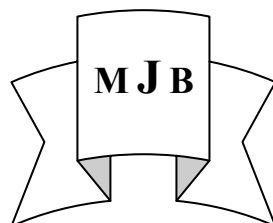


Bullet Embolisation: A Case Report

Hayder Sabeeh Nsaif

Dept.of Surgery, College of Medicine, University of Babylon, Hilla, Babylon, Iraq.



Case Report

Abstract

Background: In Iraq, Bullet injuries are one of the most surgical interests in emergency practice, especially nowadays. Many rarities and complications had been managed in a very restricted media of facilities and investigation tools.

Patient Presentation: A 30 years old male awakened from sleep at early morning complaining from sudden dyspnoea, hemoptysis and hematemesis. The patient was sleeping on the roof of his house exposed to the sky, which is a usual habit at Iraq at summer time.

After presentation, early emergency measures and admission, the patient developed right sided lower limb ischemia. Exploration of right femoral artery with removal of embolized bullet was done next day

Results : No residual chest complications with smooth postoperative period and the patient discharged from hospital improving with still paretic limb with sensory deficit .

After one month follow up, plantar flexors were improved with better sensory responses.

Conclusion: In serious presentations we should not accept simple explanations, ischemia is such a serious matter that should not wait investigative measures to start management.

الخلاصة

من الخطأ الاعتقاد بان الطلق الناري الذي أصاب الجسم من جانب واستقر في جانب آخر قد اتخذ مسارا مستقيما -دائما-. في مساره داخل الجسم، إذ في مجتمع يعاني من وفرة إصابات الطلق الناري (كمجتمعنا) فان الحالات نادرة الحدوث قد تحصل بشكل أكثر من المتوقع كما في هذه الحالة.

The Case

On early morning of 12 / 9 /2010, we were consulted to manage a case with query right leg ischemia, the case was a 30 years young male who was admitted one day ago because of sudden awakening from sleep at early morning complaining from sudden dyspnoea, hemoptysis and hematemesis. The patient was sleeping

on the roof of his house exposed to the sky, which is a usual habit at Iraq at summer time. the patient consulted our emergency department, and emergency baseline measures were achieved including:

* Careful clinical exam which revealed a small wound (bullet entrance?) just lateral to the lateral border of left scapula (fig-1), with no exit site.

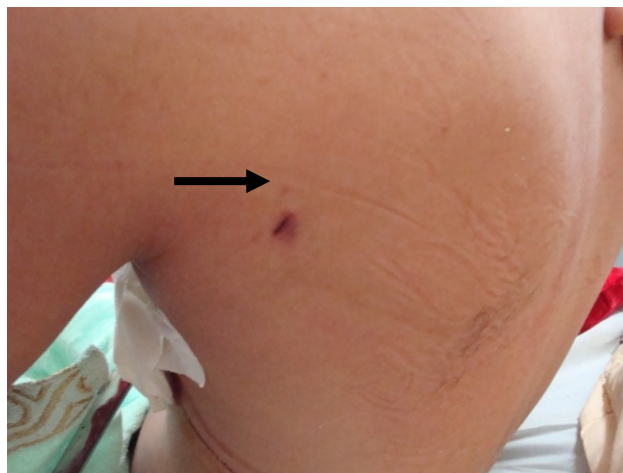


Figure 1

The patient was in pain but hemodynamically stable with both legs weakness which was attributed by doctors on call at that time that it was due to spinal injury caused by the bullet while passing from left to right side through, or near to, the spinal canal.

* CXR revealed a left sided traumatic hemopneumothorax; for which chest

tube was inserted, with no evidence for any metallic shadow.

* Emergency native CT scans was done to the chest, spine and abdomen revealing left sided hemopneumothorax and presence of metallic foreign body (bullet) at right inguinal area, with no evidence of trauma to the spine (Fig-2).

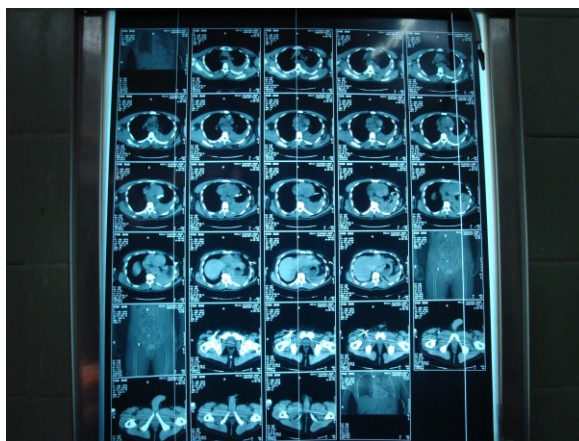


Figure 2

We started re-checking such patient upon consultation, chest drain was heavy but not to the extent that require exploration.

There were pain, numbness, paresthesia, and paresis at right leg,

with coldness, absent popliteal and foot pulses, but the femoral pulse was positive.

Neurological exam revealed diminished reflexes and Babinski sign was downward.

Left lower limb exam was normal from vascular and neurological points of view.

No Doppler study, nor angiographic study were available at that time, our decision was to explore the right femoral area because of ongoing ischemia due to high energy transfer injury to right femoral artery.

Management

We operated upon the case with right sided anteromedial thigh incision, expecting to find contused femoral artery segment with thrombus formation secondary to the bullet injury and it's energy transfer. and the early operative findings were consistent with such expectation since the artery was intact with obvious thrombus inside (arrowhead in fig-3) .

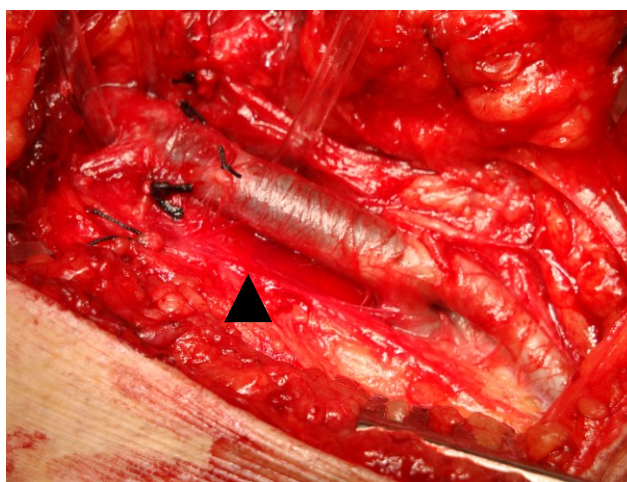


Figure 3

Before doing arteriotomy, we tried to palpate, and then to extract the bullet from nearby areas, but we failed even with extensive dissection, and by that time we remembered a similar case operated upon some years ago at other vascular center when a Fogarty catheter faced a hard object at CFA, which was an embolizing bullet!, so

we pass fingers over the distal end of the thrombus where we faced a hard, metallic object. We removed the object (the bullet) with the fresh propagating proximal thrombus through arteriotomy incision after control of the vessel proximally and distally and then lateral repair of the artery was done (Fig-4-7).

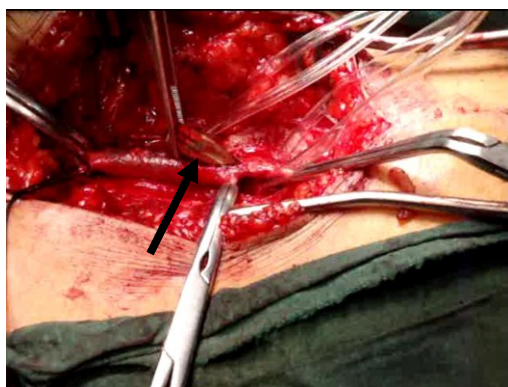


Figure 4

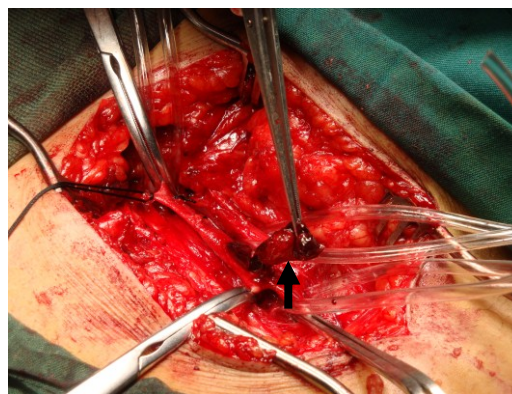
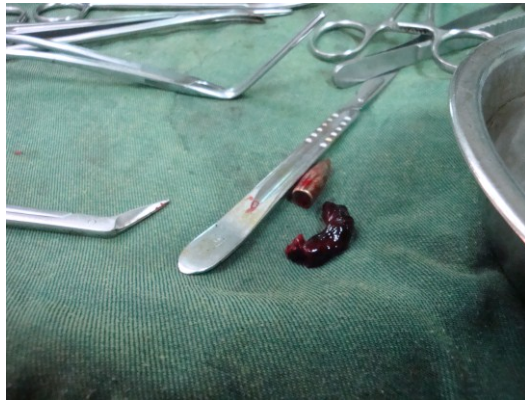


Figure 5

**Figure 6**

We admitted the patient to the RCU postoperatively because of severe dyspnoea, tachypnea, hypoxia (SPO2 92%) and limited left sided chest expansion, we kept him on continuous mask ventilation, heavy antibiotics., and bronchodilators, this regimen was continued for the next five days in the RCU, and the following other five days in the ward.

Next day in the RCU, the right foot pulses were positive, but the leg was still weak, hypotonic, hyporeflexive and swollen. Nerve conduction study was done prior to discharge and revealed injury to the tibial and peroneal nerves. Chest tube removed and the patient discharged improving and referred to physiotherapy with arrangement for elective catheterization study of thoracic vessels.

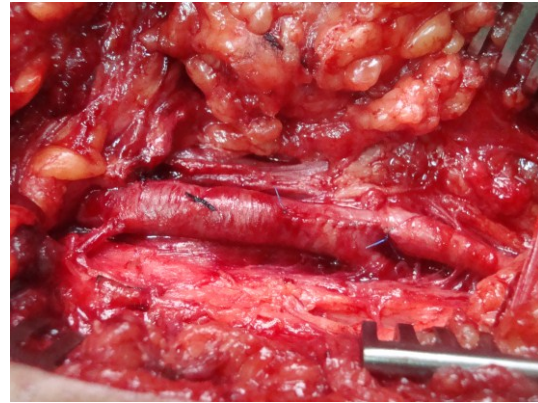
Follow Up

One month later, there were no residual chest complications, plantar flexors were improved (tibial n.), we continued on physiotherapy but the patient didn't consult us after that time.

Discussion

The case

Acute limb ischemia is a clinical diagnosis. Patients complain of numbness and pain in the extremity progressing in severe cases to motor

**Figure 7**

loss and muscle rigidity. Examination reveals the absence of palpable pulses, and the location of the pulse deficit allows one to predict the site of arterial occlusion [1]. Diminished or absent jerks are most commonly due to lower motor neuron lesions[2]. The ischemic nature of our case complaints were so obvious at the time of our exam, which cannot be explained by spinal cord injury.

Neurologic manifestations of acute ischemia may predominate and masquerades as primary neurologic disorders. for example aortic saddle emboli may present primarily with the sudden onset of bilateral lower limb weakness and sensory loss, progressing rapidly to paraplegia[3]. This is the only acceptable explanation about first day both lower limbs weakness, which suggests, and explains that our bullet was saddling at first.

We decided to explore the femoral artery without any delay to perform unnecessary investigations because according to Rutherford criteria, our patient belong to class 2, the limbs are threatened and require revascularization for salvage[4].

It is well known that following penetrating trauma, temporary cavitation is caused by the transfer of kinetic energy from the projectile to adjacent tissue, which is followed by the formation of permanent cavity

caused by tissue displacement, this mechanism explains why vessels can be injured even without being in contact with the projectiles from firearm or bone fragments[5] , this is all what was in our mind on going to theatre and we didn't realize that a confusing trajectory of a missile or a missile that is not seen on the chest radiograph of a patient with gunshot wound to the chest may suggest distal vascular embolization[6].

The possible routes of entrance of the bullet to the vascular system are one of the following:

1. pulmonary veins.
2. Left atrium.
3. Left ventricle.
4. Thoracic aorta.

The site of injury to the chest wall and the lower limb embolisation greatly favors descending aortic entrance.

It is known that on impact, the bullet change its trajectory and its residual kinetic energy diminished, and given the way the blood runs into the thoracic aorta, it closed the very small hole[7]; but our bullet was of 7.62 mm. diameter high energy transfer type, and it is surprising that how such size wound in one of the above mentioned vital structures (aorta) can heal, or even pass the acute stage safely.

Management

The clinical outcome of an embolic event depends mainly on the size of the vessel involved, the degree of obstruction, and, most important, the amount of collateral blood flow. Following arterial obstruction by an embolus, three possible events may occur to aggravate ischemia. Of primary importance is propagation of thrombus[8] . All these are consistent with peroperative findings and can explain the deterioration of the condition from vascular point of view since our patient was young with poorly developed collaterals and

luckily there was only proximally propagated thrombus which was extracted safely (Fig.6).

Follow Up

Still tow problems need to be explained, the entrance site and possible pseudoaneurysm formation, and the reversibility of neurological deficits, both lost because of loss of patient follow up.

Conclusions

In serious presentations we should not accept simple explanations, ischemia is such a serious matter that should not wait investigative measures to start management.

References

1. Karthikeshwar K, Kenneth O: Acute Limb Ischemia. Rutherford Vascular Surgery. 2005; 66: 959.
2. Brain P, Richard D, Richard C: The Nervous System. Macleod's Clinical Examination. 2009; 11:289.
3. Scott R. Fecteau, MD, R. Clement Darling III, MD, Sean P. Roddy, MD: Arterial Thromboembolism. Rutherford Vascular Surgery. 2005; 67: 978.
4. Anonymous: Suggested standards for reports dealing with lower extremity ischemia. Prepared by the Ad Hoc Committee on Reporting Standards, Society for Vascular Surgery\ North American Chapter, International Society for Cardiovascular Surgery. J Vasc Surg 4: 80-94, 1986.
5. Hoyt DB, Coimbra R: Trauma. In Greenfield LJ, Mulholland MW, Oldham KT, et al (eds): surgery: Scientific Principles and Practice, 3rd ed. Philadelphia, Lippincott Williams & Wilkins, 2001, pp 271-280.
6. Mattox KL, Beall AC Jr, Ennix CL, DeBakey ME: Intravascular migratory

bullets . Am J Surg 137: 192-195, 1979.

7. Renard A, Le Guen M, Bartou C, Langeron O, Carpentier JP. Aortic thrombi associated with thoracic

gunshot wound. Ann Fr Anesth Reanim 2009;28:976–979.[Medline]

8. Scott R. Fecteau, R. Clement Darling, Sean P. Roddy: Arterial Thromboembolism. Rutherford Vascular Surgery. 2005; 67: 974.