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BULLET EMBOLISM OF THE RIGHT EXTERNAL ILIAC ARTERY FOLLOWING CARDIAC GUNSHOT WOUND (A CASE REPORT)

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SUMMARY: Penetrating cardiac injury (PCI) frequently cause hemorrhage and cardiac tamponade. However peripheral embolization is very rare. In this manuscript one of the rare case of bullet embolism in the right external iliac artery, which occurred after cardiac gunshot wound is reported under the light of the literature.
Key Words: Cardiac gunshot wound, Arterial bullet embolism

CASE REPORT

A 46-year-old male patient was brought to the Emergency Department of Kartal Training and Research Hospital after being shot by a 9-mm caliber semiautomatic handgun. His arterial blood pressure was 60/30 mm Hg and heart rate was 130/min. There was a wound of entry in the right chest at the second intercostal space in the midaxillary line without a wound of exit. Breath sounds were diminished over the right chest. The right costophrenic sinus was closed in the plain chest roentgenogram and cardiac silhouette was normal (Figure1). In the abdominal roentgenogram there was a bullet on the middle of the iliac bone (Figure 2). The abdominal physical examination was normal. First we thought that the bullet had entered the chest and passed through the diaphragm to the abdominal cavity. Right tube thoracostomy was performed and 600 ml of hemorrhagic fluid was drained. At laparotomy we couldn't find any pathology in the abdominal cavity. Continuing the exploration we found that the bullet was in the right external iliac artery and the bullet was extracted by arteriotomy. By this time the central venous pressure was measured 20cm. H_2O a pericardiosynthesis was done which revealed non-clotting blood. A thoracotomy was performed with the diagnosis of cardiac tamponade. During the exploration there was no pathology in the lung parenchyma; however a bullet entry site on the pericardium and cardiac tamponade was seen. We opened the pericardium and saw a wound of entrance on the left auricle. Cardiac arrest progressed while we were repairing the defect on the left auricle. After internal cardiac massage and resuscitation, heart rhythm came back. During the operation, 9 units of whole blood, 2 units of fresh frozen plasma and 1000 ml colloid and 7000 ml crystalloid solutions were given. After two days in intensive care unit, the patient was transferred to the surgical ward. The patient died possibly after a sudden attack of a cerebrovascular event on the postoperative 3rd day. Autopsy permission could not be obtained.

Figure 1: Chest roentgenogram

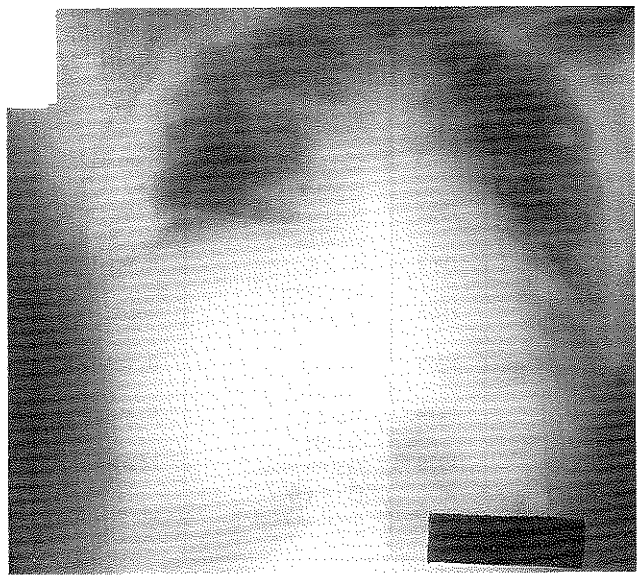

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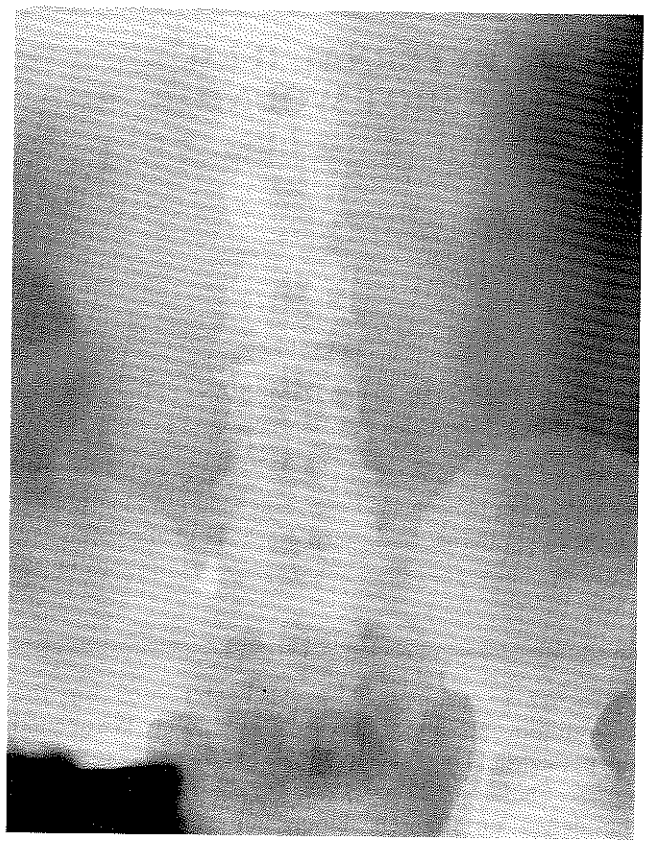
Figure 2: Abdominal roentgenogram: Bullet is being seen on the middle of the iliac bone.



DISCUSSION

As a result of the social and cultural changes in today's city life, the increase of the gunshot wounds is a truth of our lives today. Thoracic wounds are probably the most mortal injuries among the gunshot wounds. Unfortunately, many of cardiac injuries are instantly mortal or become so shortly thereafter. Over the last two decades, an evolving awareness has developed, since intentional or accidental trauma is the third most common cause of death for all age groups and the most common cause until the fourth decade of life (1).

Approximately 80% of patients with gunshot wounds to the heart die before hospital arrival (2)

Diagnosis of penetrating cardiac injury may be difficult. Frequently PCI is discovered at chest exploration for shock or tamponade. Up to one-third of patients, however, may present with normal vital signs (3). The absence of physical or imaging study does not reliably rule out PCI (4,5,6). Beck's triad, which includes distended veins, may not be present because these patients may lose significant blood volume, thus precluding venous distention. Central venous pressure measurements may not be elevated for the same reason. Echocardiography is helpful if there is evidence of pericardial fluid (5). Electrocardiography is also helpful in PCI and it shows bundle blocks or atrioventricular dissociation (7,8). In our case, at the beginning of the operation, there was no suspicion for a cardiac tamponade and 600 ml thoracic hemorrhagic fluid was not considered an indication for a thoracotomy. In addition, because of the

Table 1

Summary of Reported Cases

Date	Author	Entrance	Embolus Site	Embolectomy	Outcome
1917	Boeckel [9]	lt. ventricle	lt. femoral a.	Yes (İmmed.)	Survived, amp
1917	O'Neil [10]	lt. ventricle	lt. iliac a.	No	Died (5 days)
1919	Baumgartner [11]	lt. ventricle	rt. iliac a.	Yes (2 mo.)	Survied
1942	Griswold & Maguire [12]	lt. ventricle	rt. iliac a.	No	Survied
1948	Samson [13]	lt. ventricle	rt. iliac a.	Yes (uncertain)	Survied
1957	Neugebauer [14]	lt. ventricle	rt. brachial	No	Died (5 hours)
1957	Spencer & Kennedy [15]	lt. ventricle	rt. subclavian a.	Yes (22 days)	Survied
1961	Kinmonth *et al.* [16]	heart	rt. brachial.axil., int. carotid a.'s	No	Survied
1963	Salztein & Freeark	transseptal	rt. axillary a.	Yes (15 hours)	Survied
1964	Neerken & Clement	transseptal	rt. brachial.a.	Yes (immed.)	Survied
1965	Katz & Mackenzie [19]	lt. ventricle	rt. iliac a.	Yes (immed.)	Survied
1968	Trimble [20]	heart	rt. common carotid a.	Yes (9 days)	Survied
1969	Hardy& Timmis [21]	lt. ventricle	rt. brachial.a.	Yes (uncertain)	Survied
1974	Ward & Suzuki [22]	lt. atrium	lt. deep fem. a.	Yes (3 days)	Survied
1979	Mattox *et.al.* [23] (3 cases)	heart	uncertain	Uncertain	Uncertain
1980	Burihan *et.al.* [24]	uncertain	rt. subclavian a.	Yes (24 hours)	Survied

patient's very labile heamodynamic status, peripheral pulse examination was not reliable. This was the reason for doing the laparotomy first and doing right toracotomy instead of sternotomy or left toracotomy.

Embolization of bullets is an unusual entity. Many cases of arterial and venous bullet embolism following thoracic gunshot wound were reported. In many of them, entrances into the circulation were through main vessels. Boeckel, in 1917, reported the first case of arterial bullet embolism caused by cardiac gunshot wound (9). Table 1 shows the documentation of reported cardiac gunshot wounds followed by arterial embolism (9-24)

It is obvious that the bullet must enter the left heart before going through the systemic circulation. The bullet embolism rates in the upper and lower half of the body are almost equal and it may also occur in the carotid arteries, although very rare (Table 1).

In our case the bullet was in the right external iliac artery and we performed the embolectomy immediately because we couldn't palpate the right lower limb pulses. Untreated emboli may cause ischemia and threaten the limb. Unless suspected, diagnosed and extracted, these emboli may ultimately result in limb loss (25).

One must remember the bullet embolism when he can not see the bullet on the chest X-ray. Cardiac tamponade must be considered and peripheral extremity examination should quickly be done in such cases.

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