



Research Article

A Histopathological Analysis of Medico Legal Autopsy in Cases of Sudden Death

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Abstract

Background: *The term autopsy is derived from the greek word autopsies “to see for oneself” derives from autos (one self) and opsis (“eye”). It is a highly specialized surgical procedure that consists of a thorough examination of a corpse to determine the cause of death, assessment of clinical diagnosis as well as a key educational tool. Various histopathological findings, unrelated to the cause of death are noticed in the routine histopathological examination of the medical autopsies. Present study was conducted on 38 medicolegal cases received in the department of Pathology at Pt. J.N.M. medical college, Raipur C.G. in last 2 years (2016–2018). The present study was conducted to determine the histopathological findings related or unrelated to the cause of death and to highlight the incidental findings in the autopsies.*

Introduction

Sudden death is the death which is sudden or unexpected in a person not known to have been suffering from any dangerous disease, injury or poisoning is found dead or dies within 24 hours after the onset of terminal illness^[1] Commonly, medico legal autopsies are conducted in cases of sudden and unexpected deaths primarily to establish the cause of death in cases where such deaths have occurred in apparently healthy individuals under suspicious circumstances. The situation may become very knotty where the trauma per se is not fatal and pathological lesion found at autopsy may have been compatible with continued life like chronic heart disease and these

can create difficulties in determining the cause of death^[2].

Aim

To find out various causes of sudden deaths in deceased that was subjected to medico legal autopsies.

Objectives

- 1) To determine the histopathological findings related or unrelated to the cause of death.
- 2) To highlight the incidental findings in the autopsies.

Material and Method

The present study was a prospective observational study carried out at the Department of Pathology Pt. J. N. M. Medical College Raipur (C.G.) during the period of 2016 to 2018 All the cases with the history of sudden deaths autopsied at Dr.B.R.A.M. Hospital, Pt. J.N.M Medical College Raipur (C.G.) were included in the study. These includes

- 1.Cases that were brought dead to hospital, or the cases where the death was unobserved and were brought to our institution for post-mortem examination with the manner of death either natural or not known and the cause of which subsequently on post-mortem examination turned out to be sudden and natural.

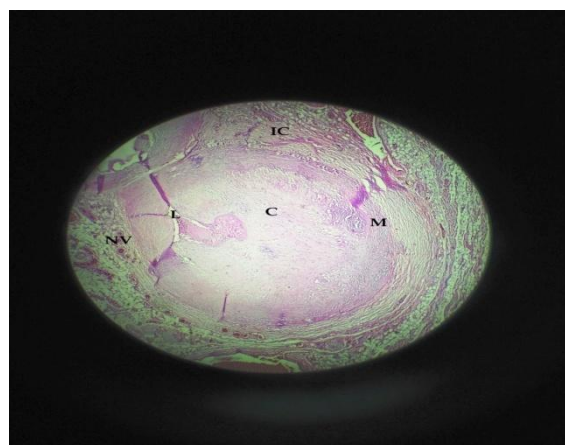
2. Cases that were admitted in the hospital and died within 24 hours of onset of signs & symptoms brought to our hospital for post-mortem examination.

Before starting the post-mortem examination, history about the onset of symptoms, their duration, habits, family history, previous medical history and any treatment records if available were obtained from the relatives. In cases where the death was unobserved and the dead body was brought directly from site of death by police for post-mortem examination, detailed were recorded from police investigating officer regarding the manner of death. Detailed autopsy was performed using the Lettulle's evisceration technique, examining and weighing of all the organs before dissection. Gross examination of the organs were performed and each individual organ was dissected as per the standard autopsy technique. If any gross pathologic changes were observed in the organs during autopsy then written consent was taken from the relatives for collection of specimen for histopathological examination. The whole organs or pieces of organs showing gross pathologic changes were preserved for histopathological examination in 10% formalin solution and were brought to the Pathology department. There detailed histopathologic examination were done. Morphologic changes were noted and correlated with the clinical

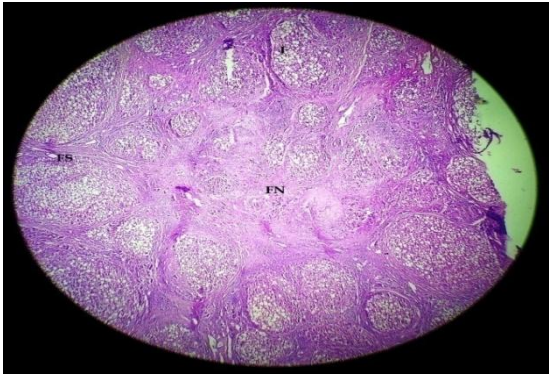
findings if available after discussing with the treating clinician. Finally the histopathology report was handed over to the forensic department for further evaluation the cause of death.

Result

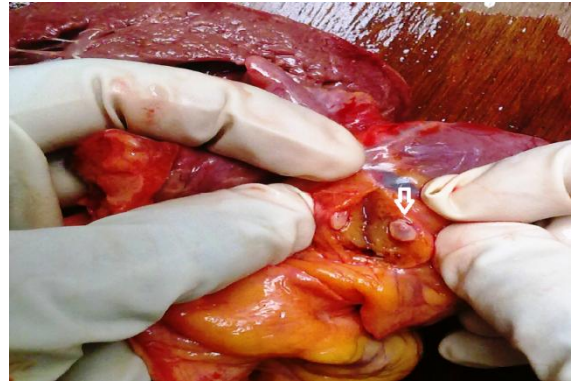
This study was conducted on 38 cases of sudden death where male preponderance was noted with M : F ratio of 2.1:1. The highest incidence was seen in 4th to 6th decades of life. Looking into system wise distribution it was observed that maximum no. cases were seen in cardiovascular system (86.8%), followed by Respiratory system (78.9%), hepatobiliary system (76.3%), urogenital system (65.7%) and central nervous system (31.5%). The present study showed a wide spectrum of histopathological findings, Atherosclerosis was the most common finding accounted for 57.8% followed by pulmonary edema (47.3%), inflammation in portal tride (42.1%), Myocardial hypertrophy (28.9%), fatty liver (28.9%), cerebral edema (23.6%), myocardial infarction (21.05%), hyaline arteriosclerosis (21.05%), acute tubular necrosis (7.8%), pneumonia (7.8%), alcoholic liver disease (7.8%), pulmonary tuberculosis (2.6%) liver cirrhosis (2.6%) and brain infarct (2.6%). Shows in table no. 3



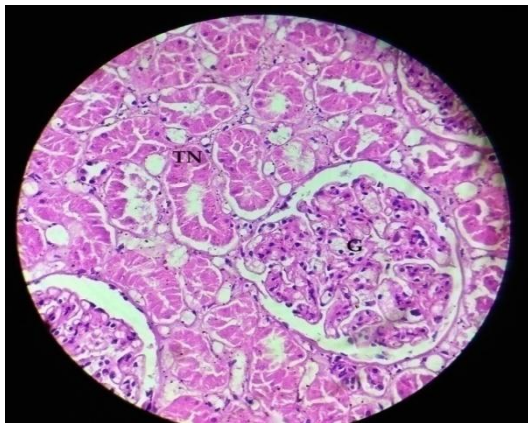
1. Photomicrograph of coronary artery showing atherosclerotic plaque occluding the lumen, (H & E, 10X). NV = Neo vascularization, L = Lumen, C = Cholesterol plaque, M = Muscle layer, IC = Inflammatory cells.



2. Photomicrograph of liver shows cirrhotic changes (H & E, 40X) - FS = Fibrous septa, FN = Fibrotic nodule, F = Fatty change.



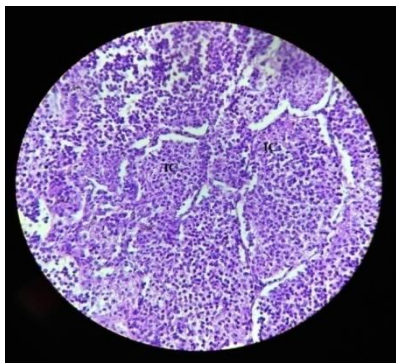
5. Photograph showing complete occlusion of left anterior descending coronary artery.



3. Photomicrograph of Kidney shows acute tubular necrosis. - (H & E, 40X)
TN = Tubular necrosis, G = Glomerulus.



6. Photograph of heart showing interventricular (thickness - 2.2cm) & left ventricular hypertrophy (thickness - 2.3cm), IVS = Interventricular septum, LVH = Left ventricular hypertrophy.



4. Photomicrograph of lung showing lobar pneumonia with acute inflammatory cell infiltrating the alveolar space uniformly. - (H & E, 10X) (IC = inflammatory cells)



7. Photograph of piece of liver showing cirrhotic changes along with macronodules all over the specimen.
MN = Macronodules.

Table no. 1 Distribution of cases according to age

Age group	Male	Female	Total	Percentage
<20	00	00	00	00
21-40	08	06	14	36.8
41-60	17	02	19	50
61-80	01	04	05	13.1
Total	26	12	38	100

Table No. 2 Distribution of cases according to histopathological finding in various organs

S. No.	System	Major finding	No. of cases	Percentage
01	Respiratory System	Pulmonary edema	16	42
02	Renal System	Acute tubular necrosis	03	7.8
03	Hepatobiliary System	Fatty liver	10	26.3
04	Cardiovascular System	Atherosclerosis	17	44.7
05	Central Nervous System	Cerebral Oedema	09	23.6

Table no. 3 Spectrum of histopathological findings in various organs

Findings	No. of cases	Percentage
Acute tubular necrosis	03	7.8
Pulmonary edema	18	47.3
Fatty liver	11	28.9
Atherosclerosis	22	57.8
Myocardial hypertrophy	11	28.9
Pneumonia	3	7.8
Old healed infarct	01	2.6
Chronic hepatitis	03	7.8
Pulmonary tuberculosis	01	2.6
Liver cirrhosis	01	2.6
Myocardial infarction	8	21.05
Alcoholic liver disease	03	7.8
Hyaline arteriosclerosis	08	21.05
Cardiac rupture	02	5.2
Cerebral edema	09	23.6
Brain infarction	01	2.6
Inflammation in Portal tride	16	42.1

Discussion

The present study was conducted in department of pathology, Pt. J.N.M. Medical College Raipur during the period of 2016 to 2018. A total 38 cases were studied. The maximum number of cases were fall in the age group of 41-60 year. In contrast to other studies done by Dr. love R bhagora et al³ showed that the largest number (30.71%) of sudden death cases were fall in the age group of 51-60 years, Ali Derya Azmak eta [9] showed maximum number (21.51%) of cases were fall in age group of 50-59 years, Bora Ozdemir et al⁵ showed that most of sudden death cases (19.5%) were fall in the age group of 41 -50 years.

From above studies, it was observed that the maximum number of sudden deaths were seen in the age group 41 to 60 years, which is consistent with the present study.

In present study, out of 38 cases of sudden deaths, 26 (68.4%) were male and 12 (31.5%) were female with male to female ratio of 2.1:1. The study done by Dr. Chandrakala joshi et al^[8] showed that, out of 115 cases, 98 (85.22%) were male and 17 (14.78%) were female with male to female ratio of 5.7:1, The study done by Ali derya azmak et al^[9] showed, out of 278 cases of sudden unexpected death, 232 (83.4%) were male and 46 (16.5%) were female with male to female ratio of 4.3:1. Thus from above studies, it was observed

that there were males predominance which is consistent with present study.

In present study, 86.8% of the deaths were due to cardiovascular diseases. Atherosclerosis (57.8%) and myocardial hypertrophy (28.9%) were the most common causes of sudden death. In the study done by Arun Puri et al^[10] the most common single cause of death was atherosclerosis which account for 24.8% out of 125 cases of sudden death. The study done by Dr. Chandrakala Joshi^[8] et al showed that out of 115 cases died of cardiovascular causes, 74 cases (64.34%) were died of atherosclerosis, The study done by Bora Ozdemir et al^[5] showed that out of 228 cases died of cardiovascular causes, 96 cases (42.1%) were died of coronary atherosclerosis. The study done by Dr. Love R. Bhagora et al^[3] showed that out of 158 cases died of cardiovascular causes, 125 cases (46.82%) were due to coronary artery disease. The study done by Ali Derya Azmak et al⁹ showed that 18.9% of sudden cardiac deaths were due to coronary artery diseases. The study done by Dr. Akhilesh Pathak et al^[4] showed that out of 36 cases of circulatory system disease, maximum deaths (25.5%) were due to coronary artery disease.

Thus, from above studies, it is observed that coronary artery disease is the most important cause of death and these findings are consistent with the present study. On the other hand, according to Escoffery and Shirley et al^[11], Ischemic heart disease was found in only 7% of all sudden death cases which shows discordance with the present study.

The second most common cause of sudden death is related to disease of respiratory system account for 78.9% of all sudden death cases. Many studies had also been reported similar findings. 19.1% in study done by Ali Derya Azmak et al^[9], 74.5% in study done by Nada Chettian Kandy et al^[7], 25.84% in study done by Dr. Love R. Bhagora et al^[3]. Thus these studies shows concordance with the present study.

The third commonest cause of sudden death was related to the diseases of hepatobiliary system which constitute 76.3%. which is consistent with the study done by dr. Akhilesh pathak et al^[4] and Mariana Costache^[6] et al showed 66 - 68% of incidence.

In present study renal system was the fourth cause of sudden death which was accounted 65.7%, commonest finding were hyaline arteriosclerosis and renal congestion, Both of these findings accounted for 21.05%.

Central nervous system involvement was the fifth commonest cause of sudden death accounted 31.5%, cerebral edema was the commonest histopathological finding (23.6%). A rare finding was brain infarct observed in 2.6%. In contrast to the other study done by Bora Ozdemir et al^[5] showed 15.3% involvement of central nervous system and, Study done by Ali Derya Azmak et al^[9] showed 14.4% involvement of central nervous system. These studies shows concordance with the present study.

Conclusion

From the above study it can be easily concluded that atherosclerosis is the most common finding followed by pulmonary edema. Histopathological studies during autopsy plays a vital role in increasing our knowledge about incidental discoveries. It aids in understanding the disease process that one encounters frequently. Such studies give an insight about true prevalence of the disease and give a substantial clue for screening the family members for hidden diseases.

Bibliography

1. Reddy KSN. The Essentials Of Forensic Medicine And Toxicology. 32th Ed. Hyderabad: K Suguna Devi Publishers; 2013.145
2. Cohle SD, Sampson BA. The Negative Autopsy: Sudden Cardiac Death Or Other? Cardiovascular Pathology. 2001;10(5): 219-22.3.

3. Dr. Love R. Bhagora*1, Dr. Amit P. Parmar2, Dr. Dipti C. Parmar3, Dr. Kajal M. Suvera4, Dr. Tejas C. Patel5. Sudden Death - An Autopsy Based Study. *Int J Res Med* 2015;4(4);154;157.
4. Dr. Akhilesh Pathak, Dr. H.M. Mangal Et.Al. Histo-Pathology Examination In Medico-Legal Autopsy Pros & Cons, ISSN 0971-0973 *J Indian Acad Forensic Med*, 32(2).
5. Bora Ozdemir1, Osman Celbis1, Rezzan Onal2, Bulent Mizrak3, Yunus Karakoc4, Multiple Organ Pathologies Underlying In Sudden Natural Deaths, *Medicine Science*, 2012;1(1);13-26. Pathologica Finding In Sudden Natural Death.
6. Mariana Costache,^{A,B} Anca Mihaela Lazaroiu,^{A,B} Andreea Contolenco,^B Diana Costache,^C Simion George,^B Maria Sajin,^{A,B} And Oana Maria Patrascu , Clinical Or Postmortem? The Importance Of The Autopsy; A Retrospective Study, *Maedica (Buchar)*. 2014 Sep; 9(3): 261–265.
7. Nada Chettian Kandy*1, Muktha R Pai2, Reba Philipose T, Role Of Histopathology On Autopsy Study: An Audit, *SAS J. Med.*; Volume-1; Issue-1(May-Jun, 2015); P-7-15.ISSN 2454-5112.
8. Chandrakala Joshi , Postmortem Study Of Histopathological Lesions Of Heart In Cases Of Sudden Death - An Incidental Findings, 2016month :Januaryvolume :3issue :5page :184-188.
9. Ali Derya Azmak, MD, Sudden Natural Deaths In Edirne, Turkey, From 1984 To 2005, *Med. Sci. Law* (2007) Vol. 47,No. 2.
10. Arun Puri1, Parul Garg2, Ishwer Tayal3, Navtej Singh4, Rajiv Joshi, Uncommon And Fluke Pathological Discoveries During Examination Of Viscera In Postmortem Cases- A Retrospective Study, *Journal Of Advanced Medical And Dental Sciences Research* |Vol. 5|Issue 2| February2017.
11. Escoffery CT, Shirley SE. Causes Of Sudden Natural Death In Jamaica: A medico-Legal Autopsy Study From University Hospital Of West Indies. *Forensic Sci. Int.* 2002;129(2):116-21.