

Profile of deaths due to Rupture of the Heart - A Critical Analysis

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Abstract

Background: At the present time, there are conflicting factors that tend to alter the relative incidence of rupture of the heart. On one hand, with increased awareness and diagnostic facility in the recognition of acute myocardial infarction, one might expect the over-all incidence of rupture as well as other fatal complications to be reduced¹. On the other hand, because of the improved outlook for the acutely ill patient, shielded from fatal arrhythmias and cardiac standstill by pharmacologic or electrical stabilization, sustained in shock with vasopressors, and protected from thromboembolism by anticoagulants, the relative incidence of cardiac rupture among fatal cases might increase². In order to determine whether there is a notable change in incidence of rupture and to re-evaluate underlying factors, the consecutive autopsy study is done for the Year 2021. Among the total 2825 cases autopsied during the study period, 97 Cases (3.43 %) were deaths due to rupture of the heart. Maximum number of deaths were seen in the age group of 21-30 Years (21.64%) followed by 31-40 Years (17.52%). Maximum cases of death were seen in males (70.10%). Maximum cases of death were seen in morning hours (43.29%) followed by evening hours (32.98%). Maximum cases of death were seen in the month of December (18.55%) followed by January and July (13.40%). Maximum case died in house (85.56%) followed by work place (11.34%). Maximum cases of death were observed in Labours (37.11%) followed by IT Company Employees (34.02%) and House wife (15.46%). Left Ventricle was the predominant type of rupture (44.32%) followed by anterior wall (14.43%) and antero lateral wall (12.37%). In most of the cases there was no history of any Pre – Existing Diseases (55.67%).

Keywords: Rupture of the heart, Left Ventricle, IT Company, Labours.

Introduction

Death is said to be sudden or unexpected when a person not known to have been suffering from any dangerous disease, injury or poisoning is found dead or dies within 24hours after the onset of terminal illness. Natural death means that the death was caused entirely by the disease, and the trauma or poison did not play any part. Cardiovascular causes are most commonly responsible for this in about 45-50% cases and Acute Myocardial Infarction (AMI) is a leading entity.³ Haemo-pericardium due to ventricular free wall rupture (FWR) as an immediate complication (within 1 to 14 days) of acute myocardial infarction is a rare cause of sudden death. It is infrequent occurring in 2–6% of all infarctions, but having high mortality (20–30%). The pathophysiological process of FWR involves thinning of myocardial wall with the intensity of necrosis occurring at distal end of the vessel where there is often poor collateral flow. The shearing effect of myocardial contraction against a stiffened necrotic area causes rupture. Most common rupture location is on the anterior or lateral wall of left ventricle. A mid-ventricular position along apex-base axis is most

common.⁴ A careful dissection and observation during autopsy can detect such an unusual finding as the cause of death.

Aims & Objectives:

1. To know the predominant sex involved in heart rupture.
2. To know the most common age group involved in heart rupture.
3. To know about the most common time predominant in heart rupture.
4. To know the predominant month involved in heart rupture.
5. To know the predominant place of death.
6. To know the type of occupation involved.
7. To know the commonest site of rupture encountered.
8. To know the effects of any predominant diseases contributing to death.

Materials And Method

A prospective study of rupture of the heart for a period of (1) Year, from January 2021 to December 2021 was studied in the Department of Forensic Medicine & Toxicology, Government Kilpauk Medical College & Hospital, Chennai – 10. This study was conducted using a pre-tested structured proforma which fulfilled the inclusion and exclusion criteria, police inquest and perusal of hospital records.

Observations

Table 1: Age Wise Distribution

Age	Frequency	Percentage %
21-30	21	21.64
31-40	17	17.52
41-50	07	7.21
51-60	09	9.27
61-70	13	13.40
71-80	14	14.43
81-90	16	16.49
Total	97	100

Maximum number of deaths were seen in the age group of 21-30 Years (21.64%) followed by 31-40 Years (17.52%)

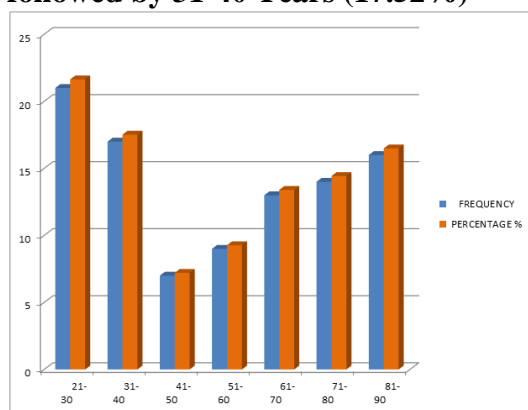


Figure 1

Table 2: Sex – Wise Distribution

Gender	Frequency	Percentage %
Male	68	70.10

Female	29	29.89
Total	97	100

Maximum cases of death were seen in males (70.10%)

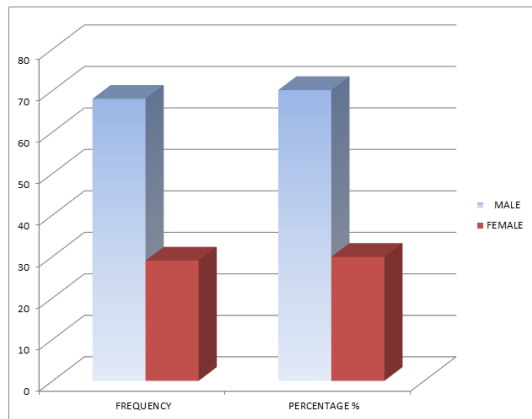


Figure 2

Table 3: Time of Death

Time	Frequency	Percentage %
Morning	42	43.29
Afternoon	23	23.71
Evening	32	32.98
Total	97	100

Maximum cases of death were seen in morning hours (43.29%) followed by evening hours (32.98%)

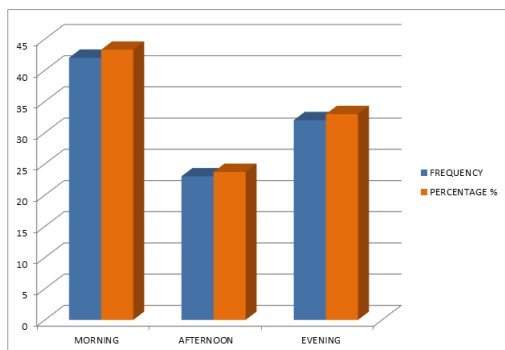


Figure 3

Table 4: Month of Death

Month	Frequency	Percentage %
January	13	13.40
February	04	4.12
March	0	0
April	03	3.09
May	09	9.27
June	09	9.27
July	13	13.40
August	07	7.21
September	08	8.24
October	08	8.24
November	05	5.15
December	18	18.55

Total	97	100
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Maximum cases of death were seen in the month of December (18.55%) followed by January and July (13.40%)

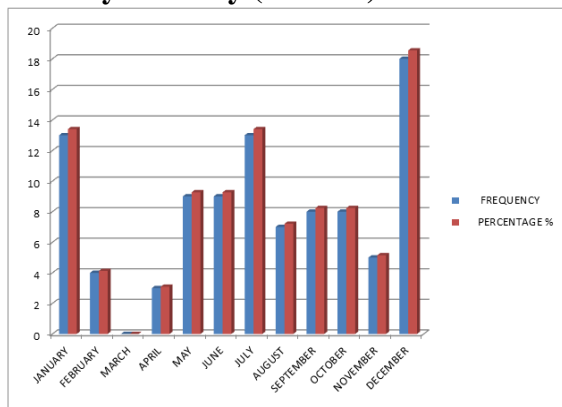


Figure 4

Table 5: Place of Death

Place	Frequency	Percentage %
House	83	85.56
Work Place	11	11.34
Others	03	3.09
Total	97	100

Maximum case died in house (85.56%) followed by work place (11.34%).

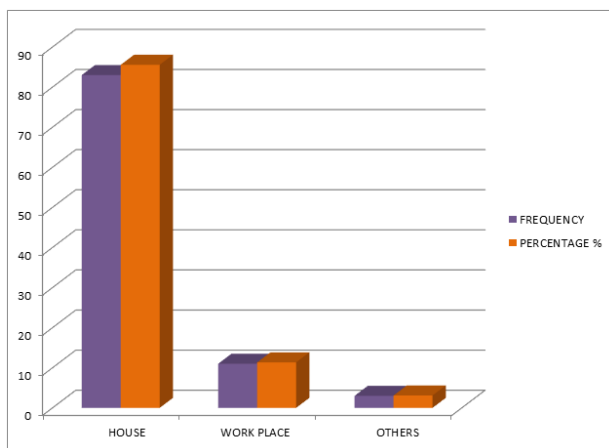


Figure 5

Table 6: Occupation

Occupation	Frequency	Percentage %
It Company	33	34.02
Labour	36	37.11
House Wife	15	15.46
Not Working	13	13.40
Total	97	100

Maximum cases of death were observed in Labours (37.11%) followed by IT Company Employees (34.02%) and House wife (15.46%)

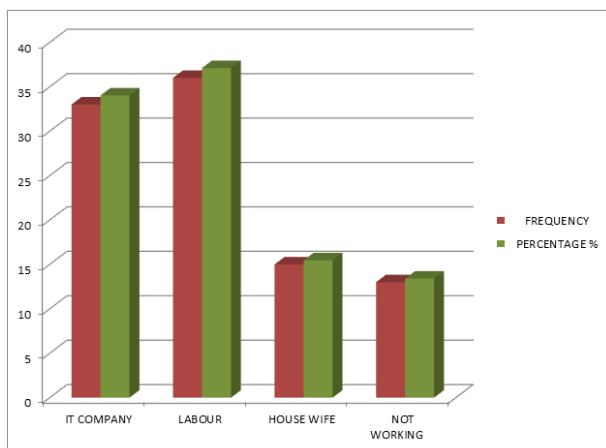


Figure 6

Table 7: Site of Rupture

Site Of Rupture	Frequency	Percentage %
Left Ventricle	43	44.32
Right Ventricle	11	11.34
Anterior Wall	14	14.43
Posterior Wall	01	1.03
Antero – Lateral Wall	12	12.37
Postero – Lateral Wall	03	3.09
Previous Mi	04	4.12
Left Ventricular Hypertrophy	09	9.27
Total	97	100

Left Ventricle was the predominant type of rupture (44.32%) followed by anterior wall (14.43%) and antero lateral wall (12.37%)

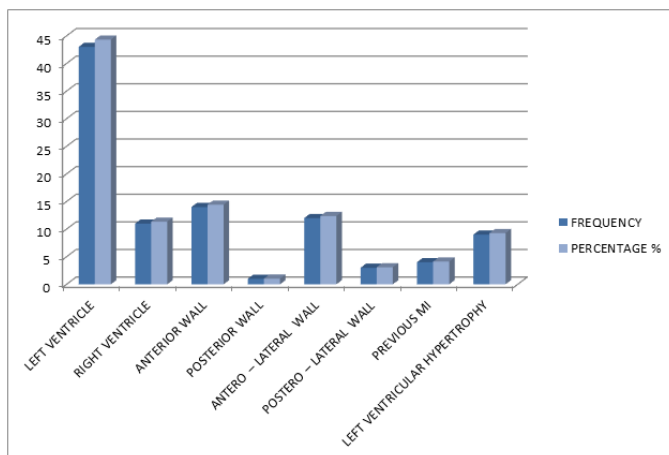


Figure 7

Table 8: Pre - Existing Diseases:

Pre – Existing Disease	Frequency	Percentage %
Yes	43	44.32
No	54	55.67
Total	97	100

In most of the cases there was no history of any Pre – Existing Diseases (55.67%).

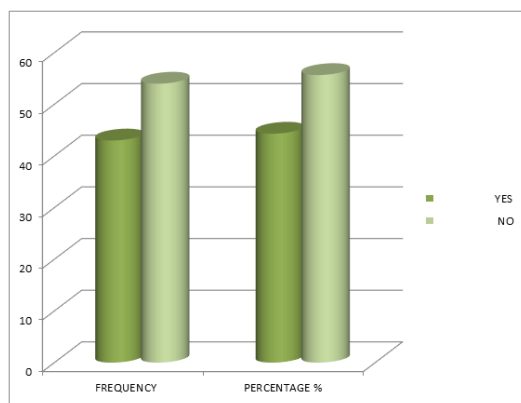


Figure 8

Discussion

Myocardial rupture is an early complication of AMI with bimodal peak of incidence (within 24 hours and 3-5 days), range being 1-14 days. It may present as ventricular free wall rupture, papillary muscle rupture or ventricular septal rupture.

Ruptured heart is the most common cause of hemo-pericardium and cardiac tamponade, the rupture always occurring through an infarct. The overall rate of mortality due to ischemic heart disease is known to increase progressively with age. First attack of AMI, h/o hypertension, no previous h/o angina pectoris and relatively large q wave infarct are associated with higher incidence of cardiac rupture⁵.

The traditional risk factors of LVFWR are older age, female sex, previous hypertension, and a first lateral or anterior-wall AMI. Clinical Presentation is sudden loss of consciousness, pulse and blood pressure. Myocardium continues to contract but forward flow is not maintained as blood escapes into pericardial cavity. Cardiac tamponade ensues and closed chest massage becomes ineffective though AMI is the commonest cause, sudden, but death due to LVFWR following AMI leading to hemopericardium is very rare. It is almost always fatal yet dramatic cases of pericardiocentesis followed by successful surgical repair have been reported⁶. Clinical Considerations Stress has been laid upon the advanced age of individuals developing cardiac rupture. In view of the pathologic characteristics of four series with cardiac rupture, it would seem that a sudden complete obstruction to flow in an area without adequately developed collateral circulation is the basic factor in producing the intense necrosis required for eventual rupture⁷. On the other hand, the fatal cases that failed to develop rupture are characterized not only by a high incidence of atherosclerotic narrowing and occlusion but also by the presence of one or more previous myocardial infarctions, which would tend to promote collateral circulation. Maximum number of deaths were seen in the age group of 21-30 Years (21.64%) followed by 31-40 Years (17.52%). This is similar to the study conducted by Gabriele AK, Maythem S, Charles BH et al. Maximum cases of death were seen in males (70.10%), this is similar to the study conducted by Bonello L, Theron A, Lambert M, et al. Maximum cases of death were seen in morning hours (43.29%) followed by evening hours (32.98%) this is similar to the study conducted by Davis N, Sistino JJ et al. Maximum cases of death were seen in the month of December (18.55%) followed by January and July (13.40%) this is similar to the study conducted by Yeo TC, Malouf JF, Oh JK, et al. Maximum case died in house (85.56%) followed by work place (11.34%) this is similar to the study conducted by Sharma D, Gupta P, Srivastava S, Jain H. Maximum cases of death were observed in Labours (37.11%) followed by IT Company Employees (34.02%) and House wife (15.46%) this is similar to the study conducted by Antman EM et al. Left Ventricle was the predominant type of rupture (44.32%) followed by anterior wall (14.43%) and antero lateral wall (12.37%) this is similar to the study conducted by Sharma D, Gupta P, Srivastava

S, Jain H. In most of the cases there was no history of any Pre – Existing Diseases (55.67%) this is similar to the study conducted by Bonello L, Theron A, Lambert M, et al.

Conclusion

Medico-legal autopsy is done in cases of sudden, suspicious and unnatural deaths. Though AMI is the most common cause of sudden death, yet ventricular free wall rupture as a complication of AMI is furthermore rare cause⁸. Detection of such rare finding may guide and help to take precautionary measures to save the life of individuals who have a history of AMI as these complications remain unnoticed and often ignored clinically. Therefore careful dissection and thorough examination during autopsy is the only key to success for finding the cause of death.

Recommendations

This study will enlighten the autopsy experts in identifying the cause of sudden death in middle aged people. The most common reason could be attributed to stress and life style adaptation. Extreme workout is also one of the precipitating cause for heart rupture.⁹ Old IHD, HTN, CVA/Stroke, antiplatelets drugs therapy remains to be contributory factors of cardiac ruptures, for which regular checkup and modification in lifestyle is mandatory.¹⁰

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