

Cardio-arterial Bullet embolization; a dilemma to cardiac surgeon

Ashur Y. Oraha, Fitoon F. Yaldo, Fahmi H. Kakamad

ABSTRACT

Introduction: Cardio-arterial bullet embolization is an extremely rare presentation of penetrating chest trauma. The aim of this case report is to present and discuss a case of delayed cardio-arterial bullet embolization causing challenges in the management. **Case Report:** A 13-year-old girl presented with bullet injury in the chest, the inlet was from the left back, medial to the lower end of scapula without outlet. On admission, the patient was dyspneic, and tachycardic. Chest-X-ray and computed tomography showed left side hemopneumothorax, multiple rib fractures with a metallic shadow in the apex of the heart. Tube thoracostomy was inserted followed by echocardiography which showed the bullet in the left ventricle. Under general anesthesia, the pericardial sac was opened, the bullet was palpated for a moment but disappeared. Intraoperative chest-X-ray was done and the bullet could not be visualized. The patient was closed. In the next day, peripheral angiography showed the bullet in the left common iliac artery, the patient was admitted back to the operative room the bullet was extracted. **Conclusion:** Missile embolization is a rare and unique

phenomenon yet it requires special attention and thorough knowledge because it might lead to catastrophic sequels.

Keywords: Bullet, Chest trauma, Embolization, Ischemia

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INTRODUCTION

Peripheral arterial embolization as a result of projectile foreign bodies (FBs) is a very rare entity. In order for the bullet to become an embolus it requires a barely enough energy to traverse only one of the vessel walls to get its path into its lumen and hence the circulation leading to its transport from the entrance wound to either the pulmonary or systemic circulation till the point of arterial occlusion [1].

Embolization relies on several factors including the shape, weight of the projectile and the patient's condition being more vulnerable by hypotension and low flow during the time of the insult. The phenomenon of missile embolization occurs especially when the bullets have a small caliber and low velocity [2].

There are sporadic reports of both arterial and venous emboli. The arterial one ideally travels peripherally to an extremity and present with end organ or limb ischemia. Hence, operative intervention with embolectomy is usually implemented for arterial bullet emboli. Regarding

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venous emboli, they ideally migrate centrally to the pulmonary arteries or the heart, retrograde embolization has also been documented [3]. In the presence of patent foramen ovale, paradoxical emboli may develop when the FBs make its path to the right side of the heart through a peripheral and then to left side through the foramen. Such migrating missiles or FBs in general can yield a confusing and misleading picture to the physician assessing the trauma patients [2].

The aim of this report is to present and discuss a case of delayed cardio-arterial bullet embolization causing challenges in the management.

CASE REPORT

A 13-year-old girl presented to the emergency room after bullet injury to the chest, the inlet was from the left back, medial to the lower end of scapula without outlet. On admission, the patient was dyspneic, no active bleeding, tachycardic but with normal blood pressure.

Chest X-ray and computed tomography were performed which showed left side hemopneumothorax, multiple rib fractures with a metallic shadow in the apex of the heart (Figures 1 and 2). Tube thoracostomy was inserted with drainage of nearly 200 cc of blood, followed by echocardiography which showed the bullet in the left ventricle.

The patient was admitted to the theatre immediately, approached via median sternotomy, the pericardial sac was opened which was found to be full of blood. There were two areas of contusion, a small one in the posterior wall of the heart and a more intense one at the apex of the heart.

The bullet was palpated for a moment but suddenly the patient developed hypotension. Intraoperative transesophageal echocardiography performed, the anesthetist could see the bullet at the aortic valve for a moment and then disappeared. The patient hemodynamics became normal again.

Intraoperative chest X-ray was done and the bullet could not be visualized, assumptions done that the bullet migrated into the abdominal vessels. The patient was closed and transferred to the intensive care unit in which another abominopelvic X-ray was performed which showed the bullet sitting obliquely in the left lower abdomen (Figure 3).

In the next day, on examination, the pulses on the left lower limb were weaker than the right with ischemic signs, decision made to do peripheral angiography which showed the bullet in the left common iliac artery, the patient was admitted back to the operative room, through left lower abdominal curved incision, the bullet was extracted.

The patient's general condition was stabilized thereafter and discharged home.

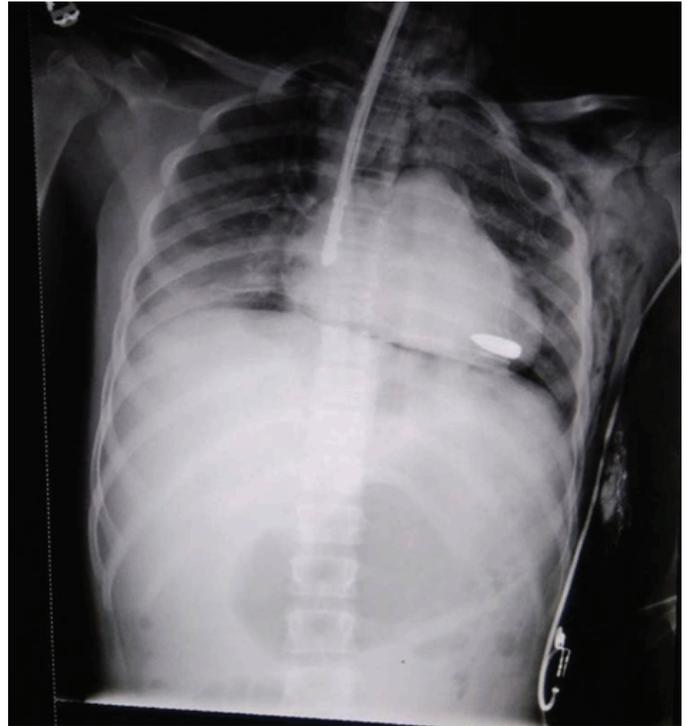


Figure 1: Plain chest X-ray showing bullet overlapping left cardiac shadow.



Figure 2: Plain abdominal and pelvic X-ray showing bullet at the left lower abdominal region.

DISCUSSION

In penetrating trauma, missile embolization being Intravascular or Intracardiac is considered as a unique phenomenon. Though reports in civilian trauma are not documented as to our knowledge, this event is crucial

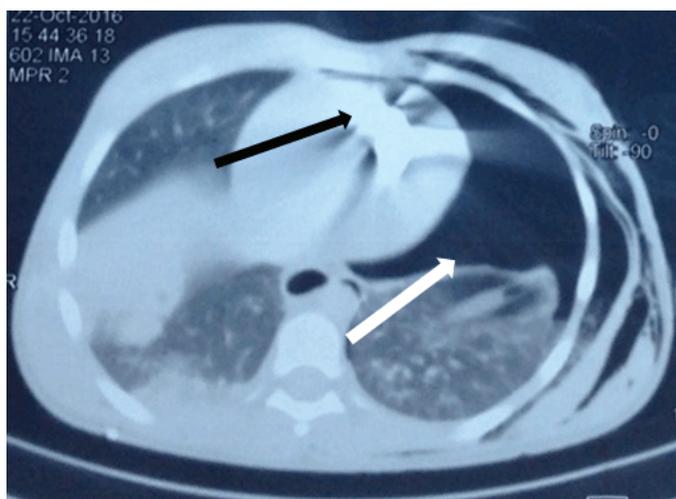


Figure 3: Computed tomography scan of the chest showing left side pneumothorax (white arrow) with metallic shadow at the region of left ventricle (black arrow).

enough to attract the awareness of the medical personnel who are involved in taking care of trauma patients [4, 5, 6]. In his literature review, Lu et al revealed 0.3% prevalence among 7,500 missile injured patients. A more recent report from combined operations in Afghanistan and Iraq of 346 soldiers with vessel injury found missile emboli in 1.1% [4].

The first embolization phenomenon was reported by Thomas Davis in 1834, when he reported a wood fragment embolization from the venous system to the right ventricle in a 10-year-old male patient. Since then multiple cases of FB embolization migrating to the pulmonary artery or right ventricle have been reported. The clinical presentations depend on the final destiny of the embolus. When the settled down conduits are arterial vessels, the patients are symptomatic in almost all cases while there is 70% chance of being symptomatic in venous system involvement [5].

The cardio or arterio-arterial type of embolization is a rare entity. In a review by Domingos de Moraes Filho et al there were only three cases reported with the primary site of the missile being the left ventricle, similar to the current case [1]. Preoperative determination of the projectile is very essential for its removal. Plain radiographs can demonstrate easily the presence of metallic objects in the body yet it is usually essential to have a second view for more definitive localization. Computed tomography scans have better spatial resolution for defining the course of the insulting object and identifying associated injuries [6].

There are some factors that have critical roles in the occurrence of this embolization including the size of the missile, kinetic energy and the proximity to the vessels. The energy of the missile should be enough to penetrate one wall of a vessel not sufficient to traverse the other [7].

There is no international consensus regarding management of cardiac and intracardiac FBs [2, 5]. However the treatment should be individualized and decision changes according to the cases; in symptomatic patients, surgical extraction is indicated regardless of the location. Floating or mobile FBs even in asymptomatic patients like ours, should be removed as well while asymptomatic cardiac or intracardiac FBs diagnosed long after the trauma which are usually embedded and immobile could be managed conservatively [2].

CONCLUSION

Missile embolization is a rare and unique phenomenon yet it requires special attention and thorough knowledge because it might lead to catastrophic sequels. Palpation and manipulation should be limited to minimal possible level.

REFERENCES

1. de Moraes Filho D, Schimit GTF, Tenório GOS, Sardinha WE, Silvestre JMS, Ramires ED. Peripheral arterial emboli due to bullet projectile: Diagnosis confirmed by vascular ultrasound. *J Vasc Bras* 2012;1(1):67–72.
2. Actis Dato GM, Arslanian A, Di Marzio P, Filosso PL, Ruffini E. Posttraumatic and iatrogenic foreign bodies in the heart: Report of fourteen cases and review of the literature. *J Thorac Cardiovasc Surg* 2003 Aug;126(2):408–14.
3. Duke E, Peterson AA, Erly WK. Migrating bullet: A case of a bullet embolism to the pulmonary artery with secondary pulmonary infarction after gunshot wound to the left globe. *J Emerg Trauma Shock* 2014 Jan;7(1):38–40.
4. Lu K, Gandhi S, Qureshi MA, Wright AS, Kantathut N, Noeller TP. Approach to management of intravascular missile emboli: Review of the literature and case report. *West J Emerg Med* 2015 Jul;16(4):489–96.
5. Alan Elison RM, Jose Antonio DE, Hector SM, Dolores LG, Francisco Xavier TG. Surgical management of late bullet embolization from the abdomen to the right ventricle: Case report. *Int J Surg Case Rep* 2017;39:317–20.
6. Kumar B, Badamali AK, Jayant A, Bhukal I, Puri GD. Intraoperative localization and monitoring of migrating foreign body using transesophageal echocardiography. *Ann Card Anaesth* 2014 Oct–Dec;17(4):314–7.
7. Stallings LA, Newell MA, Toschlog EA, Thomas CC, Kypson AP. Right ventricular bullet embolism: Diagnostic and therapeutic decisions. *Injury Extra* 2013;44(7):64–6.

Author Contributions

Ashur Y. Oraha – Substantial contributions to conception and design, Acquisition of data, Drafting the article, Final approval of the version to be published

Fitoon F. Yaldo – Substantial contributions to conception and design, Acquisition of data, Drafting the article, Final approval of the version to be published

Fahmi H. Kakamad – Substantial contributions to conception and design, Drafting the article, Revising it critically for important intellectual content, Final approval of the version to be published

Guarantor of Submission

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None

Consent Statement

Written informed consent was obtained from the patient for publication of this case report.

Conflict of Interest

Authors declare no conflict of interest.

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