALYSIS OF PEDIATRIC LIVER DISORDERS

Dr Ragda Imran[1], Dr Muhammad Usama Arshad[2], Dr Tooba Marriam[3]
[1, 3] House Officer at Mayo Hospital, Lahore
[2] Central Park Medical College, Lahore

Article Received: June 2020 **Accepted:** July 2020 **Published:** August 2020

Abstract:
Aim: *To recognize the usefulness of liver biopsy in diagnosis and document the spectrum of liver disease in children.*
Methods: *Retrospective cross-sectional study at the Department of Pediatrics and Histopathology of the Services Institute of Medical Sciences and its attached hospital from April 2019 to April 2020. Liver biopsies were obtained with a Menghini needle. Fixed tissues were processed under standard conditions.*
Results: *A total of 100 cases ranging in age from 1.5 months to 16 years were examined over the four years. The most common histological results in order of frequency are secondary hemochromatosis (30%), biliary atresia (20%), storage disorders (16%), cirrhosis (10%) and neonatal hepatitis (10%). Less common subjects were chronic hepatitis (6%), nonspecific reactive hepatitis (3%) and granulomatous hepatitis (1%). One case of hepatoblastoma, haemophagocytic lymphohistiocytosis, and congenital fibrosis has also been reported. These findings were compared with local and international histological studies.*
Conclusion: *Liver biopsy is a useful diagnostic technique for diagnosing liver disease in children. Biliary atresia, stunning disorders and neonatal hepatitis are the most common entities in our team.*
Key Words: *liver biopsy, diagnosis, liver disease.*

Corresponding author:
Dr. Ragda Imran,
House Officer at Mayo Hospital, Lahore

QR code

Please cite this article in press Ragda Imran et al, ***Importance Of Needle Biopsy In The Analysis Of Pediatric Liver Disorders.,*** *Indo Am. J. P. Sci, 2020; 07(08).*

INTRODUCTION:

The liver in the age group of children suffers from various types of infections, jaundice, unbalanced liver function tests and metabolic and cancer disorders, as a result of which there is an enlarged liver[1-2]. Cholestatic childhood and childhood syndromes can be caused by bile atresia or hepatitis in newborns. Methods of treatment of these conditions are different[3-4]. Early diagnosis and emergency treatment is the only chance of survival. Liver biopsy is the cornerstone of the correct diagnosis. There are several non-invasive diagnostic methods available to test liver disease, such as biochemical tests, serum markers, ultrasound and imaging techniques. However, liver biopsy plays an important role in the correct diagnosis of liver, collostatic jaundice, non-source, cancer and metabolic liver disorders. Liver biopsy can be a transdermal or open surgical wedge biopsy during laparotomy. Paul Ehrlich used a needle biopsy in 1883 to first examine the glycogen content of the diabetic liver. In 1958, Menghini designed a 1.4 mm diameter needle for liver biopsy[5-6]. Today, trucut, menghini, vim-silverman or jamshidi needle is used for histopathological evaluation. At the slightest risk to the patient, as a result of this procedure, a sufficient number of tissues representative of the diffuse process involving the liver is obtained. A needle biopsy represents 1/50,000 liver part[7-8]. However, with this technique, focal changes can be lost. But ultrasound is very efficient when conducted by guidance or computed tomography. Satisfactory tissue biopsy is 1-4 cm long and weighs 10-50 mg[9-10]. The purpose of this study is to look at the role of liver biopsy in diagnosing and documenting various histological pathologies of childhood liver disease.

MATERIALS AND METHODS:

Retrospective cross-sectional study at the Department of Pediatrics and Histopathology of the Services Institute of Medical sciences and its attached hospital from April 2019 to April 2020. During this period, a total of 100 patients were studied. Patients selected for biopsy include persistent jaundice, unexplained hepatosplenomegaly, severe thalassemia and unidentified pyrexia. In such cases, although alternative and non-invasive techniques are used, no definitive diagnosis can be made. Thalassaemic patients underwent a biopsy to see the liver condition before a bone marrow transplant. Prior to the biopsy, detailed analysis of these patients was performed, including history, physical examination, complete blood count, LST, serum virological markers, ultrasound, TOM, metabolic tests and coagulation profile. The biopsy was performed with a menghini needle under a diluted intravenous ketamine. Biopsy samples were immediately fixed at 10% formalities and were used as preservatives for people suspected of alcohol storage disorders. The fabrics were processed for 16-18 hours in an automatic Sakura-Japan fabric processor. Coated paraffin tissues were cut with a hand-held microtome. Four series of micron thicknesses have been painted with a routine spot of hematoxylin and Eosin (H&E). The special stains like PAS with and without diastase, Reticulin stain and Perl's stain were also used when required. The sections which showed less than three portal areas were excluded from the study. For chronic hepatitis, Knodell8 histological activity index (HAI), scoring system was used to know the grade and stage of the disease.

RESULTS:

In total, 100 cases from 1.5 months to 16 years of age were investigated over one year. The ratio of men to women was 1.2: 1. The histopathological results of children of both sexes are presented in Table 1.

Table 1. Histological Spectrum (Sex-wise distribution) of paediatric liver diseases (n = 100).

S. No.	Diagnosis	Male	Female	Total Cases	%
1.	**Secondary Haemochromatosis** (Thalassaemia Major)	14	16	30	30.0
2.	**Biliary Atresia**	13	7	20	20.0
3.	**Hepatitis**	12	8		
	a. Chronic Hepatitis	3	3	6	6.0
	b. Neonatal Hepatitis	7	3	10	10.0
	c. Granulomatous Hepatitis	1	-	1	1.0
	d. Nonspecific Reactive Hepatitis	1	2	3	3.0
4.	**Metabolic / Storage Disorders**	7	9	16	16.0
	a. Glycogen Storage Disease	5	7	12	12.0
	b. Galactosaemia	1	-	1	1.0
	c. Alpha-1 antitrypsin deficiency	-	1	1	1.0
	d. Fatty change	1	1	2	2.0
5.	**Cirrhosis Liver**	6	4	10	10.0
6.	**Tumors**	1	1	2	2.0
	a. Hepatoblastoma	-	1	1	1.0
	b. Metastatic Hodgkin's Disease	1	-	1	1.0
7.	**Miscellaneous**	1	1	2	2.0
	Haemophagocytic	-	1	1	1.0
	Lymphohistiocytosis	-	-	-	
	Congenital Hepatic Fibrosis	1	-	1	1.0
	Total	54	46	100	100%

The most common histological diagnosis was secondary hemochromatosis due to Thalassemia Major (30%), followed by biliary atresia (20%) and storage disorders (16 %). The largest share of the storage disorders was caused by glycogen storage disease (12%). Less common disorders were neonatal hepatitis (10%), chronic hepatitis (6%) and non-specific reactive hepatitis (3%). There was also one case of hepatoblastoma, haemophagocytic lymphohistiocytosis (HLH), congenital liver fibrosis and metastatic Hodgkin's lymphoma each. Sixty percent of the children with thalassemia had a Knodell HAI score between 13/22 and 18/22, and 65% of patients developed Grade 3-4 haemosiderosis. Only three children with thalassemia showed fully developed changes in cirrhosis. The distribution of various disorders by age is shown in Table 2.

Table 2. Age-wise distribution of childhood hepatic diseases (n=100).

Disorders of Liver	Number of cases in different age groups				
	1 Month - 1 year	2-5 years	6-10 years	11-16 years	Total
Secondary Haemochromatosis (Thalassemia Major)	-	7	19	4	30
Biliary Atresia	16	4	1	-	20
Glycogen Storage Disease	4	7	1	-	12
Galactosaemia	1	-	-	-	1
Alpha-1 anti trypsin deficiency	-	-	1	-	1
Fatty change	1	1	-	-	2
Chronic Hepatitis	-	4	2	-	6
Neonatal Hepatitis	10	-	-	-	10
Chronic Granulomatous Hepatitis	-	-	-	1	1
Nonspecific Reactive Hepatitis	-	1	2	-	3
Cirrhosis Liver	-	2	5	3	10
Hepatoblastoma	1	-	-	-	1
Metastatic Hodgkin's Disease	-	-	-	1	1
Haemophagocytic Lymphohistiocytic	1	-	-	-	1
Congenital Hepatic Fibrosis	-	1	-	-	1
Total	34	27	30	9	100

DISCUSSION:

Some differences in liver etiology and incidence in children are affected by the same pathologies as adults. Many genetic metabolic disorders such as glycogen storage disease, galactosemia and phenylketonuria are common in the age group of children[11-12]. Some malignant tumors such as neuroblastoma, hepatoblastoma or hemangioma cause liver growth. Some acquired changes, such as neonatal hepatitis and bile duct atresia, also occur in childhood or neonatal. The most common disorder in this study was secondary hemochromatosis (30%). This number is not a true representative of the relative incidence of liver disease. The discovery is skewed by the recent creation of the Rawalpindi Armed Forces Bone Marrow Transplant Center (AFBMTC)[13]. Liver biopsy of thalassemic children was performed for the selection of suitable cases before bone marrow transplantation. In 60% of our cases, a score of 13/22 to 18/22 was detected according to the Knodell8 histological activity index (HAI), and 65% of our children had hemosiderosis of 3-4 degrees. A study in China (2002) showed that 30% of patients were stage 3 and 44% were grade 3-4 hemosidesiderosis. In three cases, thalassemic discoidal lesions were developed in the early 6-7 years, as in an earlier study in which the range of the age of cirrhosis of jean and arc was 7-8 years. The next common group of disorders in this series was neonatal cholestasis (20%) due to bile atresia. Similarly, bile duct atresia is the most common disease observed in the Histopathology Laboratory at Ga-Rankuwa Hospital in South Africa. This intake is quite high compared to the previous three local Pakistani studies. Newborn was observed in 10% of cases with male dominance in age. In contrast to our study, variable frequencies were 2.7%, 3.3%, 13%, 15% and 18% from different centers in Pakistan and India (Table 3). The most common cause of chronic hepatitis in our configuration is hepatitis virus's "B" or hepatitis "C". A total of six (6%) were detected in cases of chronic hepatitis which were closer to two other studies related to Anwar et al (1988) and Shakoor KA15 (1987). Cases of hepatitis "C" and 2 hepatitis infections ""B" were reported in four of the six cases. Children with perinatala hepatitis have a 90% risk of developing chronic hepatitis B. Hepatitis C is relatively low in childhood, and most chronically infected children are asymptomatic and exhibit milder histological disorders. The same was true of our observations that children infected with hepatitis C were asymptomatic in the presentation and that mild hepatitis had slightly higher levels of ALT. The rate of liver biopsy is finding the underlying cause of unknown pyrexia[14]. This study detected the phenomenon "PUO" due to chronic granulomatous inflammation and possibly tuberculosis. This patient responded well to the treatment of tuberculosis. In this study, nonspecific reactive hepatitis is observed in 3% of cases that are low compared to warning and ark. This type of hepatitis was mild and can be an inflammatory process that requires more research due to underlying systemic disorders. According to our data, cirrhosis of the liver has developed with male and female intercourse of 1.5:1 out of ten (10%) Cases. This rate of cirrhosis is 14% lower than in the Karachi study (20%) than Lahore (23.4%) but Rawalpindi is higher in the previous study (6%). The causes were the cause of three cases of thalassemia, two cases, due to bile atresia and glycogen storage. Galactosemia has contributed to alpha-1 antitrypsin deficiency and chronic hepatitis. Hepatoblastoma is the most common primary childhood cancer that accounts for 1% of childhood cancers. In a study in India, 2 out of 128 children (1.6%) malignancies closer to our findings (2%) because we detected liver and Hodgkin lymphoma[15]. Similarly, one of our case studies died of this disease and two more siblings probably died in childhood from this disease.

CONCLUSION:

1. Liver biopsy is a useful diagnostic technique in the diagnosis of childhood liver disease.
2. Biliary atresia, storage disorders and neonatal hepatitis are the most common entities in our set up.

REFERENCES:

1. Weldon CB, Madenci AL, Tiao GM, Dunn SP, Langham MR, McGahren ED, Ranganathan S, López-Terrada DH, Finegold MJ, Malogolowkin MH, Piao J. Evaluation of the diagnostic biopsy approach for children with hepatoblastoma: A report from the Children's Oncology Group AHEP 0731 Liver Tumor Committee. Journal of Pediatric Surgery. 2019 May 11.
2. Yeh PJ, Chen CC, Lai MW, Yeh HY, Chao HC. Pediatric Liver Abscess: Trends in the Incidence, Etiology, and Outcomes Based on 20-Years of Experience at a Tertiary Center. Frontiers in Pediatrics. 2020;8.
3. Tian G, Kong D, Jiang TA, Li L. Complications After Percutaneous Ultrasound-Guided Liver Biopsy: A Systematic Review and Meta-analysis of a Population of More Than 12,000 Patients From 51 Cohort Studies. Journal of Ultrasound in Medicine. 2020 Jan 30.
4. Tian G, Kong D, Jiang TA, Li L. Complications After Percutaneous Ultrasound-Guided Liver Biopsy: A Systematic Review and Meta-analysis of a Population of More Than 12,000 Patients From 51 Cohort Studies. Journal of Ultrasound in Medicine. 2020 Jan 30.

5. Tian G, Kong D, Jiang TA, Li L. Complications After Percutaneous Ultrasound-Guided Liver Biopsy: A Systematic Review and Meta-analysis of a Population of More Than 12,000 Patients From 51 Cohort Studies. Journal of Ultrasound in Medicine. 2020 Jan 30.
6. Lefkowitch JH. Scheuer's liver biopsy interpretation E-Book. Elsevier Health Sciences; 2020 Mar 28.
7. Franchitto A, Carpino G, Alisi A, De Peppo F, Overi D, De Stefanis C, Romito I, De Vito R, Caccamo R, Sonia B, Alessandra S. The contribution of the adipose tissue-liver axis in pediatric patients with nonalcoholic fatty liver disease after laparoscopic sleeve gastrectomy. The Journal of Pediatrics. 2020 Jan 1;216:117-27.
8. Bafna V, Bhat S, Raj V, Badiger S, Annapandian VM, Nataraj KS, Damodar S. Quantification of Liver Iron Overload: Correlation of MRI and Liver Tissue Biopsy in Pediatric Thalassemia Major Patients Undergoing Bone Marrow Transplant. Indian Journal of Hematology and Blood Transfusion. 2020 Feb 22:1-7.
9. Gu J, Liu S, Du S, Zhang Q, Xiao J, Dong Q, Xin Y. Diagnostic value of MRI-PDFF for hepatic steatosis in patients with non-alcoholic fatty liver disease: a meta-analysis. European radiology. 2019 Jul 1;29(7):3564-73.
10. Chen CY, Lin MJ, Yang WC, Chang YJ, Gao FX, Wu HP. Clinical spectrum of intra-abdominal abscesses in children admitted to the pediatric emergency department. Journal of Microbiology, Immunology and Infection. 2020 Apr 1;53(2):283-91.
11. Yoshimaru D, Takatsu Y, Suzuki Y, Miyati T, Hamada Y, Funaki A, Tabata A, Maruyama C, Shimada M, Tobari M, Nishino T. Diffusion kurtosis imaging in the assessment of liver function: Its potential as an effective predictor of liver function. The British Journal of Radiology. 2019 Feb;92(1094):20170608.
12. Khalifa A, Rockey DC. The utility of liver biopsy in 2020. Current Opinion in Gastroenterology. 2020 May 1;36(3):184-91.
13. Nichols PH, Pan Y, May B, Pavlicova M, Rausch JC, Mencin AA, Thaker VV. Effect of TSH on Non-Alcoholic Fatty Liver Disease (NAFLD) independent of obesity in children of predominantly Hispanic/Latino ancestry by causal mediation analysis. PloS one. 2020 Jun 22;15(6):e0234985.
14. Jin R, McConnell R, Catherine C, Xu S, Walker DI, Stratakis N, Jones DP, Miller GW, Peng C, Conti DV, Vos MB. Perfluoroalkyl substances and severity of nonalcoholic fatty liver in Children: An untargeted metabolomics approach. Environment international. 2020 Jan 1;134:105220.
15. Dhole SD, Tambse MP. Histopathology findings of chronic liver diseases in pediatric age group. IP International Journal of Medical Paediatrics and Oncology. 2019 May 3;5(1).