Histopathological Analysis in Medicolegal Autopsies of 304 Cases - A Two Year Study at a Tertiary Care Centre

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ABSTRACT

BACKGROUND
Autopsies are great tools of learning for the pathologists. They shed light into the pathological processes that lead to the death of the person. This study was undertaken to determine the age and gender distribution of the deceased individuals according to the cause of death and compare the histopathological diagnosis with gross diagnosis.

METHODS
All 304 autopsy specimens received in histopathology lab for a period of 2 years were reviewed. Autopsy records, clinical case notes, gross specimens and histopathological slides were retrieved, wherever available. The results were analysed based on gross findings and histological examination. Histopathological findings were noted. Data was analysed using the SPSS (Statistical Package for the Social Sciences) software. Age and gender distribution, frequency of histological findings, causes of deaths and number of histological findings according to body systems were tabulated.

RESULTS
The present study showed that, 212 cases were males and 92 cases were females. Pathology of highest percentage of cases was detected in cardiovascular system (39.5%) followed by respiratory system (12.2%). Myocardial infarction was seen in 12.8% cases, pneumonia in 9.2%, cirrhosis of liver in 4.9%, coronary occlusion/narrowing in 10.5%, myocarditis in 11.5%, and pericarditis in 2%. Some of the other pathological findings noted were tuberculosis, burns, pancreatitis, meningitis, encephalitis, cardiomyopathy, gastric ulcer, gangrene intestine and sacrococcygeal teratoma.

CONCLUSIONS
Histopathological analysis has an important role in determining the cause of death. Co-existing morbidities and rare diseases may be diagnosed at the time of autopsy which was not diagnosed ante mortem.

KEYWORDS
Autopsy, Histopathology, Sudden Death

BACKGROUND

The autopsy has for long been regarded as the most important tool for retrospective quality assessment of clinical diagnoses as well as a key education tool. Findings from autopsy can enable the pathologist to alert the infection control unit of a hospital on possible nosocomial infections especially contagious infections; the pathologist can also identify a hereditary condition that would require genetic counselling.[1] Autopsy also provides accurate data for the determination of insurance benefits and workers compensation and the identification of environmental hazards. Findings at autopsy also generate vital statistics needed for research as well as the provision of materials for the teaching of anatomy, histology and pathology. Medico-legal investigation of death focuses on the establishment of the cause of death, the time and the circumstances of death.[2] The purpose of autopsy is to determine the manner and cause of death, confirm the clinical diagnosis, document unexpected findings and provide accurate vital statistics that are used to guide national policies in public health. Recently, because of the assumption that modern diagnostic imaging techniques can lead to accurate and complete clinical diagnosis, the autopsy is underutilized for discovering unexpected findings. This study is undertaken to know the utility of histopathology in the diagnosis of cause of death in medicolegal autopsies.

METHODS

All cases of autopsy specimens received in histopathology lab for a period of 2 years were reviewed. The autopsy records, clinical case notes, gross specimens and histopathological slides were retrieved, wherever available. Histopathological findings of the organs submitted were studied. Pathological findings which contributed to cause of death were noted. The results were analysed using SPSS (Statistical Package for the Social Sciences) based on gross findings and histological examination.

RESULTS

The present study consisted of a series of 304 autopsy cases conducted over a period of two years. Out of the total 304 cases, 212 (69.7%) were males and 92 (30.3%) were females [Table 1]. The majority (21.7%) of cases were between 41-50 years, constituting 66 of the total cases [Table 1]. Cardiovascular findings were the most common in histological findings which included mainly coronary arterial diseases, myocardial infarction, myocarditis, pericarditis and cardiac hypertrophy, which accounted for 39.5% (n= 120/304) of the case series [Table 2]. Myocardial infarction was seen in 12.8% cases, coronary artery occlusion/narrowing in 10.5% cases,

myocarditis in 11.5% cases and pericarditis in 2% cases. Cirrhosis liver was seen in 5.9% cases [Table 2]. Common findings in pulmonary system were mainly pneumonia, pulmonary edema and tuberculosis. Pneumonia was seen in 9.2% cases [Table 2]. Other cases were pulmonary embolism, lung fibrosis and bronchogenic cyst. A case of invasive aspergillosis was also noted. Some of the other pathological findings noted were tuberculosis, burns, pancreatitis, meningitis, encephalitis, cardiomyopathy, gastric ulcer, gangrene intestine and sacrococcygeal teratoma. Gross findings and histological diagnosis were compared and analysed for concordance and discordance. Gross diagnosis was found to have a sensitivity of 97.5% in cardiac lesions whereas in pulmonary lesions sensitivity of gross diagnoses was 67.2% [Table 2,3].

Age Group	Male	%	Female	%	Total	
					No.	%
0 - 10	9	4.2	14	15.2	23	7.6
11 - 20	7	3.3	7	7.6	14	4.4
21 - 30	33	15.6	11	12.0	44	14.5
31 - 40	37	17.5	22	23.9	59	19.4
41 - 50	52	24.5	14	15.2	66	21.7
51 - 60	28	13.2	8	8.7	36	11.8
61 - 70	29	13.7	9	9.8		
71 - 80	12	5.7	6	6.5	18	5.9
81 - 90	5	2.3	2	2.2	6	2.0
All	212	69.7	92	30.3	304	100

Table 1. Age and Gender Distribution of Cases with Histopathology Findings (N=304)

Organ	Histopathology		Gross Diagnosis		Sensitivity of GD
	No.	%	No.	%	%
Cardiac Findings					
Myocardial infarction	39	12.8	43	14.1	51.3
Myocarditis	35	11.5	17	5.6	22.9
Coronary artery disease	32	10.5	49	16.1	71.9
Pericarditis	6	2.0	5	1.6	33.3
Cardiac hypertrophy	8	2.6	3	1.0	12.5
Cardiac Total	120	39.5	117	38.5	97.5
Pulmonary Findings					
Pneumonia	28	9.2	36	11.8	64.3
Tuberculosis	5	1.6	12	3.9	100
Pulmonary oedema	4	1.3	7	2.3	50.0
Pulmonary Total	37	12.2	55	18.1	67.2
Liver Findings					
Cirrhosis	15	4.9	11	3.6	53.3
Renal Findings					
Renal failure	4	1.3	10	3.3	75.0
CNS	7	2.3	8	2.6	42.9
Non-specific	78	25.7	29	9.5	7.7
Others	43	14.1	74	24.3	81.4
All	304	100	304	100	

Table 2. Frequency of Histological Findings and Gross Diagnosis According to Body Systems (N=304)

x^2 = 15.4, P = 0.22, x^2 = 21.0, P = .05

DISCUSSION

From viewpoint of forensic medicine, sudden natural death (SND) is mainly defined as rapid, unexpected and natural death. The male predominance in the present study agrees with the observation of Roulson et al.[2] Mirza et al.[3] and Bora et al.[4] Although extra cardiac causes may be involved in this process, it is assumed that causes of SND are mainly related to cardiovascular events. Our results were similar to previous articles in that cardiovascular pathologies were the most common cause for SND, and frequency of

His HPD \ GD	MI	Myocarditis	CAD	Pericarditis	Cardiac Hypertrophy	Pneumonia	TB	P. Oedema	Cirrhosis	Renal Failure	SAH	NS	Other	Total (%)
MI	20 (51.3)	1 (2.6)	5 (12.8)	1 (2.6)	1 (2.6)	2 (5.1)	0	1 (2.6)	0	0	2 (5.1)	4 (10.3)	2 (5.1)	39 (12.8)
Myocarditis	5 (14.3)	8 (22.9)	5 (14.3)	0	0	3 (8.6)	0	0	0	0	0	8 (22.9)	6 (17.1)	35 (22.9)
CAD	2 (6.2)	0 (0)	23 (71.9)	0	1 (3.1)	0	0	0	1 (3.1)	0	0	3 (9.4)	2 (6.2)	32 (10.5)
Pericarditis	0	1 (16.7)	0	2 (33.3)	0	0	0	0	0	0	0	1 (16.7)	2 (33.3)	6 (2.0)
Cardiac Hypertrophy	3 (37.5)	1 (12.5)	0	0	1 (12.5)	0	0	0	0	0	0	1 (12.5)	2 (25.0)	8 (2.6)
Pneumonia	0	0	0	1 (3.6)	0	18 (64.3)	5 (17.9)	0	0	2 (7.1)	0	0	2 (7.1)	28 (9.2)
Tuberculosis	0	0	0	0	0	0	5 (100)	0	0	0	0	0	0	5 (1.6)
Pulmonary Oedema	0	0	0	0	0	0	0	2 (50)	0	0	0	0	2 (50)	4 (1.3)
Cirrhosis	1 (6.7)	1 (6.7)	1 (6.7)	1 (6.7)	0	2 (13.3)	0	0	8 (53.3)	0	0	1 (6.7)	0	15 (4.9)
Renal Failure	0	0	0	0	0	0	0	0	0	3 (75.0)	0	1 (25.0)	0	4 (1.3)
SAH	0	0	0	0	0	1 (14.3)	0	0	0	0	3 (42.9)	2 (28.6)	1 (14.3)	7 (2.3)
Non-Specific	8 (10.3)	5 (6.4)	15 (19.2)	0	0	10 (12.8)	2 (2.6)	3 (3.8)	2 (2.6)	4 (5.1)	3 (3.8)	6 (7.7)	20 (25.6)	78 (25.7)
Others	4 (9.3)	0	0	0	0	0	0	1 (2.3)	0	1 (2.3)	0	2 (2.3)	35 (81.4)	43 (14.1)
All	43	17	49	5	3	36	12	7	11	10	8	29	74	304 (100)
%	14.1	5.6	16.1	1.6	1.0	11.8	3.9	2.3	3.6	3.3	2.6	9.5	24.3	

Table 3. Histopathology versus Gross Diagnosis (N=304)

cardiovascular causes in our study was 39.5%.[5] Myocardial infarction due to atherosclerotic ischemic heart disease is probably the commonest diagnosis made in majority of sudden death cases subjected to medico legal autopsies.[5] In this study also myocardial infarction was the most common cardiovascular cause of death. A high sensitivity rate (71.9%) was found in diagnosing coronary arterial disease by gross diagnosis. But gross diagnosis of myocarditis and pericarditis showed the low sensitivity rates of 22.9% and 33.3% respectively. Discrepancies exist between gross diagnosis and histopathological evaluation in the cases of myocarditis, pericarditis and cardiac hypertrophy which is in conformity with the reports of Bora et al.,[4] Subramony[6] and Joshi C,[5] who observed that there are one or more discrepancies which accounted for 20 percent. Sudden deaths in young adults are mostly due to cardiac causes.[7] This highlights the relevance of histopathological analysis in autopsy cases to diagnose infections and inflammations. Most common pulmonary finding in our study was pneumonia (9.2%). Pulmonary tuberculosis showed a 100% sensitivity rate of gross diagnoses whereas gross diagnosis of pulmonary oedema showed a sensitivity rate of 50%. Table-2 shows that the frequency of cardiac, liver and CNS findings by histopathological evaluation are higher compared to the gross diagnoses. The sensitivity of diagnosis of myocarditis [22.9%], pericarditis [33.3%] and cardiac hypertrophy [12.5%] are significantly low by gross findings. These findings show that histopathology gives more conclusive results when compared to gross diagnosis. Histological analysis plays an important role on previously performed gross diagnosis at necropsy, especially in the lungs, liver, and kidneys.[8] Table 2 reveals that histopathological evaluation is essentially needed in the case of myocarditis, pericarditis and cardiac hypertrophy.

CONCLUSIONS

Autopsy is still the gold standard by which health care delivery can be measured and evaluated.[8] Autopsy is expected to give the answers for all unanswered questions at the completion of the autopsy.[6] Autopsy of sudden unexpected death is sometimes inconclusive even after

microscopy.[9] Meticulous autopsy and histopathological examination will help to minimize the risk of a negative autopsy.[10] Histopathology continues to be an important aid in determining the cause of death.

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