



## AUTOPSY STUDY OF LIVER: A TERTIARY CARE CENTRE EXPERIENCE

## Pathology

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## ABSTRACT

**Background:** Liver being the largest gland in human body can be affected by a wide spectrum of diseases. These disorders may be symptomatic or may remain silent are diagnosed on histopathological examination of the autopsy specimen. **Methods:** This study was conducted at SMS medical College, Jaipur, on the liver specimens of the medicolegal autopsies received over a period of two years from January 2018 to December 2019. The formalin fixed liver specimens received were studied under the microscope after Haematoxylin and Eosin (H&E) staining of paraffin embedded sections, to find out the spectrum of histopathological lesions encountered. Special stains were employed wherever necessary. **Results:** A total of 2474 cases were studied, out of which 1681 were males and rest were females. In our study the various hepatic lesions encountered were venous congestion (45.6%) followed by steatosis (23.3%), cirrhosis (6.8%), hepatitis (2.1%), granulomatous lesion (0.9%) and neoplasms (0.6%). **Conclusions:** Our study emphasizes the fact that autopsy can be an important tool to study the histopathological spectrum of various diseases, which may otherwise be silent, as well as for incidental diagnosis of rare disorders.

## KEYWORDS

Autopsy, Liver histopathology

## BACKGROUND

Liver, quite rightly called the “custodian of milieu interior”, is the main site of metabolic activities in our body. (1) It is the largest gland in human body which can be affected by a wide spectrum of diseases. Hence, it is the most frequent site for metabolic, infective, toxic and circulatory insults. These diseases can be primary or secondary hepatic involvement to alcoholism, extrahepatic infections, cardiac disturbances or neoplasms. (2)

Most of the chronic liver diseases may not cause any clinical signs or symptoms, even in advanced stages and go undiagnosed or are found incidentally during health check-up. (3) Also, many times these diseases may go unnoticed in apparently healthy individuals and lead to death. (4) Thus, these disorders affecting the liver may be symptomatic or may remain silent are diagnosed on histopathological examination of the autopsy specimen. Histopathological examination of such organs is the most important tool to point out these clinically undiagnosed lesions and will help in planning health care strategy. This can be done on the organs taken during autopsy of the cases and then studying them under the microscope after suitable processing.

This study was conducted to shed light on the spectrum of liver diseases, that are reflected in the morphology of liver at autopsy along with clinicopathological correlation.

## Methods

This study was conducted at SMS medical College, Jaipur, over a period of two years from January 2018 to December 2019. Liver specimens were received as a part of multiple viscera received from mortuary for histopathological examination of medicolegal cases. All the liver specimens from autopsies were included in the study, irrespective of age, sex and cause of death. Autolysed specimens were excluded from the study. In these cases, the information regarding age, sex, clinical findings and suspected cause of death was collected from the post-mortem records. All the liver specimens received were already fixed in 10% neutral buffered formalin. After going through the post mortem records in detail, these formalin fixed liver specimens were examined grossly first for any obvious changes. Then representative sections from the formalin fixed pieces of liver received as autopsy viscera were submitted for processing. The processed and paraffin embedded tissues were sectioned, and stained with haematoxylin and eosin (H & E) stain after standard procedures. Other sections were stained with special stains like reticulin and Masson's trichrome methods for evaluation of liver architecture, wherever necessary. These sections were then studied under the microscope to find out the spectrum of histopathological lesions encountered. The analysis of these cases was done by descriptive statistics.

## Results

During the period of study, 2474 cases were studied, out of which 1604 (64.8%) were males and 870 (35.2%) were females. The age of the

cases ranged from nine years to seventy-four years. Majority of the cases (45.5%) were from age group of 21 to 40 years (Table 1), followed by 37.0% in the age group of 41 to 60 years. There were 9.9% cases in the age group of less than 20 years while 7.6% cases were more than 60 years old.

The cause of death of these cases was recorded from the post mortem records. The post mortem records of these patients revealed that the cause of death was not known in 40.9% cases (Table 2). There were almost similar number of deaths due to traffic accidents (11.9%) and old disease (11.8%). Sudden deaths accounted for 9.0%, alcoholism was seen in 7.1% cases and 6.9% cases died due to heart attack. Poisoning was reported in 6.5% people. Other causes of death observed were electric shock, burn, hanging, drowning, dowry death and snake bite. So, as described above, in 40.9% cases the cause of death remained unknown even after post mortem examination. This finding makes histopathological study of autopsy specimens all the more significant, so as to find out any disease process that could have contributed to death in such individuals.

Gross examination of liver specimen was done. We recorded the colour, consistency and cut surface of each specimen. Table 3 depicts the gross morphology observed in our study. The gross appearance was normal in 65.1%, while it appeared yellowish and greasy in 8.2% cases. The specimens were yellowish green in 8.7% cases and appeared nodular in 6.0% cases. Tubercles were seen in 2.0% cases while grey white areas were noted in 1.0% specimens.

On microscopic examination, specific pathological findings were observed in 1961 (79.3%) cases while 513 (20.7%) cases had no specific pathology (Table 4). Out of these 1961 cases, circulatory disturbance in the form of acute and chronic congestion was the most pathological lesion noted in 1127 cases (45.6%). We had 577 cases (23.3%) of steatosis. Cirrhosis was seen in 168 cases (6.8%) while 53 cases (2.1%) showed chronic hepatitis. Granulomas were observed in 22 cases (0.9%) while neoplastic lesions were seen in 14 cases (0.6%). The neoplasms seen included both hepatocellular carcinomas (5 cases) as well as metastatic adenocarcinomas (9 cases) (Figure 1).

## DISCUSSION

Although liver is the most frequent site for metabolic, infective, toxic and circulatory disorder, many diseases of liver may remain silent and are diagnosed only on autopsy. Therefore, histopathological study of the autopsy specimens the most important tool for diagnosis of these lesions.

In our study the most common age group affected was 41 to 60 years, which was in concordance to studies conducted by Porwal et al, Umesh babu et al and Bhagat et al while only Sameer et al had older age group patients in their study. (1-4) A male predominance was seen in our study (64.8%). This has also been stated by other authors. (1-4) The

reason for male predominance could be attributed to more prevalence of consumption of alcohol in males in India.

On gross examination 65.1% of the liver specimens appeared normal, as also described by previous authors. This observation further mandates the histopathological examination of such specimens, to diagnose the diseases which could have led to death of these cases.

On histopathological examination, the various disorders diagnosed in our study include congestion, steatosis, cirrhosis, hepatitis, hepatocellular carcinoma, granulomatous pathology.

Studies have been done outside India on liver histopathology of autopsies and reveal cirrhosis and malignancies as the most common findings. (5-8) Voinova et al have observed that Alcoholic and viral diseases dominated among liver pathology cases, steatosis among alcoholic damages, cirrhosis among viral diseases, primary biliary cirrhosis among autoimmune diseases and hepatocellular carcinoma among malignant tumours.(5) Sotdehmanesh et al have stated that the silent diseases of the liver are not uncommon and steatosis is the most common finding but inflammatory disorders comprise a significant minority.<sup>(8)</sup>

Our study is comparable to other Indian studies, from different states of the country, in contrast to foreign literature and shows that circulatory disturbances, Steatosis and Chronic hepatitis are the most common hepatic lesions. (1-4, 9-11) Table 5 compares the most common histological diagnosis of present study with the previous studies reported from other states of India. In our study the most common lesion encountered was venous congestion (45.6% cases), which was also observed in studies by Sameer et al, Porwal et al, Smita et al and Shete et al. (2,4,9,10) However other authors like Umesh et al, Bhagat et al and Selvi et al have stated steatosis or steatohepatitis as the most common pathology seen in their studies.(1,3,11) The difference between our study and other similar studies could be due to difference in the sample size and pattern of study.

## Conclusions

Our study concludes that histopathology is the most important tool to diagnose the liver diseases which may remain silent and diagnosed only at autopsy. Histopathological examination also reveals incidental diagnosis of rare disorders. The diagnosis of these diseases may at times contribute in finding out the exact cause of death as well as help in contributing to the epidemiological data. In our study, we found venous congestion to be the most common histopathological finding in liver on medicolegal autopsies followed by steatosis. Although autopsy-based studies may not reflect the actual pattern of liver diseases but emphasize the need of further studies for early detection and treatment in vulnerable groups. This early detection would enhance the quality of life of the society as a whole, by prevention as well as treatment of such vulnerable population.

## Tables

**Table 1: Age and sex wise distribution of the cases**

| age group (years) | male (%)     | female (%)  | total cases (%) |
|-------------------|--------------|-------------|-----------------|
| 0-20              | 164 (6.6%)   | 81 (3.3%)   | 245 (9.9%)      |
| 21-40             | 747 (30.2%)  | 378 (15.3%) | 1125 (45.5%)    |
| 41-60             | 592 (23.9%)  | 324 (13.1%) | 916 (37.0%)     |
| 61-80             | 101 (4.1%)   | 87 (3.5%)   | 188 (7.6%)      |
| total             | 1604 (64.8%) | 870 (35.2%) | 2474 (100%)     |

**Table 2: Cause of death as per the post mortem record**

| cause of death   | no of cases | percentage |
|------------------|-------------|------------|
| unknown          | 1011        | 40.9%      |
| sudden death     | 223         | 9.0%       |
| old disease      | 292         | 11.8%      |
| traffic accident | 294         | 11.9%      |
| heart attack     | 172         | 6.9%       |
| alcoholism       | 175         | 7.1%       |
| electric shock   | 7           | 0.3%       |
| burn             | 7           | 0.3%       |
| hanging          | 74          | 3.0%       |
| poisoning        | 161         | 6.5%       |
| drowning         | 27          | 1.1%       |

|             |      |      |
|-------------|------|------|
| snake bite  | 19   | 0.8% |
| dowry death | 12   | 0.5% |
| total       | 2474 | 100% |

**Table 3: Gross morphology of liver**

| gross morphology of liver | no of cases | percentage |
|---------------------------|-------------|------------|
| normal                    | 1610        | 65.1%      |
| yellowish greasy          | 203         | 8.2%       |
| yellowish green           | 216         | 8.7%       |
| nutmeg                    | 223         | 9.0%       |
| nodular                   | 148         | 6.0%       |
| tubercles                 | 49          | 2.0%       |
| grey white                | 25          | 1.0%       |
| total                     | 2474        | 100%       |

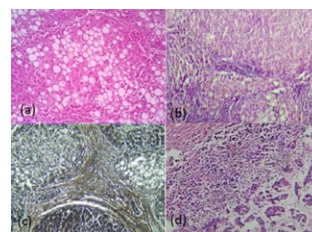
**Table 4: spectrum of Histopathological diagnosis**

| histopathological diagnosis | no of cases | percentage |
|-----------------------------|-------------|------------|
| congestion                  | 1127        | 45.6%      |
| steatosis                   | 577         | 23.3%      |
| cirrhosis                   | 168         | 6.8%       |
| hepatitis                   | 53          | 2.1%       |
| Hepatocellular carcinoma    | 5           | 0.2%       |
| metastasis                  | 9           | 0.4%       |
| granulomatous lesion        | 22          | 0.9%       |
| no specific pathology       | 513         | 20.7%      |
| total                       | 2474        | 100.0%     |

**Table 5: Comparison of most common liver pathologies on microscopic examination**

| Authors             | Most common histopathological finding on microscopy (percentage) |
|---------------------|------------------------------------------------------------------|
| Sameer et al (2017) | Circulatory disorders (31.3%)                                    |
| Porwal et al (2018) | Circulatory disorders (49.3%)                                    |
| Smita et al (2014)  | Circulatory disorders (29.1%)                                    |
| Shete et al (2016)  | Circulatory disorders (26.3%)                                    |
| Umesh et al (2015)  | Steatohepatitis (35.2%)                                          |
| Bhagat et al (2019) | Steatosis (32.5%)                                                |
| Selvi et al (2010)  | steatosis (26.9%)                                                |
| Present study       | Circulatory disorders (45.6%)                                    |

## Figure



## Figure legend

Figure 1: (a) microphotograph showing steatosis (H & E stain, 40X), (b) microphotograph showing cirrhosis (H & E stain, 40X), (c) microphotograph showing cirrhosis (Reticulin stain, 40X) and (d) microphotograph showing metastatic adenocarcinoma (H & E stain, 40X).

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