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## CASE REPORT

# A Rare Case of a Bullet in Aorta

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### SUMMARY

We report a case of a young boy who sustained bullet injury to the right 3<sup>rd</sup> intercostal space in the mid clavicular line. The bullet embolized and lodged into the aorta, but the patient was asymptomatic hemodynamically. The bullet was retrieved from aortic bifurcation obstructing the left common iliac.

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### INTRODUCTION

Bullets and bullet fragments have been reported to embolize or migrate to various distant sites after entry into the body in literature as early 1834<sup>1</sup>. Shannon et al<sup>2</sup> reported that in 79% of missile emboli, the bullets were small caliber. These bullets then migrate, either by blood flow or by gravity in case of heavier bullets, to distant point. Mattox et al<sup>3</sup> reported two cases in which bullet embolized from the right heart into the IVC and subsequently lodged the renal vein and the hepatic vein. Vascular embolization to distant site from point of entry such as pulmonary artery<sup>4</sup> or peripheral arteries such as right axillary<sup>5</sup> and right external iliac artery<sup>6</sup> have been reported in literature<sup>7,8</sup>. Even one case of bullet traveling IVC up to the right Common iliac vein has also been reported<sup>9</sup>. We came across this unusual case of bullet entering the aorta and traveling up to the left common iliac completely obstructing distal flow which previously had never been reported up to date ( April 2008) according to the search results on MEDSCAPE and PUBMED.

### CASE REPORT

A twelve year old boy Salman Sabir, resident of Lahore presented in surgical emergency with 2 hour history of penetrating stray bullet in the right third intercostal space mid clavicular line [fig 1]. At presentation his only complaint was pain in right side of chest with mild difficulty in breathing. His pulse was 106 bpm, blood pressure was 110/70, respiratory rate was 18/min and temperature was 98.6F. I/V line was maintained immediately, crystalloids were started and baseline investigations along with blood for grouping and cross matching was sent as routine. On systemic examination patient

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was fully oriented in time and space with slightly decreased air entry on right side of the chest on auscultation. Cardiovascular system examination was unremarkable. Abdomen was soft and non tender. Whole body was exposed and fully explored for any wound of exit but only a 1x1cm wound of entry was seen in right third ICS, MAL.

Patient was taken to minor procedure room and chest intubation was done under local anesthesia. Initially 400-500ml of blood was drained into the chest tube bottle, which gradually decreased. Patient was taken for post intubation CXR [fig. 2] which showed no trace of bullet with in the chest cavity, no mediastinal widening, no fractured rib or any evidence of definitive haemothorax. X ray erect abdomen AP and lateral view [fig. 3] showed that the bullet was lying in front of L4 vertebrae.

Meanwhile baseline investigation reports were received which showed Hb of 11.3 g/dl, serum Amylase was 65 against normal of 100. Liver and renal function tests were with in normal range. USG of the abdomen showed no free fluid in the abdominal cavity and was normal. Through out this time the patient remained vitally and hemodynamically stable. CT abdomen and chest with contrast was planned. The bullet appeared in front of L4 vertebra near the vascular plane but no visceral or vascular injury was noted.

On the suspicion of injury to any viscera such as liver, duodenum and pancreas, it was planned to explore the patient immediately. Exploratory laprotomy was done. Abdomen was opened using midline incision. Right and left domes of diaphragm were explored for any rent but none was found. Liver and pancreas were also found to be normal. Duodenum was completely explored after Kocherization and was found to be normal. No pancreatic or hepatic injury was noted. Whole of the gut was explored and lifted to expose the retroperitoneal area.

The area in front of L3 and L4 were palpated along with the aorta. On exploration it came out as a surprise that the bullet seemed to be located inside the aorta. Initially the bullet seemed to be with in the

layers of aortic wall beneath the adventitia but upon giving a vertical incision above the bullet it was found that the bullet was lodged within the lumen of aorta at the bifurcation [fig. 5] into left common iliac artery, leading to obstruction of blood flow to distal left limb. The pulses in left leg were palpated pre-operatively and were impalpable. After carefully taking hold of the aorta and clamping the proximal and distal ends for 30 minutes. The bullet was retrieved through the vertical incision given [fig. 6]. Then we passed a Fogarty catheter into the left external iliac vessel to retrieve any embolus but nothing came out. All of a sudden distal pulses i.e. Dorsalis Pedis and posterior tibial of left side became clinically palpable. The incision in the aorta was closed with prolene 5/0 and packed with hot sponge for 10 minutes. After securing hemostasis a drain was placed in the pelvic region and abdomen was closed. The recovery of patient from GA occurred smoothly.

Next ECG and echocardiography of the patient was planned to rule out any cardiac insult. Once again to surprise the ECG was normal; echocardiography report was negative for any pericardial effusion with normal sized cardiac chambers, good biventricular function, normal valves, normal aortic arch and ejection fraction of 63%.

On the first post operative day the peripheral pulses of left side again disappeared clinically with swollen left calf but pulses were appreciated on Doppler, also the limb was warm with adequate capillary filling. The patient was taken again to Operation Theater for embolectomy and fasciotomy. Approximately 2 ml of thrombus [fig. 9] was retrieved on Fogarty embolectomy; as a result distal pulses were again clinically palpable.

To localize entry point of the bullet in the heart, ascending, arch and descending parts of aorta we carried out whole body CT angiogram. The report of CT angiogram [fig. 7] was normal, normal common iliac arteries of both sides but the left profunda femoris and anterior tibial arteries showed thrombotic occlusion [fig.8]. We took the patient again for Operation Theater for embolectomy and release fasciotomy. Approximately 2ml of thrombus [fig. 9] was retrieved on Fogarty embolectomy; as a result distal pulses were again clinically palpable.

On the sixth post operative day chest tube was removed. Throughout his stay patient remained vitally and hemodynamically stable, taking and tolerating oral diet.

## DISCUSSION

Bullet embolism is not an unfamiliar terminology in emergency units of big urban centers. Such injuries can either present with all the clinical features of hemodynamic shock or as in our case the patient can be maintaining his/her hemodynamic and vital status. In the later case to choose between a conservative mode of treatment over an active surgical intervention is still not well established due to the limited amount of study done in this regards. However Symbas and Harlaftis<sup>[10]</sup>, in their series of 10 cases, recommended removing all emboli. The potential of bullets lodged in the vascular system to embolize is the basis for recommended removal. Numerous reports of delayed embolization support the mandatory removal of intra vascular bullets<sup>11,12</sup>.

In a hemodynamically unstable patient we are not left with many options but to resuscitate and explore, but in cases where the patient is not under hemodynamic stress and maintaining the vitals, an effort should be made to locate the bullet's exact location and to determine if there are any associated injuries such as esophageal. Simple plain X ray chest

is very helpful in this regards as it can provide with ample information regarding any major cardiac or vascular injury (mediastinal widening) and also about the location of the bullet. ECG can demonstrate S-T and T wave changes. Other option is that of trans-thoracic and trans-esophageal echocardiography to see any cardiac wall motion and filling defects, valve function and presence of pericardial fluid or blood. Finally the Angiogram remains the gold standard for evaluating patients with suspected vascular injury. It can also help in sorting out patients who need intervention over those who can be spared.<sup>[13]</sup> In our case since the bullet was obviously causing its detrimental effects by blocking the left common iliac, surgical intervention was eminent.

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