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A Retrospective Study of Histopathological Changes in Liver in Medicolegal Autopsy: A Tertiary Care Center Study

Neha Suman[1], Kiran Agarwal[2], Praveen Prakash[3]

[1]Assistant Professor, Department of Pathology, Lady Hardinge Medical College, New Delhi,
[2]HOD & Director Professor, Department of Pathology, Lady Hardinge Medical College, New Delhi
[3]Assistant Professor, Department of Pathology, Saraswathi Institute of Medical Sciences, Hapur, U.P.

Corresponding Author: Dr Neha Suman

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ABSTRACT

INTRODUCTION: The liver is referred to as "the custodian of the internal milieu". Liver diseases are often accompanied by significant changes in the morphology of liver and hence analysis of these lesions can be important in determining the apparent cause of death in certain individuals. Autopsy can provide important information regarding risk and disease progression and hence gives an opportunity to evaluate the effect of these lesions.
AIM OF STUDY: To study histopathological changes in liver in medicolegal autopsy.
MATERIAL AND METHODS: A retrospective observational study of 75 liver specimens received for medicolegal autopsy received in the Department of Pathology, Lady Hardinge Medical College, New Delhi over a period of one year (April 2024 to March 2025) were done. Sections were taken from the representative tissue and stained with hematoxylin & eosin. Special stains were put wherever required.
RESULT: The age of the patients varied from 5 days to 81-year-old with male to female ratio of 24:1. The histopathological findings noted were sinusoidal congestion, macro and microvesicular steatosis, ballooning degeneration, chronic venous congestion, cirrhosis and hepatitis. One case of liver adenomatosis was also found incidentally.
CONCLUSION: Histopathological examination of liver in autopsy plays a significant role in understanding the pathophysiology of many diseases which may go unnoticed during a person's life. These lesions may be contributory to the cause of death and must be interpreted in correlation with clinical history for a conclusive medicolegal opinion.

Keywords: Histopathology, Liver, Medicolegal autopsy

INTRODUCTION

Autopsy can provide important information regarding risk and disease progression and hence gives an opportunity to evaluate the effect of chronic inflammatory lesions, neoplasm, toxic effects of drugs and metabolic disorders.[1] The liver is referred to as "the custodian of the internal milieu". Liver plays a vital role in metabolic activities, digestion, detoxification and many other functions.[2] Liver diseases are often accompanied by significant changes in the morphology of liver and hence analysis of these lesions can be important in determining the apparent cause of death in certain individuals. The morphological

spectrum of liver lesions includes reversible injuries like steatosis, steatohepatitis to chronic end stage liver diseases. [3-5] Many of these lesions are not clinically evident even in advanced stages. These unnoticed silent liver lesions may play an important role in morbidity and mortality of individuals.[7] The aim of this study is to study the various histopathological findings in liver in medicolegal autopsy.

MATERIALS & METHODS

A retrospective observational study of 75 liver specimens received for medicolegal autopsy received in the Department of Pathology, Lady Hardinge Medical College, New Delhi over a period of one year (April 2024 to March 2025) were done. The study involved the histopathological examination of liver tissue obtained during routine medicolegal autopsies performed under legal authority. No additional procedures or intervention were carried out. Inclusion and exclusion criteria: All cases undergoing histopathological examination of medicolegal autopsy cases during the study period were included. Cases which were autolysed were excluded.

Data collection: Relevant data were extracted from case history and parameters such as age, cause of death and relevant pathological findings were analyzed.

Sections were taken from the representative area from the liver and stained with hematoxylin & eosin. Special stains such as Mason trichome (MT) were put wherever required. The findings of all the cases were recorded and analysed. Ethical approval was not required as the study used anonymized data from routine medicolegal autopsy.

STATISTICAL ANALYSIS

Collected data were entered into Microsoft Excel and analyzed. Descriptive statistics such as frequencies, percentages, mean were used as appropriate.

RESULT

A total of 75 liver specimens received for medicolegal autopsy in the Department of Pathology, Lady Hardinge Medical College, New Delhi over a period of one year (April 2024 to March 2025) were included in the study.

The age of the patients varied from 5 days to 81-year-old (table 1). Most of the cases (40%) belonged to 21 to 40 years. Out of 75 cases, 72 (96%) were males and 3 (4%) females.

Table 1: Age wise distribution of cases

Age group (years)	No. of cases	Percentage (%)
≤20	04	5
21-40	37	49.5
41-60	30	40
>60	04	5.5
Total	75	100

The histopathological findings noted were sinusoidal congestion, macro and microvesicular steatosis, ballooning degeneration, chronic venous congestion, cirrhosis and hepatitis. Table 2 shows the histopathological distribution of cases.

Table 2: Histopathological distribution of cases

Histopathological diagnosis	No. of cases	Percentage (%)
Congestion	33	44
Ballooning degeneration	22	29.3
Steatosis	32	42.6
Hepatitis	10	13.3
Chronic venous congestion	09	12
Cirrhosis	05	6.6
Granulomatous lesion	01	1.6%
Adenomatosis	01	1.3

Congestion (Figure 1A) was seen in maximum number of cases (44%), followed by ballooning degeneration, steatosis (Figure 1B), and hepatitis (Figure 1C) and

chronic venous congestion. 05 cases of cirrhosis (Figure 1D) were seen in males and history of alcoholism was present in 4 (80%) cases.

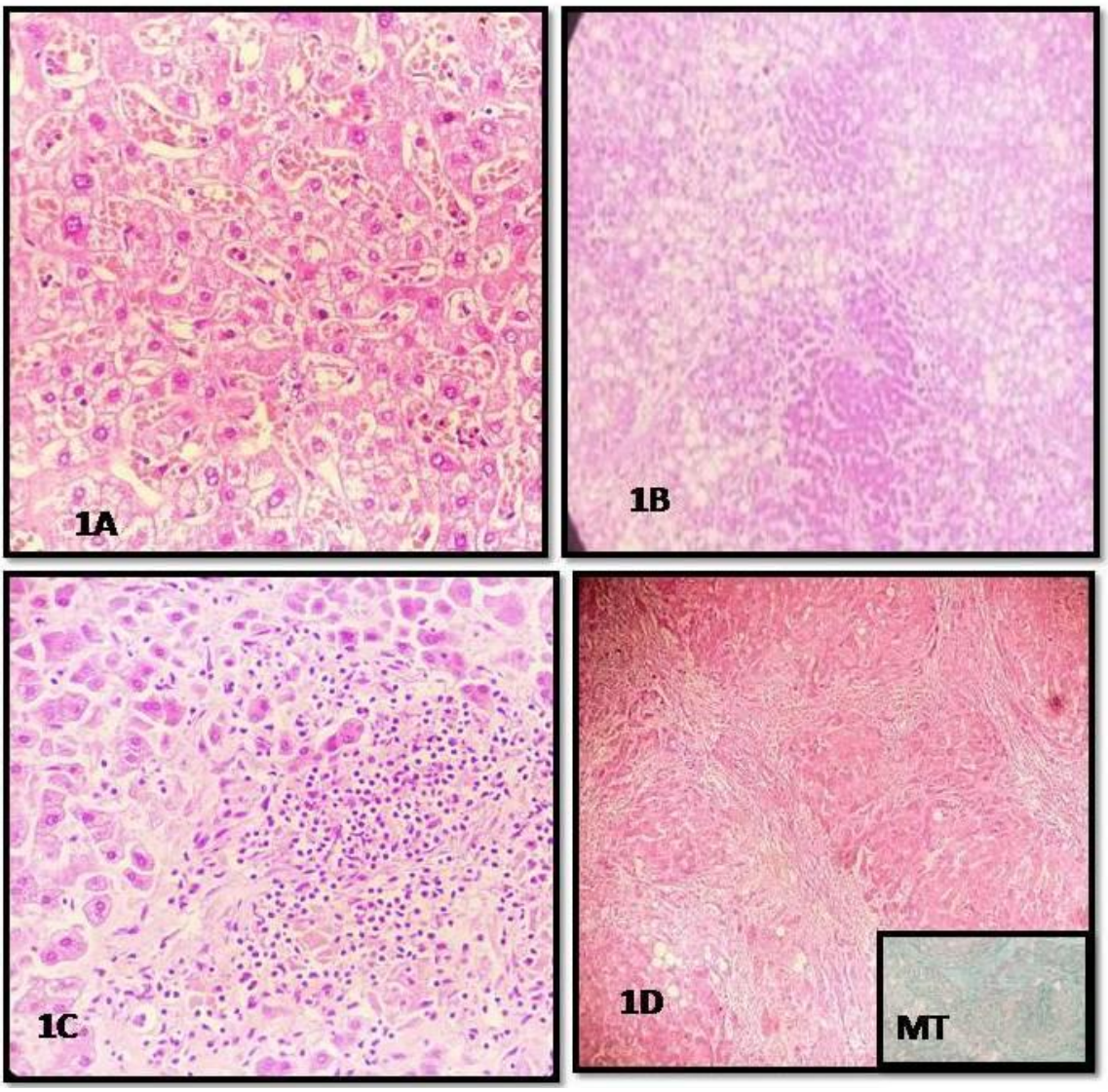

Figure 1A: Sinusoidal congestion (H& E, 40X), Figure 1B: Steatosis (H& E, 10X), Figure 1C: Interface hepatitis (40x, H&E), Figure 1D: Cirrhosis (40x, H&E) (Inset: Mason Trichome, 10X)

One case of liver adenomatosis (Figure 2A & 2B) was also found incidentally in a 2.5-year-old male child. The microscopic examination of the liver revealed well-demarcated non-encapsulated multiple nodular lesions composed of uniform hepatocytes. No significant atypia, mitotic activity or cellular pleomorphism was seen. No foci of haemorrhage, necrosis or vascular invasion were identified. The suurounding liver parenchyma appeared histologically unremarkable. Special staining with Masson trichrome was put to evaluate presence and distribution of fibrosis. The lesion (hepatic adenoma) showed minimal fibrous stroma and the lesion is composed of hepatocytes without evidence of portal triads or bile ducts. There was no significant fibrous septation within the lesion, which supports the diagnosis of liver adenoma rather than focal nodular hyperplasia or cirrhosis. One case showed presence of granulomas and the deceased had history of pulmonary tuberculosis. One case showed presence of von Meyenburg complex (Figure 2C & 2D) along with steatosis and sinusoidal dilatation and congestion.

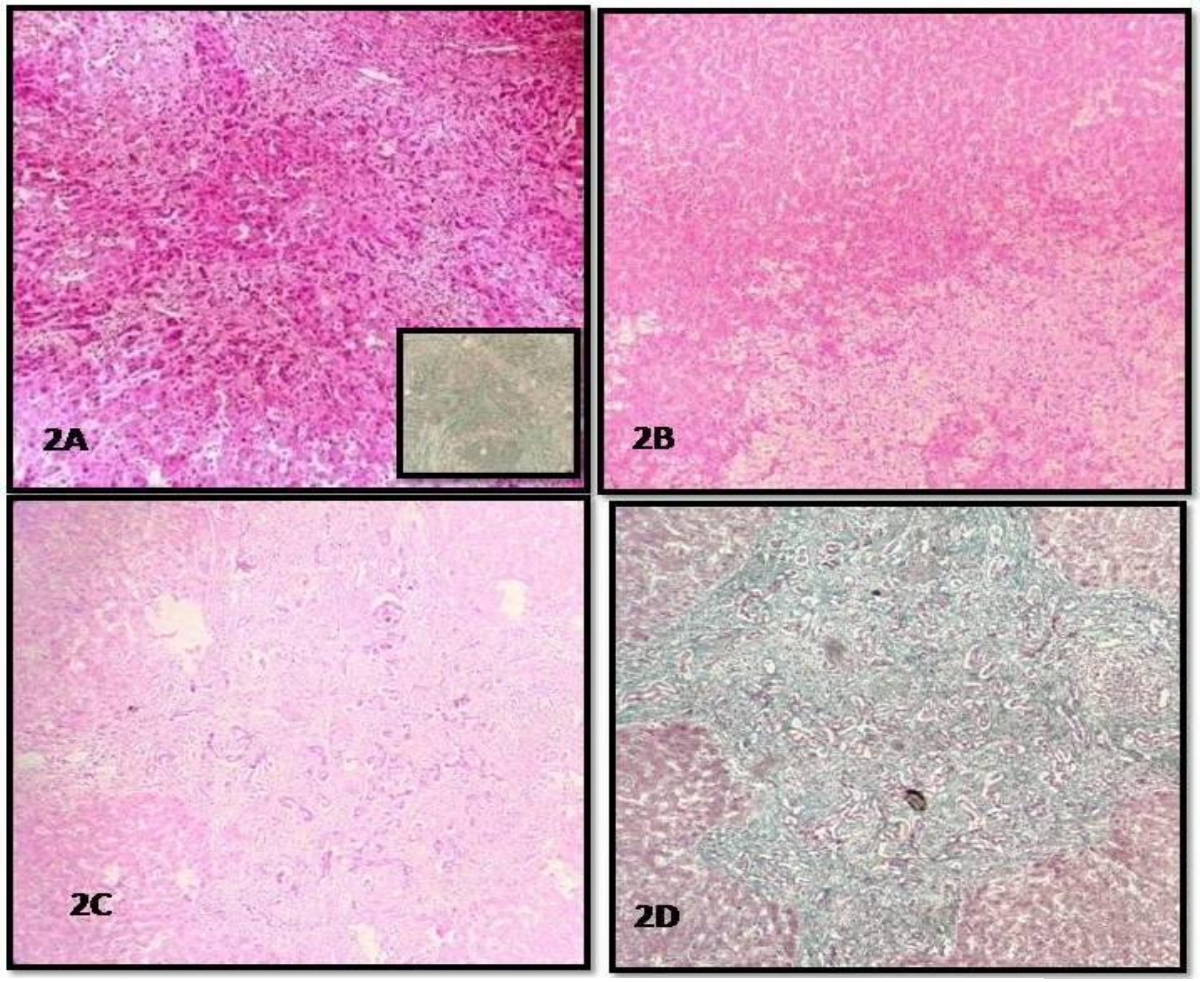

Figure 2A: Liver adenomatosis (H&E, 10X) (Inset:Mason Trichome, 10X), Figure 2B: Liver adenomatosis (H&E, 40X), Figure 2C: von Meyenburg complex (H&E, 40X), Figure 2D: von Meyenburg complex (Mason Trichome, 40X)

The cause of death in the present study was accident, suicide and poisoning and other illness (Table 3).

Table 3: Distribution of cases according to cause of death

Cause of Death	Number of cases	Percentage of cases
Accident	20	27
Suicide	09	12
Brought dead	09	12
Poisoning	03	4
Other illness	34	45
Total	75	100

9 patients were found unconscious and declared brought dead on reaching the hospital. None of the cases had any documented liver pathology as cause of death.

DISCUSSION

In the present study, maximum number of cases (49.5%) belonged to the age group 21-40 years which is similar to study by Simon KA et al [5] (38.9%). Kevadiya R [7] et al also had similar finding for 21-40 years age group, however in their study maximum number of cases belonged to 41-60 years. Table 4 shows comparison of age wise distribution of cases with other studies.

Table 4: Comparison of age wise distribution of cases with other studies

Age (years)	Simon KA et al [5]	Singal et al [6]	Kevadiya R et al [7]	Present study
≤20	25.4%	2.85%	5.33%	5%
21-40	38.9%	34.2%	39.33%	49.5%
41-60	24.7%	51.3%	46.00%	40%
>60	11.1%	11.4%	9.33%	5.5%

Table 5: Comparison of observed histopathological changes in liver with other studies

Observed histopathological changes in liver	Simon KA et al [5]	Singal et al [6]	Kulkarni MP et al[11]	Rathod D et al[13]	Present study
Congestion	4.35%	-	5.33%	58%	44%
Fatty changes	11.1%	34%	39.33%	20%	42.6%
Chronic venous congestion	-	27%	46.00%	9%	12%
Cirrhosis	2.2%	11%	9.33%	8%	6.6%
Hepatitis	3.9%	9%		-	13.3%
Granulomatous lesion	0.6%	1.5%		-	1.3%
Neoplastic lesion	0.92%	-		-	1.3%

In the present study, out of 75 cases, 72 were males and 3 were females. These findings are similar to previous studies by Simon KA et al [5] (1.5:1) and Singhal et al [6] (4.8:1). The male preponderance in these cases may be attributed to the fact that alcoholism is seen more commonly in male patients and it has been observed that alcohol is one of the etiological factors for liver diseases.

The pathogenesis of liver diseases has an insidious onset. The morphological changes have a wide range of histological patterns. In the present study, congestion was seen in most of the cases (44%) which may be secondarily related to other organ disorders like right heart failure, restrictive cardiomyopathy and right sided valvular disease. Congestion as the most common finding was seen in study by Porwal et al[3]. Ballooning degeneration (29.3%) and steatosis (42.6%) were also observed and most of these cases belonged to 21-40 years. Only 6 cases had history of alcoholism. Ballooning degeneration can be seen in alcoholic and nonalcoholic liver diseases, viral hepatitis and in certain drug induced liver injury. Steatosis is caused by a variety of etiology like alcohol, obesity, diabetes, hepatotoxins, drugs, etc. It can be seen as the commonest isolated finding or with other chronic condition and advanced liver disease like chronic hepatitis and cirrhosis respectively. In present study, the cause of death was due to other etiology than any primary liver disease. This observation may suggest that these histopathological changes may not cause increase in mortality directly but may contribute as an associated co-factor with other diseases and raising the morbidity. Previous studies by Singal et al [6] (34%), Porwal et al [3] (39.72%), Bhagat R et al [8] (32.5%), Harshitha GV et al [12] (50.82%) have observed steatosis as the most common finding. Hepatitis was seen in 13.3% cases in present study. Study by Bal et al [4] and Sotoudeh et al [9] have reported 3 % and 2.6% cases of hepatitis, respectively. Porwal et al [3] reported more number (30.13%) of cases of hepatitis in their study. Cirrhosis was seen in 6.6% of cases in present study and 4 (80%) had history of alcoholism. Previous studies by Hanif G et al [10] reported cirrhosis in 4.5% and Porwal et al in 3.42% cases. Kevadiya R et al [7] reported similar finding of 6% cases of cirrhosis and 55.5% cases had history of alcoholism, thus suggesting alcoholism as one of the etiological factors for these cases. One case of liver adenomatosis was also found incidentally in a 2.5-year-old male child in the present study. Paediatric liver adenomatosis is rare with only 4 % cases reported so far.[14] This entity, however benign, can present with multifocality or large lesions. It may undergo malignant transformation to hepatocellular carcinoma and rarely hepatoblastoma. Table 5 shows

comparison of observed histopathological changes in liver with other studies. Hence it can be seen that some of the rare findings can also be diagnosed incidentally in autopsy and may help in further understanding of these rare lesions.

Limitations of the study

No past history and relevant clinical history along with laboratory and radiological findings were available for better correlation. However, histopathology of organs at autopsy still proves to be a useful tool in highlighting some of the silent lesions leading to significant morbidity and mortality among patients.

CONCLUSION

Histopathological examination findings of liver in autopsy cases are of great help in determining the presence of liver diseases without noticeable clinical symptoms. These may act as an associated co-factor in increasing the morbidity in addition to other primary diseases. In the present study, congestion was the most common histopathological finding, followed by ballooning degeneration and steatosis. These silent liver lesions need to be diagnosed at an early stage and further preventive measures can be taken for better patient management. Also, this study provides an insight into the importance of autopsy as a learning tool to study the histopathological spectrum of silent liver diseases, in addition to some rare conditions like paediatric liver adenomatosis paving the path for better understanding of these lesions.

Declaration by Authors

Ethical Approval: The study involved the histopathological examination of liver tissue obtained during routine medicolegal autopsies performed under legal authority. No additional procedures or intervention were carried out. Ethical approval was not required. However, all procedures performed were in accordance with the ethical standards of the institutional and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

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Conflict of Interest: The authors declare no conflict of interest.

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