

Interesting and Unexpected Histopathological Findings in Medicolegal Autopsy Cases - An Experience in a Tertiary Care Centre

Harish Chandra Singh^{1*}, Kaustav Mohapatra², Jyotirmayee Mishra³

¹Associate Professor,
Department of Pathology,
VIMSAR, Burla, Sambalpur,
Odisha, India. Email:
drjyotirmayee15@gmail.com

*Corresponding author

²Senior Resident, Department of
Pathology, VIMSAR, Burla,
Sambalpur, Odisha, India.

³Associate Professor,
Department of Pathology,
VIMSAR, Burla, Sambalpur,
Odisha, India.

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Abstract

Background: Autopsy is an important key to reveal the cause and manner of death in medicolegal cases and a source of learning from a pathologist's perspective. Few of the ailments are diagnosed only at autopsy as they may not cause any functional derangement. **Aim:** The aim of this study was to determine the spectrum of histopathological findings including neoplastic lesions related to or unrelated to the cause of death. It was also aimed to highlight various incidental and interesting lesions in autopsies. **Methods:** A retrospective and prospective study of medicolegal autopsies for four years was conducted in a tertiary care centre in western Odisha to study the various spectrum of histopathological findings. **Results:** The study consisted of 100 autopsy cases and histopathological findings were studied in all the cases. In most of the cases (59 cases) no preliminary cause of death was mentioned. Myocardial infarction (14 cases) was the most common incidental histopathological finding noted followed by fatty liver (9) cases. Neoplastic lesions accounted for 4 number of cases. **Conclusion:** This study contributed with few important histopathology findings to reach a definitive diagnosis of diseases in some unknown causes of death. Autopsy studies help in better understanding and detection of incidental findings significant enough to change the course of treatment only if the disease was diagnosed prior to death.

Keywords: Medicolegal Autopsy, Interesting, Histopathological Findings.

INTRODUCTION

The term "autopsy" is derived from Greek word "autopsia," meaning "to see for oneself".^[1] There are mainly two different types of autopsies: (1) The Clinical or Academic Autopsy and (2) Forensic or Medicolegal Autopsy. The clinical autopsy is performed with prior consent of the relatives of the deceased in order to find the cause of death but forensic

autopsy or medicolegal autopsy deals with deaths due to unnatural causes (homicide, suicide, accident) and can be performed only at the instructions of legal authority. Forensic autopsy is done to get the answers pertaining to medicolegal objectives like, sudden unexpected death, unwitnessed, unexplained, criminal deaths, and deaths due to medical or surgical negligence.^[2,3] Most of the cases don't require histological study to determine the cause of death but it helps to establish causes in few and also in



further medical studies. Various different pathology is also studied.^[4,5]

Various histopathological findings not pertaining to cause of death in the deceased are noted in routine histopathological examination of medicolegal autopsies. These findings have been of great academic value and serve as an eye opener to the infrequent and rare lesions which go unnoticed when a person is alive. The medicolegal autopsy provides an opportunity for studying not only medically diagnosed and treated neoplasms, but also the natural evolution of untreated disease.^[4,6] Autopsy study fulfils the need of many interests, besides diagnosing the cause of death. It is important for both the family of the deceased and the society for knowing, or at least making an effort to find out the cause behind the death.^[7] Eventually these findings help the forensic experts to categorise and separate the causes of death. These are important for assessing statistics of mortality required for better public health and health service planning.^[8]

MATERIALS AND METHODS

A retrospective as well as a prospective study of medicolegal autopsies for four years from January 2017 to December 2020 was conducted in the Department of Pathology, VIMSAR, Burla, a tertiary care centre, in western Odisha. A total number of 100 separate cases were sent for histopathological examination, where the various internal organs were studied. The relevant organs to the case concerned were preserved and sent in

10% formalin. In most of the cases organs comprised of heart, liver, spleen, kidneys, brain, lungs, uterus with ovaries and bony tissue. Organs were processed and representative sections were given in a routine manner. All the tissue sections were stained with Haematoxylin and Eosin (H & E) stain. Detailed gross and histopathological findings were noted and the salient features were studied in each case.

RESULTS

The present study was conducted on 100 autopsy cases, from VIMSAR, Burla, Odisha, India conducted over a period of four years from January 2017 to December 2020, where internal organs were sent for histopathology study. Out of the total 100 cases, 80 cases were those of males and 20 cases were females. A total of 163 separate organs were sent for all of the 100 cases together. Various spectrum of histopathological lesions were noted [Table 1]. The majority of cases were between 41 to 60 years of age group (44%) [Table 2]. The commonest cause of death was myocardial infarction found amongst 14 cases.

All the cases were received from the department of Forensic Medicine and Toxicology, VIMSAR, Burla. Probable cause of death was mentioned in 41 cases whereas in remaining 59 cases the cause of death was mentioned as 'unknown'. Sudden death was mentioned in 12 of the cases. Most of the sudden deaths were attributed to

myocardial infarction (MI) and hypertrophic heart disease.

In one case of sudden death, where the brain of the deceased was received showed features of sickle cell disease (SCD) with vaso-occlusive crisis (VOC). Sickle cell disease was also found in three more cases, where two of the cases had VOC in spleen [Figure 1] and another one had it in kidney. A part of the brain was received in another case of sudden death and probable cause was suspected to be meningitis, but thorough examination showed Negri bodies in purkinje cells, which are pathognomonic features of Rabies [Figure 2]. Histopathology findings in lungs were mostly associated with emphysematous changes followed by congestion. Another case where the cause of death of a male was unknown, incidental finding of both chronic interstitial lung disease (CILD) and chronic pyelonephritis was found together. Three separate cases each of pulmonary tuberculosis (TB), acute respiratory distress syndrome (ARDS) and CILD were noted in lung specimens. Most common pathological finding in liver specimens were that of fatty change (9 cases) followed by cirrhosis, congestion, chronic hepatitis, TB, regenerative nodule, adenocarcinoma deposits and simple liver cyst. Incidental finding of benign spindle cell tumor was noted in pancreas which was sent along with one of the liver specimens in a case of hepatitis. Out of 41 samples of kidney, most of the cases (11 cases) showed normal histomorphology, followed by congestion in 8 cases and acute tubular

necrosis (ATN) in 8 cases. Incidental findings in kidney was found in two cases, where one of the case was of sudden death and other was due to snake bite. In sudden death case, the cause of death was MI and in kidney there were features of focal segmental glomerulosclerosis (FSGS) [Figure 3], whereas in the snake bite case the kidney showed features of chronic pyelonephritis (CPN) [Figure 4] and liver showed amoebic abscess. One case each of sickle cell disease, adenocarcinoma, acute pyelonephritis and tuberculosis was found in kidney specimen. Product of conception leading to septic abortion was found in two out of six cases of uterus and cervix, whereas two cases each of chronic cervicitis and congested myometrium was found. In another case a bony tissue showed metastatic papillary carcinoma thyroid.

Table 1: Spectrum of histopathological lesions (n = 100)

| Sl.No. | Histopathology findings | No. of cases |
|--------|-----------------------------------|--------------|
| 1 | Myocardial infarction | 14 |
| 2 | Fatty Liver | 9 |
| 3 | Cirrhosis | 7 |
| 4 | Chronic hepatitis | 3 |
| 5 | Pulmonary oedema | 5 |
| 6 | Pneumonia | 6 |
| 7 | Chronic Interstitial lung disease | 3 |
| 8 | ARDS | 3 |
| 9 | Acute Tubular Necrosis (ATN) | 8 |
| 10 | Pyelonephritis | 5 |
| 11 | Tuberculosis | 6 |
| 12 | Neoplastic lesion | 4 |
| 13 | Sickle cell disease | 4 |

| | | |
|----|------------------|-----|
| 14 | Rabies | 1 |
| 15 | CVC spleen | 6 |
| 16 | Normal study | 9 |
| 17 | Autolysed sample | 7 |
| | Total | 100 |

Table 2: Age distribution of autopsy cases (n =100)

| Age group | No. of cases |
|-----------|--------------|
| 0-20 | 15 |
| 21-40 | 31 |
| 41-60 | 44 |
| 61-80 | 10 |

Table 3: Case distribution based on probable cause of death (N=100)

| Sl.No. | Probable cause of death | No. |
|--------|-------------------------|-----|
| 1 | Unknown | 59 |
| 2 | Sepsis | 3 |
| 3 | Septic abortion | 3 |
| 4 | Sudden death | 12 |
| 5 | Suicide (Poisoning) | 3 |
| 6 | Liver disease | 6 |
| 7 | PUO | 5 |
| 8 | Malignant neoplasm | 2 |
| 9 | Snake bite | 4 |
| 10 | Alcohol intoxication | 3 |

Our study found unexpected and incidental findings in total eight cases where the cause of death was not because of all the histopathological diseases found in various organs [Table 4]. In two of the cases where the cause of death was unknown, one had MI with fatty changes in liver and the other had chronic interstitial lung disease with chronic pyelonephritis. MI was also found in three more cases where one of the cases with pyrexia of unknown origin (PUO) had regenerative nodule in liver, another case of organophosphorus (OP) poisoning had acute tubular necrosis (ATN) in kidney with sickled RBCs in spleen and the third with sudden death had glomerulosclerosis in kidney. One of the snake bite victim had incidental findings of chronic pyelonephritis with amoebic liver abscess. In remaining two cases where the main pathology was in liver as hepatitis and congestion, the incidental finding was benign spindle cell lesion in pancreas in one case and chronic interstitial lung disease with chronic pyelonephritis in other case.

Table 4: Histopathological unexpected findings

| Sl. No. | Probable cause of death | Histopathological finding explaining cause of death | Unexpected additional histological findings |
|---------|----------------------------|---|---|
| 1 | Unknown | MI | Fatty changes in liver |
| 2 | Unknown | CILD | Chronic pyelonephritis |
| 3 | PUO | MI | Regenerative nodule in liver |
| 4 | PUO | Hepatitis | Benign spindle cell lesion in Pancreas |
| 5 | Sudden death | MI | Glomerulosclerosis |
| 6 | Snake bite | Chronic Pyelonephritis | Amoebic liver Abscess |
| 7 | Organophosphorus poisoning | MI | Kidney- ATN, Spleen- VOC (SCD) |
| 8 | Liver disease | CILD | Liver- congestion, Kidney- CPN |

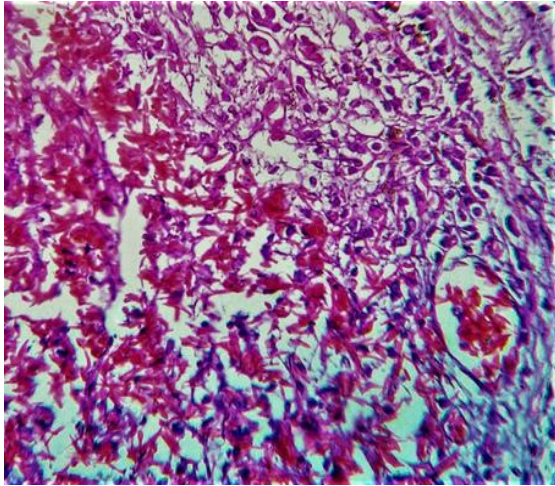


Figure 1: Microsection from spleen showing congested vascular channels packed with sickled RBCs (H&E x400)

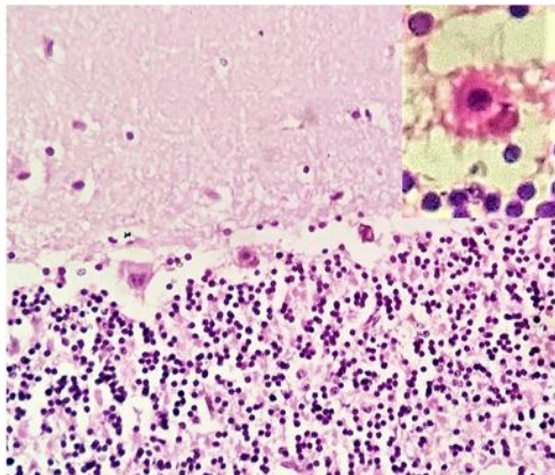


Figure 2: Microsection from brain showing eosinophilic Negri body, in a Purkinje cell. (H&E, x100) (Inset- Negri body)

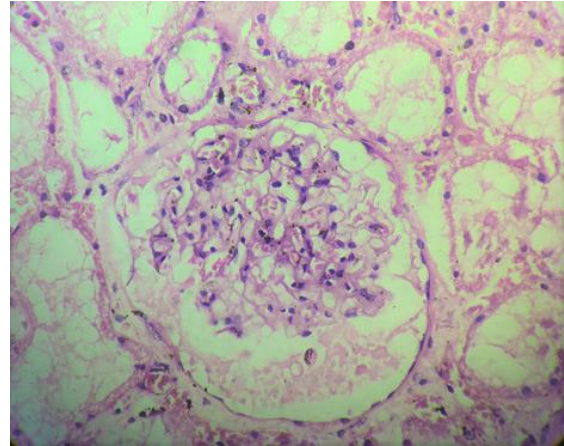


Figure 3: Microsection from kidney with FSGS showing crescent (H&E x400)

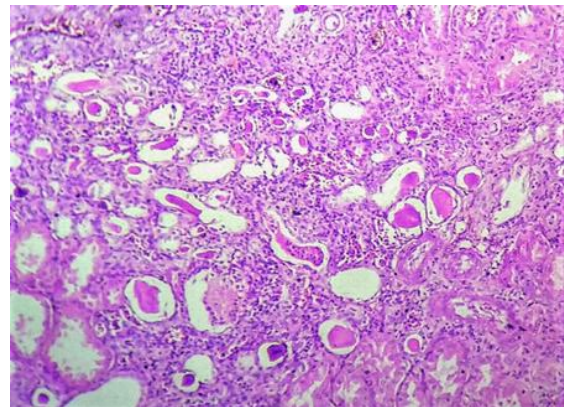


Figure 4: Microsection from kidney showing thyroidisation of tubules in Chronic Pyelonephritis (H&E x400)

DISCUSSION

In the present study we found MI due to atherosclerosis (14%) to be the most common histopathology finding, followed by fatty liver (9%) and normal study (9%) which was similar to study conducted by Sapna Patel et al and Arunalatha P et al.^[9,10] Hypertrophic cardiomyopathy (HCM) was found in three cases. HCM is a common clinically presenting cardiac disease which is associated mutation in gene encoding β -myosin heavy chain (β -MHC).^[11] Most of the cases where the



cause of death was due to heart condition, deceased were mostly asymptomatic and diagnosis was incidental. Since the cause of death is not known or undiagnosed prior to death, mostly heart is looked for any changes suggestive of myocardial infarction (MI) or coronary artery disease (CAD). Heart disease is associated with other metabolic disorders such as non alcoholic fatty liver disease, type 2 diabetes mellitus, and deaths due to cardiac conditions account for nearly one third of all deaths in the world.^[12] Similarly in another case, which was associated with MI there was pathological changes of nodular regenerative hyperplasia in liver (NRHL). Nodular regenerative hyperplasia in liver is a rare condition characterised by nodular transformation of liver parenchyma without fibrosis. NRHL is often found in cases with portal hypertension or obstructive venopathy resulting in hyperproliferative response by liver.^[13,14] Sickle cell disease (SCD) is a common endemic disease of western Odisha and is known to be associated with life threatening vaso-occlusive crisis (VOC). VOC in persons with sickle cell disease might be triggered by fever or mild infection. During the episodes of acute vaso-occlusive crisis, myocardial ischemia and infarction are commonly seen in SCD cases. Atherosclerosis is one of most common cause for MI. But in SCD the cause is vaso-occlusive crisis resulting in mismatch perfusion, rather than atherosclerosis. Renal disorders are also caused due to vascular insufficiency and can occur at any age group. But

end stage renal disease in SCD occurs in long standing cases.^[15-18] Here we have a case of young male with organophosphorus poisoning, but the incidental findings revealed that the person was having sickle cell disease and most probable cause of death might have been due to MI. We received heart, kidney and spleen of the deceased male, where the spleen showed venous congestion with sickled RBC and kidney showed features of ATN. Sudden death due to MI is very common in chronic renal failure patients. It might be caused due to cardiac electrical defect or cardiac myopathies because of long standing disease or even due to electrolyte imbalance due to dialysis.^[19] In a separate case of MI in an elderly male, where kidney was also received for the autopsy showed features of glomerulosclerosis. In one of the snake bite victims kidney and liver were sent to us. Histopathological findings in both the organs were not at all related to the death and purely incidental. Kidney showed features of chronic pyelonephritis and liver showed amoebic liver abscess. Chronic pyelonephritis is a long standing complication of recurrent urinary tract infection (UTI). In our study an elderly male's death was due to unknown illness and his lungs and kidney were received for histopathology study. He was suffering from chronic interstitial lung disease (CILD) with chronic pyelonephritis, both of which are two separate diseases and causes are also different. CILD is mostly drug induced. In two separate case reports by Rambaran KA and Singh A, mentioned

about drug induced CILD, was caused by chronic exposure to nitrofurantoin, a drug commonly used in UTI.^[20,21] In another case of hepatitis where a mass was present in pancreas. On histopathology study, we found incidental benign spindle cell tumor of pancreas.

CONCLUSION

Histopathological examination proves to be an essential tool in the study of Medicolegal Autopsy cases. Kidney, liver, lungs and heart were the commonly received organs in our study. Histopathological examination of these organs proved to be helpful to reach upon a diagnosis in few of the cases. Most common histopathological findings noted were of myocardial infarction followed by fatty liver and normal histology findings in various organs. Some of the histopathology findings were much of a surprise to a pathologist like cerebrovascular accident caused by undiagnosed sickle cell crisis, adenocarcinomatous metastasis to liver, bony metastasis of papillary carcinoma thyroid, suspected meningitis turning out to be rabies and a coexisting benign spindle cell tumor of pancreas in a hepatitis patient, are a few of the cases to be mentioned. Few of the organs showed autolysis, which might have been caused due to delay in the processing of samples before sending it to laboratory.

Limitations

The present study was more confined in highlighting interesting and incidental findings, besides the

specimens which were autolysed could not be studied. It might have been much better to study the lesions of various organs separately.

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