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Histomorphological Profile of Hepatic Pathology in Forensic Autopsy Specimens Received in the Department of Pathology in a Tertiary Care Hospital, Mandya - A Record Based Study

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Abstract

Background: Liver is the most vulnerable organ which faces a wide variety of disturbances. Most chronic liver diseases may not have prominent clinical - findings. They either go undiagnosed/ found incidentally. Hence, autopsy is a magnificent learning tool to study the Histopathological-spectrum of diseases in the liver.

Aim: Determine the various pathologic changes in autopsy liver specimens and score the degree of steatosis and fibrosis.

Methods: This is a record - based study where haematoxyl in-eosin stained liver slides of autopsy cases were reviewed. Demographic details and gross findings were taken from the autopsy register. Histopathological findings were noted with grading of steatosis and staging of fibrosis. Masson - trichrome staining was done wherever necessary.

Results: Out of 144 cases, 71 (49%) are unremarkable, and 73 (51%) have varying degrees of fatty changes along with other pathology. Among these 73 cases, 50 (34.6%) have pure steatosis with no other associated pathologies. 14 (10%) cases have histological - features suggestive of viral-hepatitis and seven (5%) cases have cirrhosis.

One case each in a non-specific abscess (0.7%) and cavernous - haemangioma (0.7%) respectively are noted. Steatosis is graded from 0 to 4 based on the percentage of affected parenchyma. Accordingly, 71 cases (49.3%) have grade 0, 22 cases (15.3%) have grade-1, 16 cases (11.1%) have grade-2, 20 cases (13.9%) have grade-3 and 15 cases (10.4%) have grade-4 steatosis.

Staging of fibrosis is done according to the Batts-Ludwig system. 106 cases (73.6%) have no fibrosis, 15 cases (10.4%) have stage-1 fibrosis involving only the Periportal - zone, 9 cases (6.3%) have stage-2 fibrosis showing periportal-septate, and 7 cases each has stage-3 (bridging - fibrosis) (4.9%) and stage – 4 (definite - cirrhosis) (4.9%) fibrosis.

Conclusion: Autopsy specimens of the liver can be used to determine patterns of liver injury but is unable to provide information on the true prevalence of different liver disorders in our community. However, it will aid in our comprehension of the various pathologies.

Keywords: Autopsy, Steatosis, Cirrhosis, Masson - Trichrome

Introduction

The liver is the most vulnerable and major organ in our body facing a wide variety of problems like metabolic, toxic, microbial, and circulatory disturbances.[1] Most chronic liver diseases, even in advanced stages, may cause no prominent clinical signs or symptoms.[2] They either go undiagnosed or found incidentally during general health check - ups, investigations for other diseases, surgery, or at autopsy.[3]

Autopsy is a magnificent learning tool in the hands of pathologists to study the Histopathological spectrum of diseases.[4]

Diseases in the liver can be congenital malformations, chronic venous congestion, hepatitis, fatty change, cirrhosis, steatohepatitis, pyogenic and amoebic abscess, hydatid cyst, storage disorders, hemosiderosis, tuberculosis, infarcts, action mycosis, hepatoblastoma, hepatocellular carcinoma, metastatic deposits, etc. [5]

On microscopic examination, the degree of steatosis and fibrosis can be graded as follows: 6

Grading of steatosis

- Grade I: When micro and macro vesicular steatosis affected 5-25% of the liver parenchyma
- Grade II: When 26-50% of the parenchyma was affected
- Grade III: When 51-75% was affected
- Grade IV: When more than 75% of the parenchyma was involved

Staging of fibrosis

- Stage 0: No fibrosis
- Stage 1: Fibrosis confined to portal tracts
- Stage 2: Periportal or portal-portal septa but intact vascular relationships
- Stage 3: Bridging fibrosis but no obvious cirrhosis
- Stage 4: Probable or definite cirrhosis

Hence, this study helps to analyze the various disease patterns of liver pathology found at autopsy and to know the extent of liver damage.

Objectives

a. To estimate the percentage of liver pathology in autopsy specimens

b. To determine the various pathologic changes in autopsy liver specimens

c. To score the degree of steatosis and fibrosis in autopsy liver specimens

Methodology

Study population: Autopsy specimens of the liver received from January 2022 to December 2023 in the Department of Pathology, Mandya Institute of Medical Sciences, Mandya

Sampling method: All the autopsy specimens of liver received between January 2021 to December 2023 are selected which includes a total of 144 cases after considering the following inclusion and exclusion criteria.

Inclusion criteria: All liver specimens of forensic autopsy received in the Department of Pathology are included.

Exclusion criteria: Autolysed specimens are excluded.

Method of data collection: The data is recorded using a semi-structured proforma which contains three parts:

1. The first part has details regarding demographic characteristics like the age and gender of the deceased.
2. The second part has the details regarding the gross and microscopic findings.
3. The third part has the details regarding scoring systems of hepatic injury.

Analysis

The data is entered into a Microsoft Excel spreadsheet and analyzed using Statistical Package for the Social Sciences (SPSS) version 20.0 software. Descriptive statistics for categorical data like gender, gross features, and microscopic findings will be expressed in terms of frequency and percentage. Continuous data like the age of the patient is expressed in mean and standard deviation.

Results

A total of 144 cases are evaluated in this study which includes 112males and 32females with a wide age range of 1 to 90 years with the majority being in the 3rd decade (42 cases). Out of 144 cases, 71 (49%) cases are unremarkable, and remaining all the 73 (51%), cases have varying degrees of fatty changes along with other Histopathological features.

Among these 73 cases, 50 (34.6%) have pure steatosis with no other associated pathologies. 14 (10%) cases have histological features suggestive of viral hepatitis and 7 (5%) cases have cirrhosis. One case each in a non-specific abscess (0.7%) and cavernous Haemangioma (0.7%) (Fig 1) respectively is also noted (Chart 1).

Grading of steatosis is done in all 144 cases. Grade 0 suggests the absence of steatosis. Grade I is assigned for cases in which 5-25% of the parenchyma is affected, grade II for 26 to 50%, grade III for 51 to 75%, and grade IV for more than 75%. Accordingly, 71 cases (49.3%) have grade 0, 22 cases (15.3%) have grade 1 (Fig 2a), 16cases (11.1%) have grade 2 (Fig 2b), 20cases (13.9%) have grade 3 (Fig 2c), and 15 cases (10.4%) have grade 4 steatosis (Fig 2d) (Table 1).

Staging of fibrosis according to the Batts-Ludwig system is done in all 144 cases. Accordingly, 106 cases (73.6%) do not show any fibrosis, 15 cases (10.4%) have stage 1 fibrosis (Fig 3a) involving only the peri portal zone, 9 cases (6.3%) have stage 2 fibrosis (Fig 3b) showing peri portal septate, and 7 cases each has stage 3 (Fig 3c) (bridging fibrosis) (4.9%) and stage 4(definite cirrhosis) (4.9%) fibrosis (Fig 3d). (Table 2)

Table 1: Grading of Steatosis

	Frequency	Percent
Grade 0	71	49.3
Grade 1	22	15.3
Grade 2	16	11.1
Grade 3	20	13.9
Grade 4	15	10.4
Total	144	100.0

Table 2: Staging of Fibrosis

	Frequency	Percent
Stage 0	106	73.6
Stage 1	15	10.4
Stage 2	9	6.3
Stage 3	7	4.9
Stage 4	7	4.9
Total	144	100.0

Chart 1: Histopathological Findings

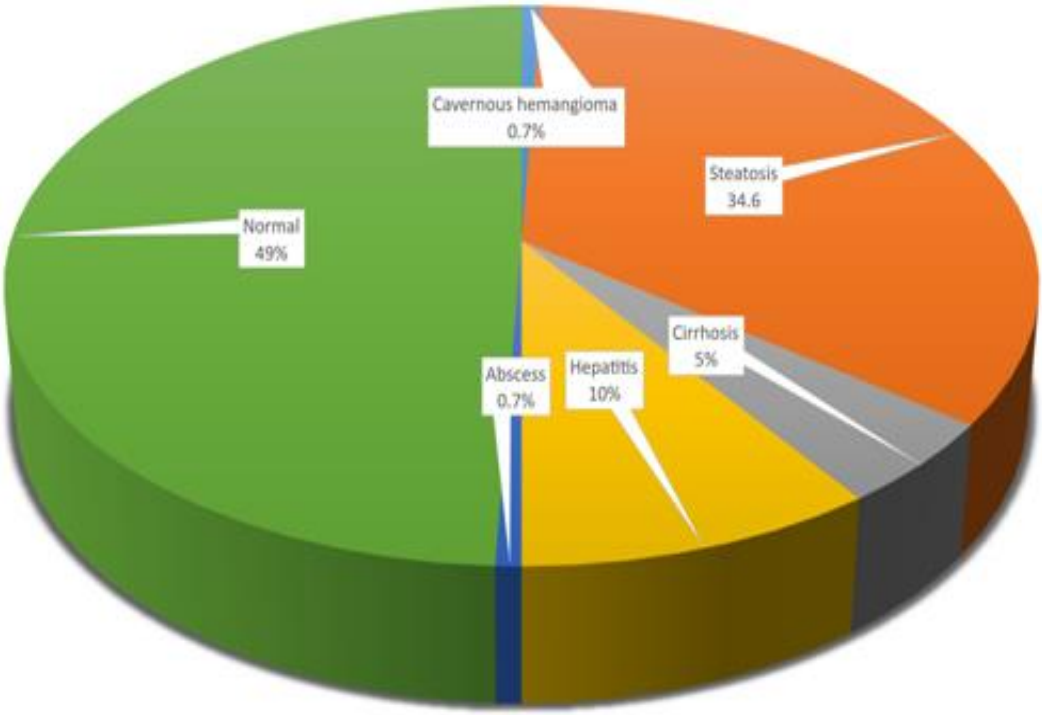


Figure 1: Cavernous Haemangioma OF LIVER (H & E, $50_{X)}$

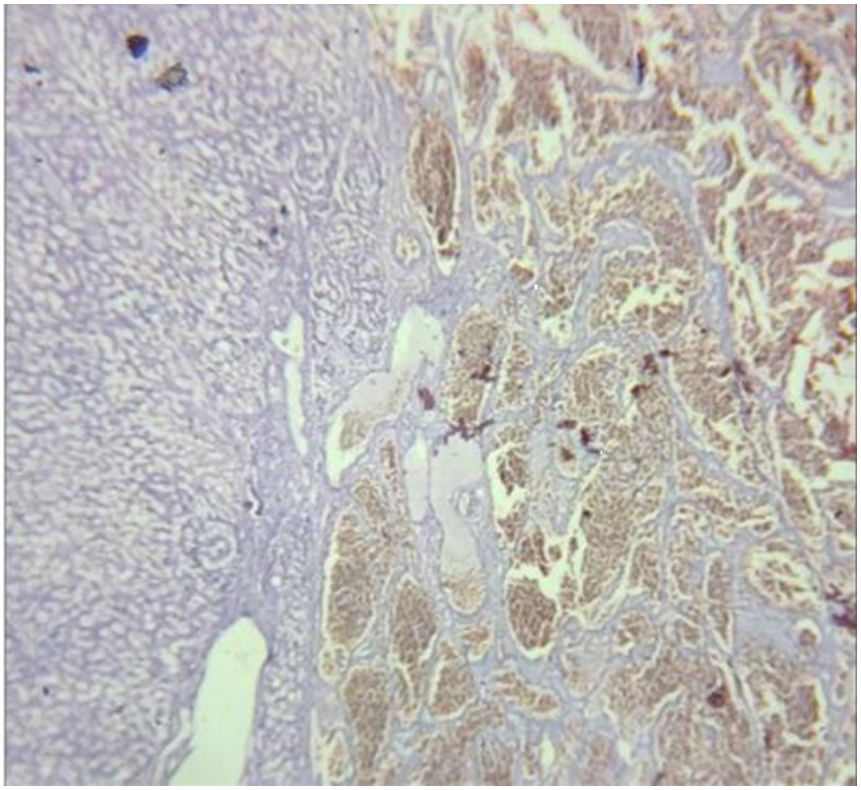


Figure 2: Grading of Steatosis (H&E, 50X), (a) Grade1, (B) Grade2, (C) Grade3, (D) Grade 4

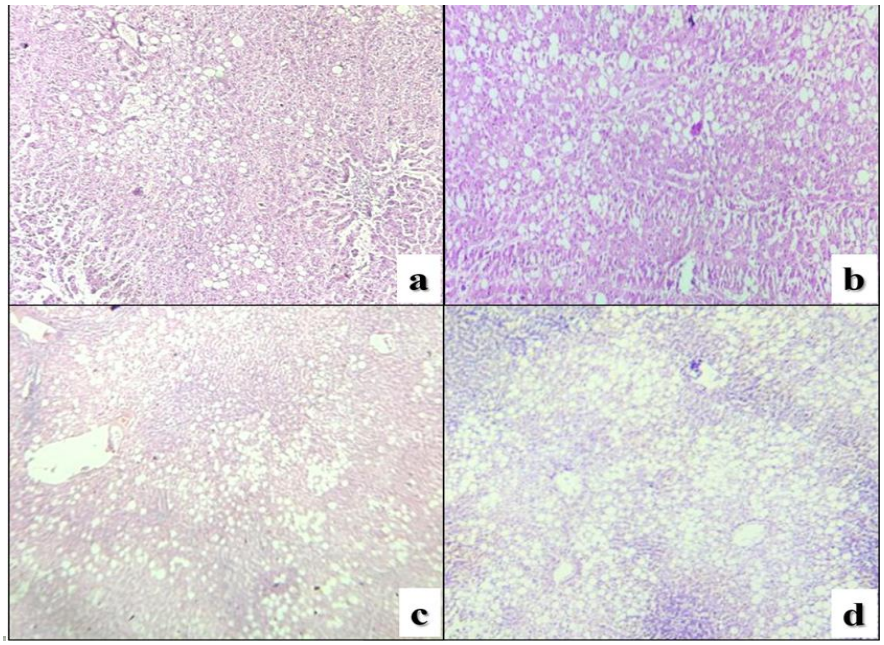
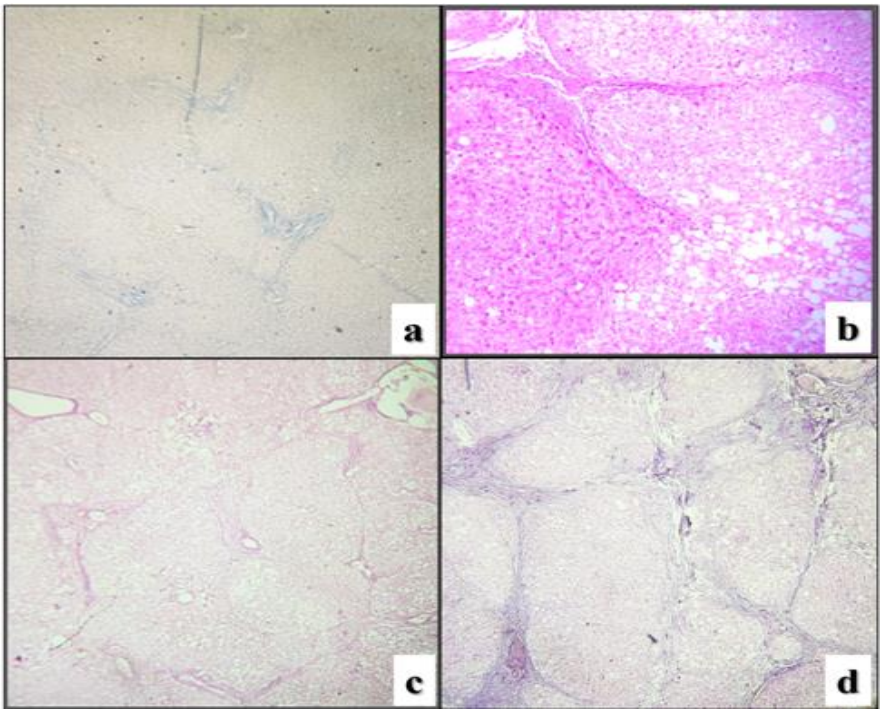


Figure 3: Staging of Fibrosis (A) Stage 1 (Masson Trichrome, 10_x) (B) Stage 2 (H&E, 10 x) (C) Stage 3 (H&E, 10x) (D) Stage 4 (H&E, 10x).



Discussion

In our study, 51% of the cases had pathological changes on microscopic examination which is similar to the studies of Prashanth Patel et al., and Rasoul S et al., where 43% and 37% respectively had pathologic alterations.[1,2]The most common feature in our study waspure steatosis (20%), followed by hepatitis (10%) and cirrhosis (5%). In the study done by Ritu Bhagat, et al., Anirudh Behera, et al., Prashant Patel, et al., Thamil Selvi, et al., and Rasoul S, et al., steatosis was found in

32.5%, 21.9%, 35.7%, 26.9% and 31.6% respectively, hepatitis was found in 18.3%, 12.5%, 0.98%, 13.9%, and 4.7% respectively and cirrhosis was noted in 7.5%, 9.37%, 2.44%, 7.4%, and 0.8% respectively.[1,5]

Grading of steatosis was done from grade 1 to grade 4 in the studies by Prashanth Patel et al. and Rasoul S, et al. Accordingly, 37.7% and 64.8% were grade 1, 36.9% and 17.7% were grade 2, 13.1% and 12.9% were grade 3 and 12.3% and 4.6% were grade 4 respectively.[1,2] Whereas, in our study, including 49.3% of normal liver, 15.3% had grade 1, 11.1% had grade 2, 13.9% had grade 3, and 10.4% had grade 4 steatosis.

Even after a thorough literature search, not many studies related to the staging of fibrosis were found as the majority had focused only on the Histopathological spectrum of liver lesions. [1,9]A study by Umesh Babu et al. mentioned 3cases of periportal fibrosis, 6 cases of portal-portal septae and a single case of bridging fibrosis.[10]

Conclusion

Our research leads us to the conclusion that autopsy specimens of the liver can be used to determine patterns of liver illness, with fatty changes being the most frequently observed characteristics. Since it is autopsy research, it is unable to provide information on the true prevalence of different liver disorders in our community. However, it will aid in our comprehension of the various illness patterns.

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