

## Liver biopsy and its usefulness in pediatric practice



### Medical Science

**KEYWORDS :** liver biopsy, hepatitis, liver function test.

**Dr. Jignesh C. Panchal**

38, vijay park society, Gor no kuvo, Maninagar east, Ahmedabad – 380008

**Dr. Snehal V. Patel**

25, Rangkunj society, Near naranpura cross roads, Naranpura, Ahmedabad 13

### ABSTRACT

*Liver is enlarged in various conditions like infections, cirrhosis of liver, storage conditions and neoplasms. In evaluating a patient with liver disease, history, physical examination and blood investigations guide to the diagnosis, with liver biopsy required in many for confirmatory diagnosis. This study was thus conducted to know the role and usefulness of liver biopsy in diagnosing liver diseases. Liver biopsy of 25 patients was carried out with vim silvermann needle with necessary workup done prior to procedure. It was observed that out of 25 cases, 5 cases had acute viral hepatitis, of which 2 had fibrosis and 1 case showed fatty changes. Chronic hepatitis was diagnosed in 9 cases, of which 2 had cirrhosis. 2 cases each of neonatal hepatitis and hemolytic changes were seen. Diagnosis of 1 case each of metabolic storage disease, glycogen storage disease, acute fulminant necrosis and portal triaditis was made thus explaining the important role of liver biopsy as a diagnostic tool in liver disease.*

#### Introduction:

The liver plays an important role in metabolism and has number of functions in body including glycogen storage, decomposition of red blood cells, plasma protein synthesis. It is also largest gland in human body. The liver is necessary for survival, a human can only last upto 24 hours without liver function. The liver is only human internal organ that can actually regenerate itself to a significant extent.

Liver is palpable in absence of liver diseases in-

- (1) In children normal liver edge can be felt upto 2cm below right costal margin.
- (2) Presence of palpable caudate on Riedel's lobe.
- (3) Increased diaphragmatic descent.
- (4) Presence of emphysema with associate depressed diaphragm.
- (5) Thin body habitus with narrow thoracic cage.

#### Palpable liver in liver diseases:

- (1) Infections: Active hepatitis (enlarged and tender) chronic hepatitis, liver abscess.
- (2) Cirrhosis (enlarged with nodular irregularity).
- (3) Fatty infiltration (enlarged with rounded edge).
- (4) Storage disorders.
- (5) Neoplasms etc.

The common diseases which affect liver are viral hepatitis, liver abscess, fatty infiltration, vascular congestion (congestive cardiac failure), infiltrative disorders (leukemia, lymphoma), tumors and metabolic storage diseases.

In evaluating a patient with liver diseases medical history, physical examination and blood studies known as liver function tests (LFT) give an over view of health of liver. If LFT results are persistently abnormal, additional studies are required to determine exact cause of problem.

A liver biopsy is powerful clinical tool for diagnosing liver disease. It is generally safe in experienced hands and is currently considered criterion standard for evaluation of hepatic inflammation and fibrosis.

#### Material and Methods:

The cases studied in present study were taken from pediatric ward of our hospital. The period of study extended from September 2006 to September 2008. During this period in 25 patients liver biopsy was carried out.

#### Selection Criteria:

- (1) Patient with abnormal liver function tests in a liver disease when it should be normal.
- (2) Patient having jaundice due to liver cause which is undiagnosed.
- (3) Patient having unexplained persistent enlarged liver.

- (4) Patient having abnormal firm liver consistency.
- (5) Patient having generalized (systemic disease) where liver is also involved.

#### Exclusion Criteria:

- (1) Patients having increased pro-thrombin time INR>1.6.
- (2) Thrombocytopenia APC<60,000.
- (3) Patient with ascites.
- (4) No positive consent from parents.

In each case detailed history was taken and complete clinical examination was done. Cases were worked up thoroughly through relevant laboratory and other investigations to approach diagnosis.

Though prothrombin time was the only investigation which is required prior to performing liver biopsy, a list of investigations were carried out which ultimately lead to plan for liver biopsy or helped in making diagnosis of liver disease in one or another way.

#### Observations and Discussion :

##### 1. Age Incidence :

Age in years	Present study		G.ChangalRaju et al34 series Percentage	R.S.Dayal et al35 series Percentage
	Cases	Percentage		
0-3	08	32%	39%	63.25%
3-6	14	56%	36%	24.50%
6-9	02	08%	11%	12.25%
9-12	01	04%	14%	
Total	25	100%	100%	100%

It is seen from above tables that maximum number of patients in whom liver biopsy was done were less than 6 years age. In present study 0-6 years cases are 88%, these correlates with 75% of cases and 87.75% of cases of 0-6 years age group by G. ChangalRaju et al and R.S. Dayal et al series respectively.

##### 2. Sex Incidence :

	Present Study		Study by S. Gupta, R.K. Puri36 and M. Balasubramaniyam percentage
	Cases	Percentage	
Male	15	60%	60.9%
Female	10	40%	39.9%
Total	25	100%	100%

The male : female ratio in present study is 60:40 i.e. 1.5:1 that correlates with the study by S.Gupta, R.K. Puri and ZM. Balasubramanyam which is 60.9:39.9 i.e. approximately 1.5:1

### 3. Clinical Features of cases studied at the time of admission :

Sr No	Clinical features Cases	Present study		G.ChangalRaju et al34 series (%)
		Percentage		
1	Jaundice	20	80%	14%
2	Fever	19	76%	35%
3	Pallor	16	64%	-
4	Abd. Distention	09	36%	78%
5	Vomiting	06	24%	-
6	Oedema	06	24%	26%
7	Bleeding	05	20%	-
8	Itching	01	04%	-
9	Skin rash	01	04%	-
10	Hepatomegaly	25	100%	-
	a. Liver size 1.5 3 cm	8 cases		
	b. 3.0-6.0 cm	16 cases		
	c. 6.0 cm and above	1 cases		

In present study hepatomegaly, jaundice, fever, pallor, abdominal distension, vomiting and oedema were the common presenting clinical features, comparative study also showed the similar presenting features but with preponderance of one over other. Liver is palpable upto 1.5 cm throughout the childhood hence liver size less than 1.5 cm was considered normal. Present study shows that majority of patients (64%) have moderate hepatomegaly (size 3-6 cm).

### 4. Liver consistency of cases at the time of admission :

Sr. No.	Liver Consistency	Present Study	
		Cases	Percentage
1	Soft	6	36%
2	Firm	19	76%
3	Hard	00	00%
	Total	25	100%

Abnormal liver consistency is one of the criteria for carrying out liver biopsy. In present study 70 of cases in whom liver biopsy was done 76% were having firm liver consistency on admission and only 36% of cases were having soft liver consistency.

### 5. Biochemical Derangement in Present study :

Sr. No.	Test	Present Study	
		Cases	Percentage
1	S.Bilirubin : Normal	4	16%
	Moderate altered	7	28%
	Severely altered	14	56%
2	S.G..T. Normal	7	28%
	Moderate altered	4	16%
	Severely altered	14	56%
3	S.A.P. Normal	2	04%
	Moderate altered	2	04%
	Severely altered	21	84%

In present study, liver function tests were severely altered in majority of patients. 56% of total cases have severely altered S.G.P.T. and S.Bilirubin levels whereas 84% of cases have severely deranged S.A.P.

### 6. Liver Biopsy Diagnosis of all 25 Patients :

Twenty five liver biopsies were done in present study. Tissue required for diagnosis was adequate in all the cases. There was no complication during or after the procedure. All the slides and blocks were prepared by myself, special staining methods like PAS & diastase were also used when found necessary. Patholo-

gist's opinion was taken for confirmation of diagnosis and some of the slides were sent for expert reporting.

Sr. No	Liver biopsy diagnosis No. of Cases Percentage		Present study	
1	Normal liver		3	12%
2	Acute Viral Hepatitis		5	20%
	a	Infective hepatitis only	2 cases	
	b	With fibrosis	2 cases	
	c	with fatty charge		
3	Chronic hepatitis		9	36%
	a	Gr. I	2 cases	
	b	Gr. II	5 cases	
	c	Gr. III	2 cases	
	I	Only chronic hepatitis	5 cases	
	II	Associated with fibrosis	2 cases	
	III	Associated with cirrhosis	2 cases	
4	Neonatal hepatitis		2	08%
5	Hemolytic changes		2	08%
6	Glycogen storage diseases		1	04%
7	Metabolic storage diseases		1	04%
8	Acute fulminant necrosis		1	04%
9	Portal triaditis		1	04%
	Total		25	100%

In present study liver biopsy result is normal in 12% of cases. Acute viral hepatitis is present in 20% of total cases in which, in 2 cases fibrosis and in 2 cases fatty changes are present.

In 36% of cases chronic hepatitis is diagnosed, in which 2 cases shows changes of cirrhosis and 2 cases of fibrosis.

Neonatal hepatitis is diagnosed in 8% of total cases. Hemolytic changes are seen in 8% cases. There is one case each of glycogen storage diseases, metabolic storage disease, acute fulminant necrosis and portal triaditis.

### Summary and Conclusions :

- (1) In present study, in 25 cases liver biopsy was done as an ultimate tools to evaluate liver disease.
- (2) The patients who were selected for liver biopsy were those who were having undiagnosed jaundice due to liver cause, unexplained persistent enlarged liver, abnormal firm liver consistency, liver involvement in systemic disease and patients with abnormal unexplained liver function tests.
- (3) Patients having increased prothrombin time, thrombocytopenia and patients with ascites were not submitted for liver biopsy till above things were normal.
- (4) All the cases were studied in detail through detail history, clinical examination and appropriate laboratory investigation for evaluation of liver disease prior to submitting for liver biopsy.
- (5) Liver biopsy was done as a last investigation when liver disease was not diagnosed inspite of detail laboratory and radiological workup.
- (6) Out of all patients undergone liver biopsy, 88% were less than 6 years of age. This is comparable to study by G.ChangalRaju and R.S.Dayal. 60% of total cases were male, this is comparable to study by S.Gupta, R.K.Puri and M. Balasubramanyam.
- (7) Common presenting features were jaundice, fever, pallor and abdominal distension. Vomiting, bleeding, oedema, itching and skin rash were also present but less commonly.
- (8) All the cases presented with hepatomegaly, out of them 76% cases were having abnormal firm liver consistency.
- (9) Biochemical tests were severely deranged in majority of patients. 56% of patients shows severely altered S.Bilirubin and S.G.P.T. on admission.
- (10) The liver biopsy was done by Vim Silverman's needle in all cases. The biopsy was done successfully on first attempt

and sample obtained was adequate for histo-pathological examination in each case.

- (11) No complications occurred due to liver biopsy during the procedure, during stay in hospital or after discharge when patients were followed up.
- (12) There was no mortality due to procedure.
- (13) Out of all 25 cases, liver biopsy report was normal in 3 cases. 5 cases had acute viral hepatitis, out of them 2 cases had fibrosis and 1 case shows fatty changes. Chronic hepatitis was diagnosed in 9 cases, according to grades of inflammation grade-I, -2 cases, grade-II, -5 cases and grade-III,

-2 cases were present. Cirrhosis was present in 2 cases of chronic hepatitis and hemolytic changes. One case each of metabolic storage diseases, glycogen storage disease, acute fulminant necrosis and portal triaditis was diagnosed.

Thus liver biopsy is a ultimate tool of investigation to diagnose liver disease. It can diagnose liver disease which could not be diagnosed by clinical examination and laboratory investigations.

Also, it shows extent of liver injury and helps in grading of liver inflammation.

## REFERENCE

- Diseases of Liver and biliary system. Sheila Sherlock. James Dooley 115h edn. Oxford, U.K. | 2. Castell DO, Frank B.B., Postgraduate Medicine, 1977.62 (6) . | 3. Costell DO, O'Brien DK, Myench H. Chalmers TC, Ann. Internal Medicine 1969-70, 70:1883-89. | 4. Eugene R. Schiff Michael F. Sorrel, Willis C. Moddrey eds. Schiff's disease of Liver 9th edition, Philadelphia. | 5. David Zakim, Thomas D, Bayer eds. Hepatology a textbook of liver Disease. 4th edition, Philadelphia. | 6. Jackson-Siegelboon Gastroenterology, <http://www.gicare.com/pated/epdly27.m/try>. | 7. Essential pediatrics : O.P.Ghai : 7th edition. | 8. Nelson Textbook of Pediatrics, 18th edition. | 9. Grant A. Neuberger, J. Guidelines on use of liver biopsy in clinical practice. British Society of Gastroenterology. | 10. Bravo, AA Sheth SG, Chopra S, Liver biopsy, N Engl J Med. 2001. | 11. Firpi RJ Soldeola Pico, Adbdmlalek MP et al. Clin. GastroenterolHepatol 2005. | 12. Michael AJSauyer MD Comoncecourty memorial hospital. | 13. Ludwig J, Batts KP, Mayer TP, Poterucha JJ Advances in Liver biopsy diagnosis. Mayo Clin. Procedure 1994. 301 : 69(7) 677-8. | 14. American College of Physicians Clinical competence in percutaneous liver biopsy. Amber College of Physicians. | 15. P.J.Mehta Practical Medicines : 17th edition. | 16. Ward Procedures - Mansukh Patel, YoeshUpadhyay, 4thedition. | 17. Human Histopathology with colourAtlas, 5thedn. Inderbirsingh. | 18. Robins and Cantors Pathology, 7thedition. | 19. Anatomical basis of clinical proc..39th edition, Grey's Anatomy. | 20. Liver biopsy interpretation, 6thedn. Peter J. Schevnar, Jay Leukowich. | 21. Rosai and Ackerman's Surgical Pathology, Vol. 1,9thedn. JuvanRosai. | 22. Recent advances in histopathology. 18thedn. By Massimo Pignatelli MD, Ph.D., FRCP, Path and James C.C. Underwood, MD, FRCP. | 23. Reddy KR, Jeffers LJ, Evaluation of liver biopsy, Schiff's diseases of Liver 8thedn. | 24. Piccinio F. Sangill : Complication following liver biopsy. | 25. Schiano TD, AzeemBudion CA et al : Importance of Specimen size. | 26. Frerichs, FT Von Ulberden Diabetes.Hirschwole. Berlin 1884. | 27. Schopfer F. Dela Possibilities de faire intra vitam in diagnostic histopathologiqueprecis des malldier duo fovie et de la role. Scm. Med. 1907, 27 : 229. | 28. I version P, Roholm K. Med. Scand. 1939 102 : 1. | 29. Sherlock's Aspiration liver biopsy technique and Diagnostic application Lancet, 1948. | 30. Sherlock's Pick R. Von Leewen DJ, Liver Biopsy today, 1984. | 31. Sternburgs Surgical Pathology, GIT : Associate Organs. | 32. Cases in Clinical Pathology, a diagnostic approach 4thedn. RN Wolmsley, LR Watkinson HJ Koin. | 33. <http://en.Wikipedia.org/wilki/Liver>. | 34. ChanganRaju C., Bhaskara Reddy D. and Suvarnakumari G. Pattern of liver biopsy in children, a biopsy study. Indian Journal of Pediatrics, 42 : 39-45, 1975. | 35. Dayal R.S., Mathur, G.P. Prasad R., Nahi P.N. Clinopathological study of 98 cases. Indian Pediatrics, 32, 129, 1966. | 36. S.Gupta, R.K. Puri and M. Balasubramanyam needle biopsy of Liver in pediatric practice. Indian Journal of Pediatrics, 37 : 565, 1970. | 37. <http://www.emedicinehealth.com>.