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Original Article

Pathology Section

Autopsy Finding in Lung and Liver: A Histopathological Study

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ABSTRACT

Introduction: Autopsy is a procedure that helps to study the cause of death. It should be followed by the histopathological examination as it can help in studying the disease process.

Aim: To study the prevalence and pattern of lung and liver diseases in medicolegal and neonatal autopsies along with histopathological examination.

Materials and Methods: A retrospective descriptive study was carried out to highlight histopathological findings in lung and liver medicolegal and neonatal autopsies. A total of 51 lung and 46 liver autopsy samples were received in the department during the study period.

Results: The findings that were observed on histopathological examination of lung were oedema, congestion, bronchopneumonia, emphysema, tubercular pneumonia, meconium aspiration, pulmonary hypoplasia, interstitial pneumonia, type I congenital adenomatoid malformation and fungal pneumonia. The findings seen on the histopathological examination of the liver specimens were sinusoidal and vascular congestion, cirrhosis, steatosis, chronic hepatitis, chronic venous congestion, granulomatous inflammation, adenocarcinoma, portal triaditis and hepatic peliosis. However, there were 14 cases among the lung and liver autopsy cases which showed incidental pathological findings which were not known at the time of death.

Conclusion: This study highlights the importance of histopathological report in lung and liver autopsy cases.

Keywords: Alveolar oedema, Incidental findings, Sinusoidal and vascular congestion

INTRODUCTION

Autopsy is a procedure that aids to identify the changes occurring in the organs which helps to establish the cause of death and time of death. It also helps to study the ante-mortem as well as postmortem aspect of death [1]. The medicolegal autopsy helps to study the untreated disease process or the diseases about which the person was unaware during his or her lifetime and do not clinically show any symptoms. Histopathological examination of the autopsied specimen helps to highlight many incidental findings. These serve as important learning tools for the pathologists as well as for the forensic experts [2]. Autopsy of various organs is often followed by histopathological examination. However, some pitfalls can delay or make it impossible to give final histopathological report. Few of these pitfalls are poorly preserved tissue, delay in carrying out autopsies, improper sampling, improper preservation and delay in the transportation of the specimen. Microscopic examination however, is still a very useful method to study the disease process [3]. Both lung and liver constitute the site of many diseases. Some of these give rise to symptoms. Many pathological processes are clinically asymptomatic and are hence picked upon autopsy and histopathological examination. The lungs and liver are involved in various kinds of inflammatory, neoplastic and other lesions [4,5]. The importance of the study is that it highlights the pattern of various lesions in the lung and liver which are seen in the medicolegal and neonatal autopsies along with histopathological examination, which were either incidental or the direct cause of the death.

MATERIALS AND METHODS

The retrospective descriptive study of the medicolegal and neonatal autopsies was carried out in the Department of Pathology, Lady Hardinge Medical College, New Delhi from January 2016 to July 2018. Medicolegal autopsis during that period, irrespective of age and sex, were included in this study. A total of 44 medicolegal autopsies were conducted in the study period in which part of lung was sent in all 44 cases and part of liver was sent in 39 cases. Seven cases were of autopsies done in neonate/case of intra-uterine death. Both lung and liver autopsy specimen in these seven cases were submitted for histopathological examination. Hence, a total of 51 lung autopsy samples [Table/Fig-1] and 46 liver autopsy samples [Table/Fig-2] were received in the department during the study period. Parts of lung and liver specimen were sent to the department preserved in 10% formalin along with clinical details and gross findings. The tissues were processed for the histological examination. All the histological sections were stained with Haematoxylin and Eosin stain and examined.

RESULTS

A total of 51 specimens of part of lung were received during the period of study. Histopathological examination was carried out in each case. Out of these 51 cases, 13 specimens of lung were poorly preserved and autolysed. The majority of the lung samples belonged to autopsies carried out in intrauterine death/newborn to 15 years of age (i.e., 17 cases). There were 12 cases between age range of 16 to 30 years and 31 to 45 years respectively, nine cases between 46 to 60 years and one case of age more than 60 years. These 51 cases comprise of 35 (68.6%) males and 16 (31.4%) females. The variety of findings that were seen on histopathological examination of lung include oedema, congestion, inflammation (acute, chronic, granulomatous), changes in interstitium, emphysematous change, meconium aspiration, interstitial pneumonia and type I Congenital adenomatoid malformation. Out of 51 cases, 14 cases showed diffuse alveolar oedema, congestion, widened alveolar septa and focal area of haemorrhage. Definitive diagnosis of bronchopneumonia was rendered in seven (13.7%) cases. Emphysematous changes were seen in four (7.8%) cases [Table/Fig-3]. Two cases showed bronchopneumonia with lung abscesses. Four cases (7.8%) showed exudates in bronchus, with lymphoplasmacytic infiltrate in the wall, caseous necrosis and epithelioid cell granulomas. Acid fast bacilli were identified in all four cases. Hence, these were labelled as Tubercular pneumonia. Gross examination of three of these lungs

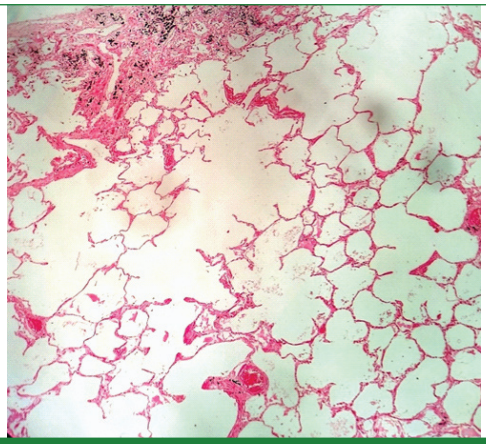
Pathological findings	New born–15 years (Male/Female)	16-30 years (Male/Female)	31-45 years (Male/Female)	46-60 years (Male/Female)	>60 years (Male/Female)	Total (Male/Female)
Poorly preserved/autolysed	7 (4/3)	2 (0/2)	1 (1/0)	2 (2/0)	1 (1/0)	13 (8/5)
Emphysema	-	-	2 (2/0)	2 (2/0)	-	4 (4/0)
Bronchopneumonia	2 (2/0)	3 (1/2)	-	2 (2/0)	-	7 (5/2)
Diffuse alveolar oedema, congestion, descriptive	3 (2/1)	4 (1/3)	6 (4/2)	1 (0/1)	-	14 (7/7)
Tubercular pneumonia	-	2 (1/1)	1 (1/0)	1 (1/0)	-	4 (3/1)
Bronchopneumonia with multiple lung abscess	-	1 (1/0)	1 (1/0)	-	-	2 (2/0)
Meconium aspiration syndrome	2 (2/0)	-	-	-	-	2 (2/0)
Pulmonary hypoplasia	2 (2/0)	-	-	-	-	2 (2/0)
Interstitial pneumonia	-	-	1 (1/0)	-	-	1 (1/0)
Type I Congenital adenomatoid malformation	1 (0/1)	-	-	-	-	1 (0/1)
Fungal pneumonia	-	-	-	1 (1/0)	-	1 (1/0)
Total	17 (12/5)	12 (4/8)	12 (10/2)	9 (8/1)	1 (1/0)	51 (35/16)

[Table/Fig-1]: Pathological findings in 51 cases of Lung specimen received.

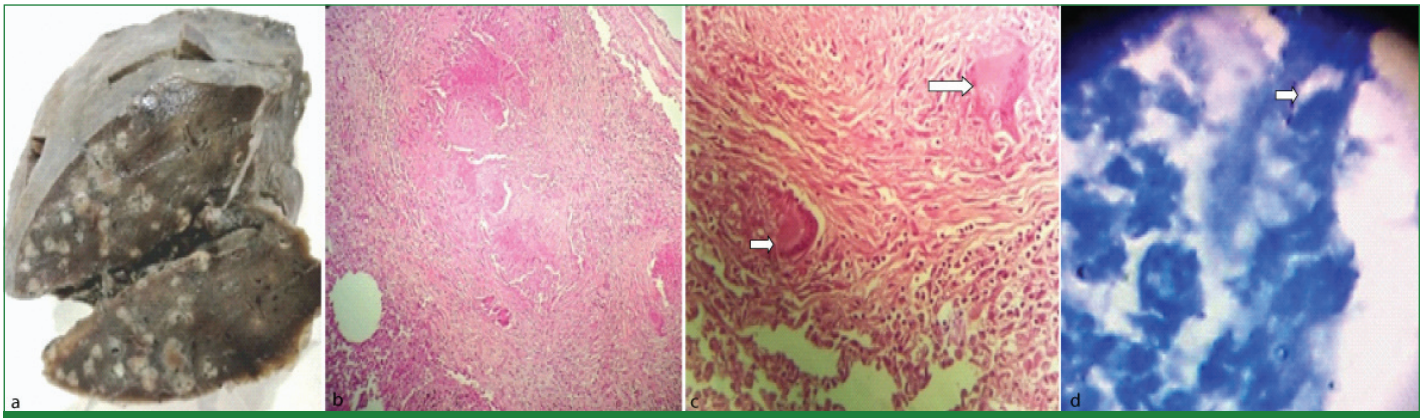
Pathological findings	New born–15 years (Male/Female)	16-30 years (Male/Female)	31-45 years (Male/Female)	46-60 years (Male/Female)	>60 years (Male/Female)	Total (Male/Female)
Sinusoidal and vascular congestion	5 (5/0)	6 (1/5)	3 (2/1)	5 (5/0)	1 (0/1)	20 (13/7)
Cirrhosis	-	-	3 (3/0)	2 (2/0)	1 (1/0)	6 (6/0)
Autolysed	5 (2/3)	-	-	-	-	5 (2/3)
Steatosis	-	1 (0/1)	2 (2/0)	1 (1/0)	-	4 (3/1)
Descriptive	-	3 (0/3)	-	-	-	3 (0/3)
Chronic Hepatitis	-	1 (1/0)	1 (1/0)	-	-	2 (2/0)
CVC liver	-	-	1 (1/0)	1 (1/0)	-	2 (2/0)
Epithelioid cell granuloma, ZN negative	-	1 (0/1)	-	-	-	1 (0/1)
Adenocarcinoma liver	-	-	-	1 (1/0)	-	1 (1/0)
Portal triaditis	-	-	1 (1/0)	-	-	1 (1/0)
Hepatic peliosis	1 (1/0)	-	-	-	-	1 (1/0)
Total	11 (8/3)	12 (2/10)	11 (10/1)	10 (10/0)	2 (1/1)	46 (31/15)

[Table/Fig-2]: Pathological findings in 46 liver specimens received.

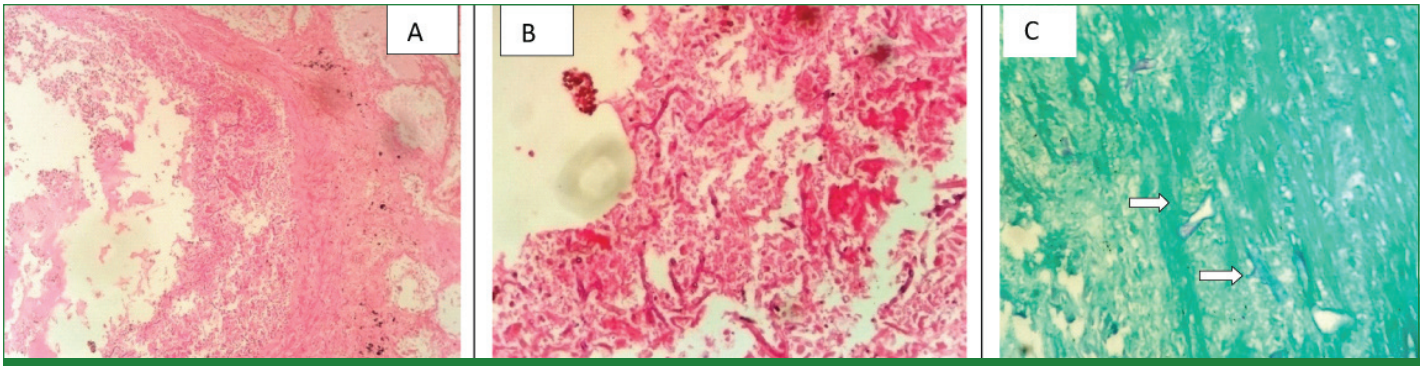
showed whitish necrotic areas with areas of congestion and one lung in addition showed cavitations [Table/Fig-4]. There was one case of fungal pneumonia showing fungal hyphae with acute angle branching [Table/Fig-5]. There were two cases in which lung of newborn male showed squames in alveolar spaces and bronchioles along with yellowish meconium bodies and mucus, suggestive of meconium aspiration. Gross examination on autopsy of lung of one new born female showed multiple cysts in middle and lower lobe of right lung varying in size from 0.2 to 0.8 cm. Microscopically, sections from middle and lower lobe of right lung showed variably sized cysts lined by pseudostratified ciliated epithelium. The wall of the cysts showed glands and cartilage, suggestive of type I Congenital adenomatoid malformation. One specimen of lung showed features suggestive of interstitial pneumonia. Lung specimen of two newborn males showed pulmonary hypoplasia [Table/Fig-1].



[Table/Fig-3]: Emphysematous change with broken up alveolar spaces (H&E, 100X).

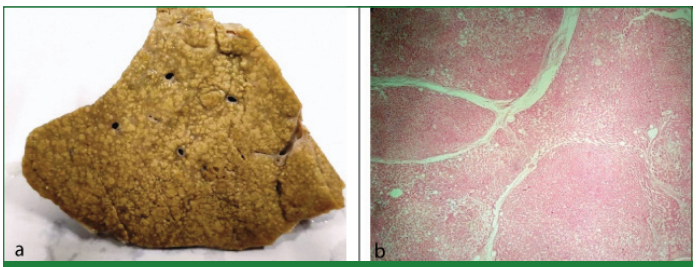


[Table/Fig-4]: a) TB lung: scattered tan irregular sized nodules representing granulomas; b) Caseating necrosis with epithelioid cell granuloma, Tb lung (H&E, 40X); c) Epithelioid cell granuloma with langhans giant cells (H7E, 400X) marked with arrows; d) The arrow is lying over the afb positive structure (1000X).

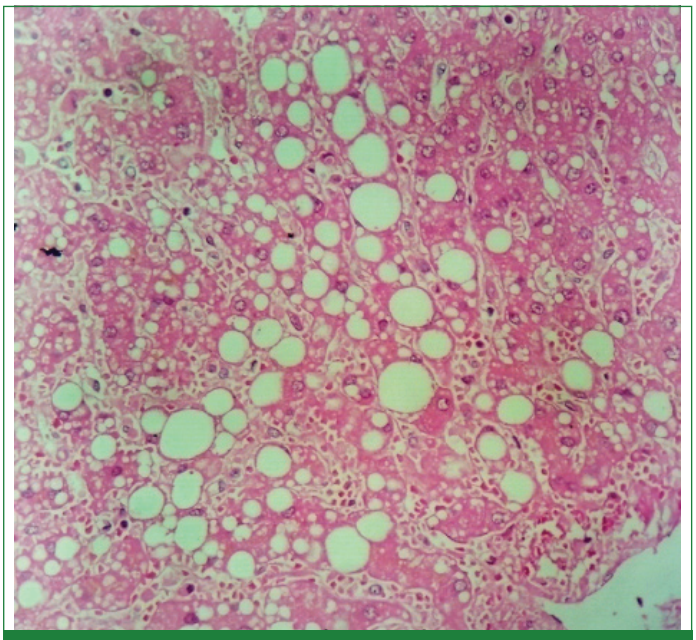


[Table/Fig-5]: A,B) Fungal hyphae with acute angle branching in case fungal pneumonia (40X and 400X H&E); C) PAS staining demonstrating fungal hyphae, marked with arrows (400X).

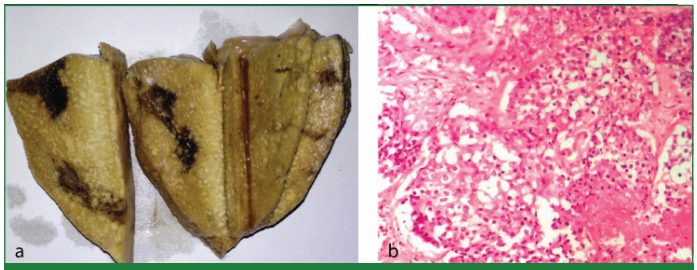
Out of the total liver specimens (i.e., 46 cases), most of the cases on histopathological examination showed sinusoidal and vascular congestion (i.e., 20 cases, 43.5%). Grossly, these liver specimens appeared unremarkable. There were six cases (13%) showing cirrhosis both grossly and microscopically [Table/Fig-6]. Five liver (10.8%) specimens show autolytic changes. Hepatic steatosis was seen in four cases (8.6%), [Table/Fig-7]. There were two cases of chronic hepatitis, two cases of chronic venous congestion, one case of ziehl neelsen stain negative epithelioid cell granulomatous inflammation and one case of portal triaditis. There was one case of adenocarcinoma of liver on microscopy [Table/Fig-8] which grossly showing single nodule with area of necrosis and one case of hepatic peliosis secondary to nodular adrenal hyperplasia which grossly showed solid, grey brown liver with few cystic spaces filled with blood. Microscopically, liver showed variable sized blood filled spaces, lined by benign endothelial cells communicating with hepatic sinusoids [Table/Fig-9]. Three cases were descriptive which showed mild congestion and very focal fatty change [Table/Fig-2].



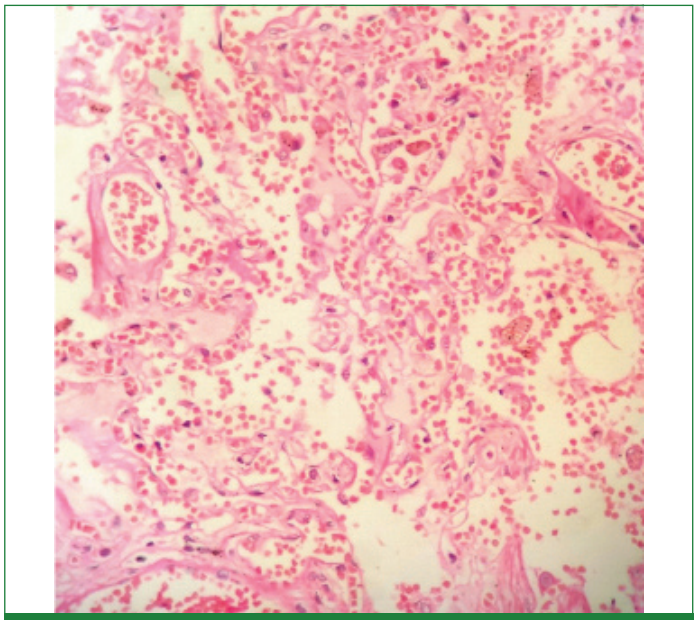
[Table/Fig-6]: a) Specimen of part of liver showing cirrhosis (micronodular); b) Cirrhosis of liver with lobules formation and fibrosis (H&E, 10X).



[Table/Fig-7]: Liver with microvesicular and macrovesicular steatosis (H&E, 100X).



[Table/Fig-8]: a) Gross specimen of adenocarcinoma, liver; b) Microscopy of adenocarcinoma, liver (H&E, 40X); clear to eosinophilic polygnal cells with well defined cytoplasmic borders, slightly high nucleocytoplasmic ratio.



[Table/Fig-9]: Hepatic peliosis histopathology with variable sized blood filled spaces, lined by benign endothelial cells (H&E, 40X).

In 14, out of all the cases, pathological findings were incidental. These included three cases of tubercular pneumonia, one case of interstitial pneumonia, one of bronchopneumonia and one of emphysema in which the patients were brought dead. There were two cases of status epilepticus in which lung showed bronchopneumonia. The second patient of status epilepticus in addition showed ziehl neelsen stain negative epithelioid cell granulomatous inflammation in the liver. One patient on autopsy had stent in left anterior descending artery. Lung specimen showed emphysema while liver showed chronic venous congestion in this case. Among liver, cirrhosis was seen incidentally in three cases. All three patients were brought dead. One patient was suspected of having hepatic malignancy which on histopathology turned out to be the case of hepatic peliosis without any evidence of malignancy on histopathological examination. There was one case in which the patient was brought dead. Histological examination of the liver specimen showed adenocarcinoma [Table/Fig-10]. These findings were not known at the time of death; hence these signify the importance of histopathology in these cases.

S No.	Age/sex	History/indication of autopsy	Gross finding	Histopathological findings
1.	32-35 year/M	Sudden death	Lung: Autolytic changes in lung with few areas of consolidation	Interstitial pneumonia
2.	50 year/M	Sudden death	Lung: Autolyitc changes with cavitation	TB pneumonia
3.	25 year/F	Sudden death	Lung: Whitish necrotic areas with areas of congestion	TB pneumonia
4.	30 year/ M	Sudden death	Lung: Congestion with caseation	TB pneumonia
5.	53 year/M	Sudden death	Liver: firm with micronodules (0.2 to 0.4 cm)	Cirrhosis
6.	15 days/M	Suspected infantile hepatic hemangioma	Liver: solid, grey brown with few cystic spaces filled with blood	Hepatic peliosis
7.	31 year/M	Seizures with sudden death	Liver: Cirrhotic nodules in liver(1 to 5 mm)	Cirrhosis
8.	60 year/ M	Stent in left anterior descending artery	Lung: congestion with small cystic space near capsule measuring 1 to 5 mm Liver: unremarkable grossly	Emphysema, lung Chronic venous congestion, liver
9.	55 year/M	Status epilepticus	Lung: congestion with thin pleura	Bronchopneumonia
10.	78 year/M	Sudden death	Liver: micronudules (2 to 4 mm)	Cirrhosis
11.	55 year/M	Sudden death	Liver: single nodule with area of necrosis	Adenocarcinoma, liver
12	26 year/ F	Status epilepticus	Liver: mild autolytic changes Lung: consolidation with abscess cavities	Epithelioid cell granuloma, ZN negative, liver Bronchopneumonia with lung abscess
13.	58 year/M	Sudden death	Lung: congestion with small cystic spaces near pleura measuring 2 to 3 mm	Emphysema, lung
14.	29 year/F	Died during delivery	Lung: boggy with consolidation	Bronchopneumonia, lung

[Table/Fig-10]: Incidental findings in autopsy.

DISCUSSION

In the present study, lung lesions were seen predominantly in males with a male female ratio of 2.2:1. Khare P et al., and Bal MS et al., also found lung lesions more in males than females with male: female ratio as 2.7:1 and 4:1 respectively in their studies [1,5]. The majority of cases in the present study belonged to newborn to 16 years followed by both 16 to 31 and 31 to 45 years respectively. However, the majority of the lung samples in study by Khare P et al., belonged to autopsies carried out in adults between 16 to 60 years age group [1]. In the present study, thirteen cases showed poorly preserved/autolysed lung tissue. Most of the cases were of diffuse alveolar oedema, congestion followed by bronchopneumonia, emphysematous change, bronchopneumonia with lung abscesses, tuberculous pneumonia, meconium aspiration, pulmonary hypoplasia, fungal pneumonia, type I congenital adenomatoid malformation and interstitial pneumonia. Khare P et al., showed congestion and oedema to be the commonest finding found on histopathological examination of lung specimens in his study followed by changes in the interstitium, inflammation (pneumonia, granuloma and fungal), emphysematous change, acute respiratory distress syndrome, hyaline membrane disease and meconium aspiration [1]. Diffuse alveolar oedema and congestion were also observed by many authors to be the commonest finding in their series of cases [6,7] which correlated with the prevalence seen in the present study. Tubercular pneumonia was seen in 7.8% cases in present study. Kandy NC et al., found tuberculous changes in lungs in 15.78% cases in their study [8]. Patel S et al., found 3.46% cases of lung tuberculosis in all the cases and one having extrapulmonary involvement in addition to the lung tuberculosis [2].

In the present study, the male: female ratio for liver lesions was 2.1:1. The age group of 16-30 years recorded the maximum number of cases followed by age range newborn to 15 years and 31 to 45 years. In the present study, sinusoidal and vascular congestion was reported in maximum number of cases (43.5%) followed by cirrhosis (13%), autolytic changes (10.8%) and steatosis (8.7%). Maximum cases of cirrhosis and steatosis were seen between 31-45 years of age. Study by Bal MS et al., also showed liver diseases trend to be more common in males than females with a male: female ratio of 4.88:1 [5]. Another study by Devi M et al., showed male: female ratio of 6:1 [6]. Fatty change liver (39%) constituted maximum number of cases among the liver lesions in the study done by Bal MS et al., [5]. Other pathological findings in liver in his study were cirrhosis (14%), congestion (9%), hepatitis (3%) and malignancy (3%). Devi M et al., reported cirrhosis to be the commonest liver disease (25%) followed by chronic hepatitis (22%) [6]. Other findings were hepatic steatosis (17%), portal triaditis (15%), congestive liver and miscellaneous cases (5%). Alagarsamy J et al., reported fatty change, Chronic Venous Congestion (CVC), cirrhosis of liver, neoplasm and hepatitis with CVC in the histopathological examination of liver specimen [9]. Tsokos M et al., studied 45 cases of sudden death [10]. They reported cirrhosis in all cases with a male: female ratio of 1.6:1. Present study showed six cases of cirrhosis which were all males. Voinova LV showed that steatosis was mostly related to alcohol and cirrhosis was mostly associated with viral diseases [11]. Few other studies showed hepatic steatosis to be the commonest finding [5,12-14] with male predominance. Present study showed granulomatous hepatitis in one case. Soutoudehmanesh R et al., found granulomatous hepatitis in 0.2% of cases in his study [15].

Few of the cases in the present study showed incidental findings on autopsy and microscopic examination which were not known at the time of death. These could be the silent findings or can be the cause of death. These cases reveal the importance of histopathology in autopsy towards study of actual disease prevalence.

LIMITATION

The limitation of the study was that only a part of the organ was received for the histopathological study. However, if this shortcoming is overcomed, histopathological reporting would be more precise and would help much more to understand the cause of death.

CONCLUSION

This study highlights the importance of histopathological report in lung and liver autopsy cases, especially in the 14 cases where histopathology findings were incidental and were not considered at the time of death.

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