

KALP TAMPONADI: İSTANBUL'DA HEMOPERİKARDİUM KAYNAKLI ÖLÜMLER

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Olguların 87'si (% 74.36) erkek, 30'u (% 25.64) kadın olup, erkek olguların baskınlığı doğal ve travmatik kökenli tamponad gruplarının ikisinde de belirlenmiştir. Travmatik kökenli tamponad kaynaklı ölüm olgularında erkek baskınlığı daha belirgindir. Toplam 117 olgunun 69'unda (%58.97) hemoperikardium orijini doğal hastalık olup, 48 (% 41.01) olguda orijin travma olarak belirlenmiştir.

ÖZET

Amaç:

Perikard kesesi içine kanama kalp boşlukları ya da özellikle aort ve pulmoner arter gibi büyük damarların intraperikardial segmenti kaynaklıdır. Çoğu olguda hemoperikardium, rüptüre myokard enfarktı ya da rüptüre dissekan aort anevrizması gibi doğal hastalık kanama kaynağı olarak saptanmaktadır, fakat göğüs bölgesine yönelik travmanın sonucu olarak da tamponad sonucu ölümler otopsilerde tespit edilmektedir.

Yöntemler:

Adli Tıp Kurumu Morg İhtisas Dairesi'nin 2004-2006 yılları arasında kapsayan 3 yıllık döneme

ait otopsi kayıtlarının retrospektif analizinde kalp tamponadı kaynaklı toplam 117 ölüm olgusu saptanmıştır.

Bulgular:

Olguların 87'si (% 74.36) erkek, 30'u (% 25.64) kadın olup, erkek olguların baskınlığı doğal ve travmatik kökenli tamponad gruplarının ikisinde de belirlenmiştir. Travmatik kökenli tamponad kaynaklı ölüm olgularında erkek baskınlığı daha belirgindir. Toplam 117 olgunun 69'unda (%58.97) hemoperikardium orijini doğal hastalık olup, 48 (% 41.01) olguda orijin travma olarak belirlenmiştir. Tamponad olgularında rüptür lokalizasyonunun dağılımı incelendiğinde; doğal hastalık kaynaklı olgu-

larda en sık lokalizasyonun sol ventrikül (20; % 28.98) olduğu, travmatik olgularda ise sağ ventrikül olduğu belirlenmiştir (28; % 58.33). Perikard kesesi içinde kan volümü 350-1300 cc arasında değişim göstermiştir.

Sonuç:

Ateşli silah ve kesici-delici alet yaralanması kaynaklı ölüm olgularında hedef organda yaralanmaya neden olan yaraların lokalizasyonunun olguların % 79'unda göğüsün sol tarafı olduğu belirlenmiştir.

Anahtar Kelimeler: kalp tamponadı, hemoperikardium, künt travma, penetran travma, otopsi, myokard rüptürü.

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CARDIAC TAMPONADE: HEMOPERICARDIUM-RELATED FATALITIES IN ISTANBUL, TURKEY

Of the cases 87 (74.36 %) were males and 30 females (25.64 %). The preponderance of male cases was prominent in both natural and traumatic death cases but was significantly apparent in traumatic cases. The origin of the hemopericardium was natural disease in 69 (58.97 %) of total 117 cases. In 48 (41.01 %) cases it was resulted from trauma.

ABSTRACT

Objective:

Bleeding into the pericardial sac may occur from the surface or the cavities of the heart, or from the intrapericardial segments of the roots of great vessels, particularly the aorta and pulmonary artery. In most cases, the cause of hemopericardium is a natural disease such as a ruptured myocardial infarct or a ruptured dissecting aneurysm of the aorta but it is also a sequel to the trauma of the chest.

Methods:

Retrospective analysis of autopsy records of the Council of Forensic Medicine between the years

2004-2006 revealed 117 fatalities resulting from cardiac tamponade.

Results:

Of the cases 87 (74.36 %) were males and 30 females (25.64 %). The preponderance of male cases was prominent in both natural and traumatic death cases but was significantly apparent in traumatic cases. The origin of the hemopericardium was natural disease in 69 (58.97 %) of total 117 cases. In 48 (41.01 %) cases it was resulted from trauma. Localization of the rupture in tamponade cases showed the following distribution: the most frequent site of rupture in natural death cases was left ventricle (20; 28.98 %), in traumatic cases it was right ventricle (28; 58.33 %).

Volume of blood in pericardial sac ranged between 350 and 1300 cc.

Conclusion:

In cases of stab wounds and gunshot fatalities the localizations of the wounds leading to injury in target organs were detected to be at left side of the chest in 79 % of the cases.

Key words: cardiac tamponade, hemopericardium, blunt trauma, penetrating trauma, autopsy, myocardial rupture

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INTRODUCTION:

The pathophysiology of cardiac tamponade, as a cause of death, is related to an increase in intrapericardial fluid pressure that exceeds atrial venous pressures, and so impeding venous return to the heart (1). The normal volume of pericardial fluid (30 to 50 ml) creates a balance between production and reabsorption.

The causes of cardiac tamponade include active or passive pericardial effusion and haemopericardium resulting from trauma, iatrogenic intervention or rupture of an acute myocardial infarction, intrapericardial rupture of a dissecting ascending aortic aneurysm (1,2).

Post-acute myocardial infarction myocardial rupture includes ventricular free wall rupture, ventricular septal rupture or papillary muscle rupture. But, the lateral and inferior aspects of the left ventricle have been reported as equally susceptible to post-infarct rupture (3,4). In trauma cases if the bleeding rate exceeds the drainage rate or a clot closes the defect then sufficient amount of blood may accumulate in the pericardial sac to cause cardiac tamponade.

In penetrating trauma cases, bleeding can fill the pericardial sac as well as the pleural cavities and mediastinum. In

these cases either hemorrhagic shock without tamponade or cardiac tamponade alone results in death. Most of the patients die at the scene or after a short time period and only 6 %

of patients are reported to reach emergency service alive (5, 6).

In this study, we present a detailed analysis of hemopericardium-related fatalities detected in forensic autopsies carried out in Council of Forensic Medicine, Istanbul, Turkey between the years 2004 and 2006.

MATERIALS AND METHODS:

We retrospectively analyzed the autopsy records of the Council of Forensic Medicine, Istanbul, Turkey and selected cardiac tamponade cases between the years of 2004-2006. The Council of Forensic Medicine is the only official center for forensic autopsies and for this reason all suspicious deaths in Istanbul and its neighborhood are referred to the Council for forensic autopsy.

Retrospective analysis of autopsy records of the Council of Forensic Medicine between the years 2004-2006 revealed 117 fatalities resulting from cardiac tamponade. The autopsy files of these cases

together with findings of death scene examination were evaluated for the following parameters:

1. The gender and age of the cases.
2. The causes and the origin of the cardiac tamponade
3. Hospitalization history before death.
4. Volume of blood in the pericardial sac.
5. Site of the rupture
6. In stab wounds and wounds of firearms, range of wounds reaching to target organs.

RESULTS:

Retrospective analysis of autopsy records of the Council of Forensic Medicine between the years 2004-2006 revealed 117 fatalities resulting from cardiac tamponade. Of the cases 87 (74.36 %) were male and 30 female (25.64 %). The preponderance of male cases was prominent in both natural and traumatic death cases but was significantly apparent in traumatic cases. Most crowded age group was 41-50 in natural death cases, whereas 21-30 in traumatic cases (Table 1).

Table-1. Distribution of cases according to age groups and gender

AGE GROUPS	TRAUMATIC		NATURAL		TOTAL
	MALE	FEMALE	MALE	FEMALE	
0-10	1	1	0	1	3
11-20	7	1	1	1	10
21-30	10	1	4	5	20
31-40	9	3	3	3	18
41-50	8	1	17	1	27
51-60	3	2	13	4	22
61-70	1	0	5	4	10
71 and over	0	0	5	2	7
TOTAL	39	9	48	21	117

The origin of the hemopericardium was natural disease in 69 (58.97 %) of total 117 cases. In 48 (41.01 %) cases it was resulted from trauma. In total 48 traumatic deaths, stab

wounds were the reason of hemopericardium in 29 cases, gunshot wounds in 7 and gross bodily trauma in 12 cases. In natural deaths, rupture of intrapericardial branch of the

aorta was detected in 64 %, whereas myocardial rupture was the leading cause of tamponade in traumatic cases with a frequency of 69 % (Table 2).

Table-2. Distribution of cases according to target organs

TRAUMATIC	MYOCARDIAL RUPTURE	AORTIC RUPTURE	AORTIC AND MYOCARDIAL RUPTURE
Gross Bodily Trauma	6	4	2
Stab Wounds	22	4	3
Firearm Fatalities	5	2	0
NATURAL	25	44	0
TOTAL	56	54	5

Localization of the rupture in tamponade cases showed the following distribution: the most frequent site of rupture

in natural death cases was left ventricle (20; 28.98 %), in traumatic cases it was right ventricle (28; 58.33 %) (Table 3).

Volume of blood in pericardial sac ranged between 350 and 1300 cc and the mean volume was 572, 05 cc.

Table-3. Distribution of cases according to localization of rupture sites

	NATURAL	STAB WOUNDS	FIREARMS	GBT	TOTAL
Left ventricle	20	5	3	3	31
Right ventricle	0	15	2	1	18
Left atrium	0	0	0	0	0
Right atrium	0	2	0	0	2
Interventricular septum	5	0	0	2	7
Intrapericardial aorta	44	4	2	4	54
Left ventricle and aorta	0	3	0	2	5
TOTAL	69	29	7	12	117

In perforating trauma cases (stab wounds, gunshot wounds), in 22 of total 29 stab wounds- resulting fatalities there was single wound, two wounds in 6 cases and 5 wounds in 1 cases. Of total 39 wounds, there

was injury in target organs in 29 wounds. In all firearm fatalities there were single shots and all these wounds were found to result in injury in target organs. In cases of stab wounds and gunshot fatalities

the localizations of the wounds leading to injury in target organs were detected to be at left side of the chest in 79 % of the cases (Figure 1).

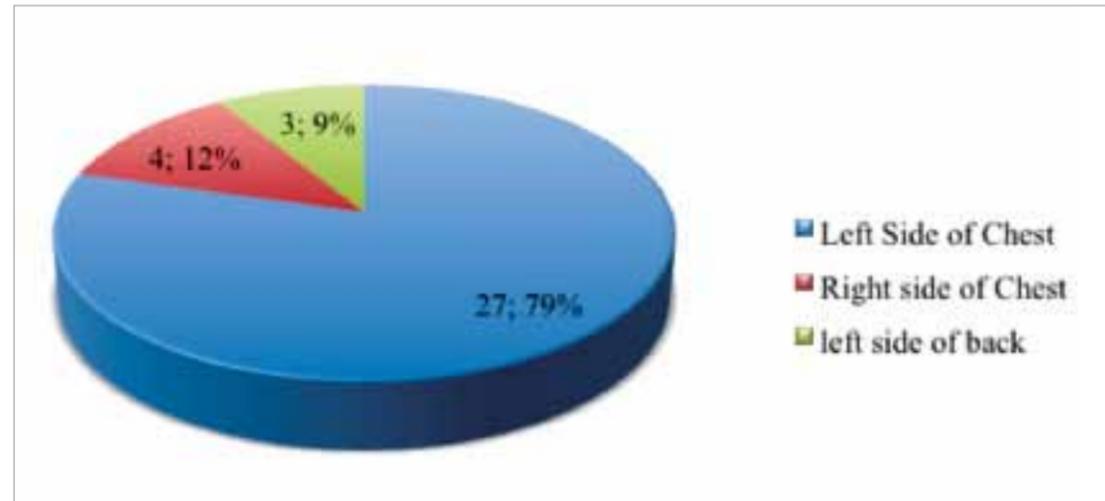


Figure-1. Localization of stab and firearm wounds on chest region

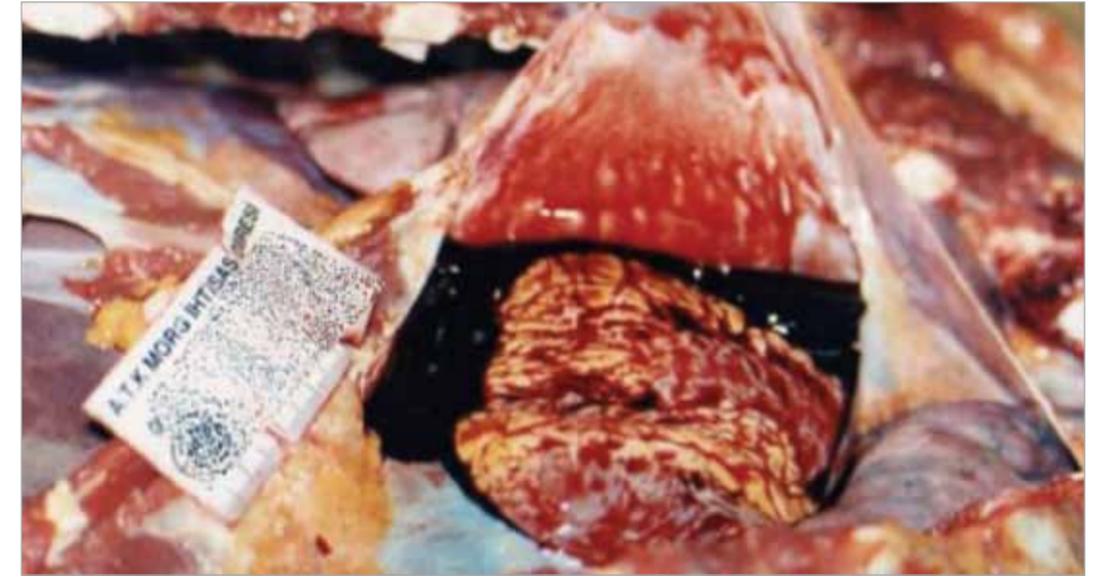


Figure-2. Cardiac tamponade resulting from aortic rupture due to blunt chest trauma

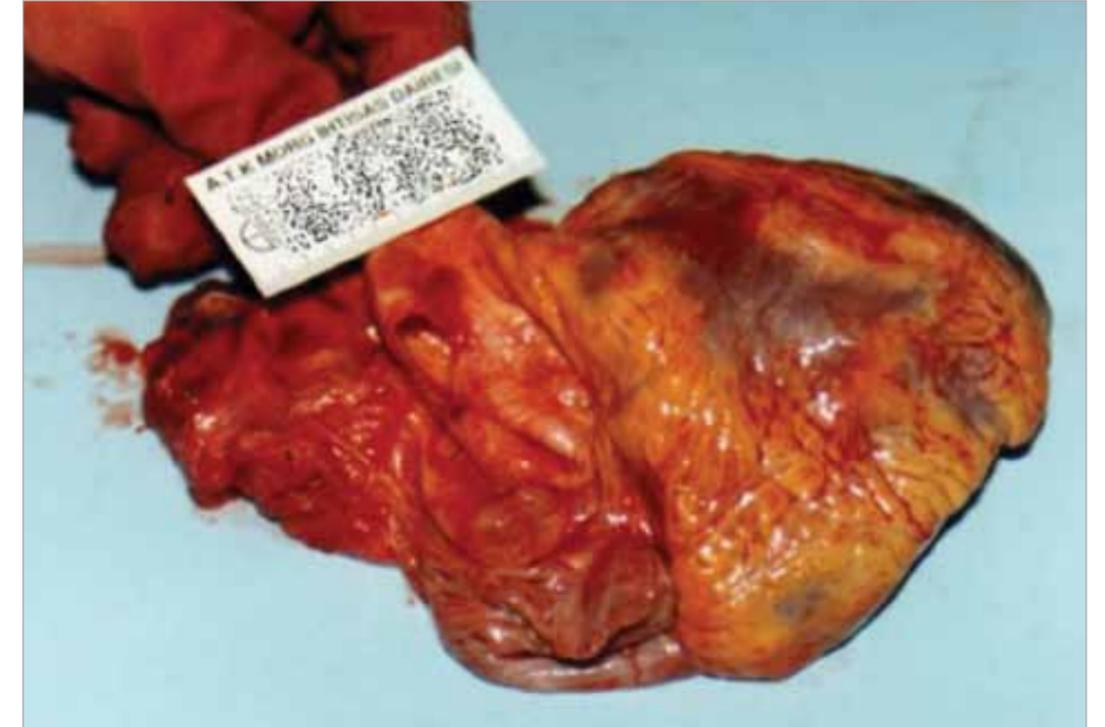


Figure-3. Aortic rupture due to blunt chest trauma

DISCUSSION:

Bleeding into the pericardial sac may occur from the surface or the cavities of the heart, or from the intrapericardial segments of the roots of great vessels, particularly the aorta and pulmonary artery. In most cases, the cause of hemoperikardium is a natural disease such as a ruptured myocardial infarct or a

incidence of males in criminal incidents.

Traumatic rupture of myocardial tissue and/or aorta is encountered in blunt chest trauma cases. Blunt chest trauma is reported to be present approximately in 1/3 of all road traffic accidents (8, 9). Acceleration/deceleration trauma, squeezing of heart between chest bone and vertebral

will determine the amount of blood in pericardial sac.

It is suggested that anatomic structure is one of the factors determining the injury in target organs in chest trauma (8). The surface of the heart exposed to the anterior chest wall consists of the right (55 %), left ventricular wall (20 %), the right atrial wall (10 %), the ascending

Bleeding into the pericardial sac may occur from the surface or the cavities of the heart, or from the intrapericardial segments of the roots of great vessels, particularly the aorta and pulmonary artery.

ruptured dissecting aneurysm of the aorta but it is also a sequel to the trauma to the chest. In these trauma cases if the bleeding rate exceeds the drainage rate or a clot closes the defect then sufficient amount of blood may accumulate in the pericardial sac to cause cardiac tamponade (6, 7).

In this study, in approximately 60 % of cardiac tamponade-related fatalities were detected to result from natural diseases and the source of bleeding was ascending branch of thoracic aorta approximately in 65 % of the cases.

The preponderance of male cases in this series was consistent with preponderance of male cases in general autopsy population in other studies. This figure is particularly significant in traumatic fatalities and attributed to the active role of males in social life and high

column, sudden increase in intrathoracic pressure are the mechanisms suggested for myocardial and aortic rupture (6, 10). Falling from a height on feet is an example for indirect trauma for rupture of these organs (5).

In penetrating / perforating traumas, stab wounds constitute the majority of cardiac tamponade-related fatalities (7). Being consistent to this fact, in this study we found 29 stab wound-related fatalities resulting in cardiac tamponade, whereas there were only 7 firearm fatalities.

It has been stated that about 400-500 ml of blood in pericardial sac was sufficient to cause death (5). In our series, volume of blood in pericardial sac ranged between 350 and 1300 cc. In perforating trauma cases, blood is also detected in pleural cavities and in these cases the rate of bleeding

aorta and pulmonary artery (10 %) and the venae cavae (5 %). For this reason, the position of right ventricle renders it more vulnerable to injury. In concordance with these findings, we also found higher frequencies of penetrating wounds involving the right and left ventricles in our study. The localization of wounds of penetrating trauma in our cases was detected to be left side of the chest in 79 % of the cases.

It is clear that the patients with perforating chest trauma will be referred to the emergency in a clinical picture of cardiac tamponade and for this reason, physicians in care of these patients (Specialists of Emergency Medicine and Emergency Surgeons) should be familiar with diagnostic and therapeutic procedures in handling of these cases for optimal evaluation of these patients having high mortality.

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