ISSN 2394–806X (Print), ISSN 2454-5139 (Electronic)
IJHRMLP, Vol: 06 No: 01, January, 2020
Printed in India
© 2020. All Rights Reserved.

ORIGINAL RESEARCH PAPER

Postmortem study of histopathological lesions of heart in sudden natural deaths brought to JNIMS, Imphal

Moirangthem BK[1], Angam G[2], Devi Reena[3], Gangmei Agatha[4], Laishram Suraj[5], Kamei Hellena[6]

Received on November 01, 2019; editorial approval on December 15, 2019

ABSTRACT

Introduction*: To study the histopathological lesions of heart in autopsy specimens, that plays a major role as cause of death in sudden natural deaths.* ***Materials and methods****: A retrospective study was carried out over a period of 5 years i.e from January 2014 to December 2018 in the Department of Forensic Medicine and Toxicology, JNIMS, Imphal. Total 1010 medicolegal autopsies were conducted during this period, out of which sudden natural death was seen in 51 cases. Among the 51 cases, 25 were of deaths due to cardiac cause.* ***Results****: This study included 25 cases of sudden cardiac deaths. Maximum number of cases was in the age group of 40-50 years. All the cases were males. Grossly, the average weight of heart was between 300-400 grams. Out of 25 cases, the most common cause of death is found to be Coronary insufficiency which constitute 64%, followed by Myocardial infarction (24%), myocarditis (8%) and cardiomyopathy (4%).* ***Conclusion****: Coronary atherosclerosis as the commonest pathological lesion was found and is the leading cause of death.*

Keywords*: Atherosclerosis; morphology; myocardial infarction; coronaries.*

INTRODUCTION

Death is said to be sudden or unexpected when a person not known to have been suffering from any dangerous diseases, injury or poisoning is found dead or dies within 24 hours after the onset of terminal illness (WHO).[1] Sudden death is an enigma which may occur due to cardiac or extra cardiac causes.[2] World health organisation has defined sudden death as death occurring within 24 hours from the onset of symptoms. It is reported that concordance between clinical and pathological cause of death are moderate and autopsy still provides a very important procedure for evaluating causes of death.[3]

Many a times it has been found that when gross pathology could not help to evaluate the cause of death, Histopathology can conclusively opine the involved cardiac pathology.

MATERIAL AND METHODS

The present study was carried out at the Department of Forensic Medicine and Toxicology, JNIMS, Porompat, Imphal, Manipur from September 2019 to November 2019. Datas were collected from the postmortem reports, of postmortem conducted in the mortuary of JNIMS from January 2014-December 2018 and were analysed. In the present study, 51 heart specimens were sent for histopathological examination. Out of which 25 cases showed pathological changes in the heart.

RESULTS

In the present study 25 cases were considered. Maximum number of cases presented between the age group 40-60 years. All the victims were male. Incidence of sudden death in rural population were more than urban with 17 (68%) and 8 (32%) cases respectively as shown in **Table 1**.

Address for correspondence:
[1]Associate Professor (**Corresponding author**)
Mobile: +919612184554
Email: baps1971nao@gmail.com
[2]Professor & HOD
[3-6]PG Trainee, Department of Forensic Medicine and Toxicology, JNIMS, Imphal, India

Cite this article as: *Moirangthem BK, Angam G, Devi Reena, Gangmei Agatha, Laishram Suraj, Kamei Hellena. Postmortem study of histopathological lesions of heart in sudden natural deaths brought to JNIMS, Imphal. Int J Health Res Medico Leg Prae 2020 January;6(1):41-44. DOI 10.31741/ijhrmlp.v6.i1.2020.8*

It was observed that in 52% of the total cases, victims died at their work place followed by the victim's house with 28%. As shown in **Table 2**.

In the present study, in gross finding, it was found that most of the heart weight ranged from 300-400 grams constituting 44%. Atherosclerotic plaque was found mostly in left anterior descending artery(36%). 1%-25% stenosis seen in 40%, 25%-50% stenosis seen in 4%, 50%-75% stenosis seen in 24% and 75%-100% seen in 32% as shown in **Table 3**.

Table No.4 showing the histopathological findings which shows atherosclerosis found to be the most common finding constituting 44% of the total cases followed by myocarditis (8%), atherosclerosis with myocardial infarction and myocardial hypertrophy with atherosclerosis constitute 8% each, 20% of the cases shows no specific findings as shown in the **Table 4**.

The cause of death is found to be the coronary insufficiency constituting 64% of the total cases, followed by myocardial infacrtion with 24%, myocarditis (8%) and cardiomyopathy (4%) as shown in **Table 5**.

Table 1 Socio demographic profile of victims

Category	Total	Percentage
Age		
Below 10 years	0	0
10-20 years	1	4
20-30 years	0	0
30-40 years	1	4
40-50 years	12	48
Above 50 years	11	44
	25	100
Gender		
Male	25	100
Female	0	0
	25	100
Area distribution		
Rural	17	68
Urban	8	32
	25	100

Table 2 Place of occurrence

Place of occurrence	Total	Percentage
Victim's house	7	28
Victim's work place	13	52
On the way	5	20
	25	100

Table 3 Gross findings

Weight of the heart		
Heart weight	**Total**	**Percentage**
300-400g	11	44
>400g	10	40
>500g	2	8
>600g	2	8
	25	100
Presence of Atherosclerotic Plaque		
Blood vessel involved	**Total**	**Percentage**
Left anterior descending artery	9	36
Left circumflex artery	2	8
Right coronary	1	4
Both	6	24
No findings	7	28
	25	100
Grades of Narrowing		
	Total	**Percentage**
1-25%	10	40
25-50%	1	4
50-75%	6	24
75-100%	8	32
	25	100

Table 4 Histopathological findings of heart (microscopic findings)

Findings	Total	Percentage
Atherosclerosis	11	44
Myocarditis	2	8
Atherosclerosis + Myocardial infarction	2	8
Atherosclerosis + Myocarditis	1	4
Findng of heart (Atherosclerosis + Myocardial hypertrophy	2	8
Myocarditis + Myocardial hypertrophy	1	4
Atherosclerosis + Myocardial Hypertrophy + Myocardial infarction	1	4
No specific findings	5	20
	25	100

Table 5 Cause of death

Findings	Total	Percentage
Coronary insufficiency	16	64
Myocardial infarction	6	24
Myocarditis	2	8
Cardiomyopathy	1	4
	25	100

DISCUSSION

Investigations in the cases of sudden death take an important place in forensic practice. The cardiac autopsy is important to study the pathological lesions in the heart. In this study, most of cardiovascular deaths occurred within age range of 41-60 years. Similar findings were reported by Joshi C[3], Karanfil R et al,[4] Stavroula A et al.[5] This shows that age is a powerful risk factor for heart disease. The development of atherosclerosis increases markedly with age up to an age of about 65.

In the present study, all the victims were males. This again emphasize that male is at greater risk for heart diseases as compared to females. The male dominance was reported by other authors Ozdemir B et al,Thomas AC et al, Shanti B et al, Farb A et al, Chugh SS et al.[6-10]

Community character of sudden death victims in the present study depicted that maximum victims were from rural area (68%) followed by urban (32%). The rural predominance could be due to absence of medical facilities, 1st aid or immediate treatment might not have been given in time as it takes lots of time to reach the hospitals. So large number of death cases are observed in the study. Whereas in Urban area, a good number of medical facilities are available due to the presence of highly advanced medical colleges and hospitals, where large number of experienced doctors are available, patient are given emergency treatment and medication if brought in time.

In our study, marital status of victims revealed that 88% were married followed by unmarried with 12% of total cases.

It was observed that in 52% of the total cases, victims died at their work place followed by the victim's house with 28%.

On gross examination, the average weight of heart as measured was found to be between 300-400 g which contributes 44% followed by more than 400 gram constituting 40%. Findings are consistent with the study done by Porwal V et al[11].On gross finding, three vessels involvement was seen in 24%. The most common involved vessel was Left anterior descending artery (36%) followed by left circumflex artery (8%) and right coronary artery (4%). Similar findings are observed in a study done by Porwar V et al.[11]

In the present study, 1-25% stenosis seen in 40%, 25-50% stenosis seen in 4%, 50-75% stenosis seen in 24% and 75-100% seen in 32%.

In comparison of histopathological findings in our study, coronary atherosclerosis was most common finding present in 44% cases. Similar findings were observed in Joshi C, Karanfil R et al, Stavroula A et al, Ozdemir B et al, Basso C et al, Drory Y et al, Corrado D et al.[3-6,12-14]

The next common lesion in present study was myocardial infarction and myocardial hypertrophy with atherosclerosis constituting 8% each. Similar incidence was reported by Basso C et al[12] and Wang HY et al.[15] Myocarditis was found in 8% of the total cases. Variable percentage of myocarditis has been reported by different authors Joshi C (9%)[3], Ozdemir B et al (7%)[6], Basso C et al (10%)[12], Drory Y et al(25%)[13] and Kramer Y et al (29%).[16] The cause of death was found to be coronary insufficiency which constitute 64%, followed by myocardial infarction with 24%.

CONCLUSION

Present study concluded that the most frequent lesion in the heart cases were atherosclerosis. Atherosclerosis was the main cause of myocardial infarctions and sudden death. In sudden deaths, cause of death can be determined by autopsy but routine autopsy procedure is not sufficient. So, in medico legal autopsies, especially for sudden death, it is proposed that every possible organ must be sampled for histopathological examination and must be examined with a multidisciplinary approach (scene investigation, medical history, biochemical, microbiological, toxicological etc) as it provide the most accurate clues to a better understanding of human cardiovascular diseases. The study highlight the need for employing preventive lifestyle modification strategies like stress reduction, healthy diet and regulate exercise especially in the young people. So to conclude, a detailed and meticulous post-mortem examination of whole heart is important to rule out the various aetiologies.

Conflict of interest: None.

Source of funding: None declared.

Contribution of authors: We declare that this work was done by the author(s) in this article and all liabilities pertaining to claims relating to the content of this article will be borne by the authors.

Ethical clearance: The study is carried out by collection of data from past records.

REFERENCES

1. Reddy KSN. The essentials of forensic medicine and toxicology. 33rd ed. India: Jaypee Brothers Medical Publishers; 2014. p. 150.
2. Nisha M, Bhawna S, Sumiti, Duhan Amrita, Singh Sunita, Sen Rajeev. Histomorphological spectrum of various cardiac changes in sudden death: an autopsy study. Iranian J of Pathology 2011;6(4):179-86.
3. Joshi C. Postmortem study of histopathological lesions of heart in cases of sudden death - An incidental findings. J Evid Based Med Health 2016;3(6):184-88.
4. Karanfil R, Gulmen MK, Hilal A. Evaluation of cardiac conduction system in sudden death cases. J For Med 2013;27(1):17-28.

5. Stavroula A Papadodima, Emmanouil I, Panagiotis S et al. Cardiovascular disease and drowning: Autopsy and laboratory findings. Hellenic J Cardiol 2007;48:198-205.
6. Ozdemir B, Celbis O, Onal R et al. Multiple organ pathologies underlying in sudden natural deaths. Medicine Science 2012;1(1):13-26.
7. Thomas AC, Knapman PA, Krikler DM, Davies MJ. Community study of the causes of natural sudden death. BMJ 1988 Dec 3;297(6661):1453-6.
8. Shanthi B, Saravanan S, Elangovan RS, Sudhan V. Sudden death causes: An autopsy study in Adults. Int J Sci Stud. 2016;4:176-9.
9. Farb A, Tang AL, Burke AP, Sessums L, Liang Y, Virmani R. Sudden coronary death: Frequency of active coronary lesions, inactive coronary lesions and myocardial infarction. Circulation 1995;92(7):1701-9.
10. Chugh SS, Kelly KL, Titus JL. Sudden cardiac death with apparently normal heart. Circulation 2000;102(6):649-54.
11. Porwal V, Khandelwal S, Jain D, Gupta S. Histological classification of atherosclerosis and correlation with ischemic heart disease. An autopsy based study. Ann of Pathol Lab Med 2016;3:99-104.
12. Basso C, Calabrese F, Corrado D et al. Postmortem diagnosis in sudden death victims: macroscopic, microscopic and molecular findings. Elsevier, Cardiovascular Research 2001;50:290-300.
13. Drory Y, Turetz Y, Hiss Y et al. Sudden unexpected death in persons less than 40 years of age. Am J Cardiol 1991;68:1388-92.
14. Corrado D, Basso C, Schiavon M et al. Screening for hypertrophic cardiomyopathy in young athletes. The New Engl J Med 1998;339:364-9.
15. Wang HY, Zhao H, Song LF. Pathological study of unexpected sudden death clustered in family or village in Yunnan province: report of 29 cases of autopsy. Zhonghua Yi Xue Za Zhi 2007;87(31):2209-14.
16. Kramer MR, Drory Y, Lev B. Sudden death in young Israeli soldiers: analysis of 83 cases. Isr J Med Sci 1989;25:620-4.