

Management of bullets lodged in the heart

Abordagem terapêutica dos projéteis retidos no coração

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Abstract

A 29-year-old man, having a firearm wound, with a missile lodged in the heart. He arrived at the hospital in hemodynamic stable condition. The transesophageal echocardiogram (TE) effectuated on the diagnosis and revealed on the missile location. After 18 days, he underwent an elective off-pump cardiac surgery for extract of a bullet from the right ventricle (RV) wall and interventricular septum (IVS), having an uneventful postoperative evolution. The authors discuss the therapeutic options to follow, based on data of related literature, concluding that some individualized asymptomatic patients with a missile embedded in the heart should undergo surgery to remove it.

Descriptors: Wounds, gunshot, surgery. Foreign bodies, surgery. Heart injuries. Heart septum, injuries, surgery. Heart ventricles, injuries, surgery.

Resumo

Paciente do sexo masculino, 29 anos, apresentando ferimento por arma de fogo, com projétil alojado no coração e que chegou ao hospital hemodinamicamente estável. O diagnóstico, evidenciando a localização da bala, foi feito pelo ecocardiograma transesofágico (ET). Após 18 dias, foi submetido à cirurgia eletiva, sem circulação extracorpórea (CEC), para retirada do projétil encravado em parede anterior do ventrículo direito (VD) e septo interventricular (SIV), com sucesso. Os autores discutem a conduta terapêutica para os projéteis retidos no coração, com base na literatura consultada, concluindo que a cirurgia para remoção dos mesmos pode ser indicada em pacientes assintomáticos individualizados.

Descritores: Ferimentos por arma de fogo, cirurgia. Corpos estranhos, cirurgia. Traumatismos cardíacos. Septo cardíaco, lesão, cirurgia. Ventriculos cardíacos, lesão, cirurgia.

Work performed in the Hospital do Servidor Público Estadual, Francisco Morato de Oliveira (HSPE)

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INTRODUCTION

Heart injuries by gunshots are more frequent nowadays, due to the increase in violence in big urban centers. The pre-hospitalization mortality rate is normally high and can reach 50%. Victims that manage to arrive in the emergency department almost always need immediate resuscitation and thoracotomy. Some survivors can remain with projectiles embedded in the heart. The treatment of these patients has been the subject of discussion and controversy and the best conduct has not been well-established yet [1].

CASE REPORT

G.P.N, a 29-year-old male Caucasian patient, was admitted to the emergency department of HSPE, referred from another hospital due to a gunshot wound. The bullet passed through his right arm and penetrated the thorax. In the physical exam, he presented with an arterial pressure of 110 x 80 mmHg, a heart rate of 80 beats per minute, with a tubular drain in the right pleural cavity, signs of a fracture of the humerus, with absence of radial and ulnar pulses on the right side. Radiographies showed a supracondylar fracture of the right humerus, tubular drain in the pleural space on the same side and the presence of the projectile superimposed on the cardiovascular silhouette (Figure 1). In virtue of the presence of a right humeral artery lesion, the patient was submitted to emergency surgery for reconstruction using an autologous saphenous vein graft and simultaneously, surgery treatment of the fracture.

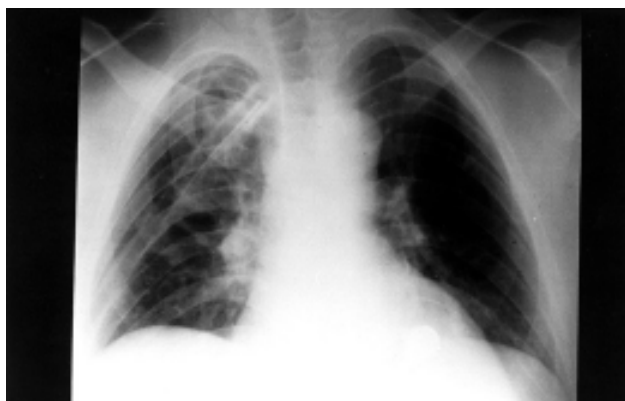


Fig. 1 – Chest radiograph showing the tubular drain in the right pleural space and the projectile located in the heart silhouette

He had a good post-operative evolution and after eleven days, a chest radiography showed an unaltered projectile position on the cardiovascular silhouette. The electrocardiogram continued normal, the transesophageal echocardiogram (TE) showed a slight pericardial effusion

and the image of a metallic object located in the front wall of the right ventricle (RV) and interventricular septum (IVS) – Figure 2.



Fig. 2 - Transesophageal echocardiogram showing a slight pericardial effusion and the metal object in the right ventricle and the interventricular septum

After the 11th day, he was submitted to an exploration thoracotomy, by left antero-lateral incision, with drainage of the pericardial liquid, at which time the surgeon verified, by palpation, the presence of a bullet lodged in the RV anterior wall. The surgical team considered the possible risks of its removal without CPB and opted to perform the procedure at another time and transferred the patient to the Cardiovascular Surgery Department.

After seven days, he was submitted at another surgery using median sternotomy and a scar was found in the RV anterior wall near to the anterior interventricular coronary artery. An incision in this area allowed the caliber .38 bullet to be removed (Figure 3), from the interventricular septum. The incision was sutured with individual 4-0 polypropylene stitches, without the necessity of cardiopulmonary bypass. The patient evolved satisfactorily and the immediate and late post-operative periods were uneventful. The patient is still asymptomatic after six years of clinical follow up.

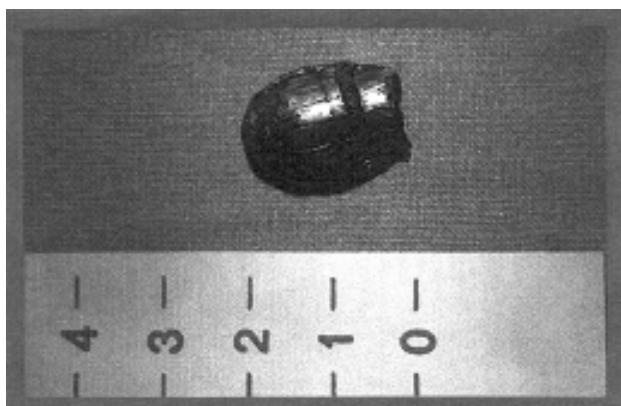


Fig. 3 - Caliber .38 bullet extracted from the right ventricle and the interventricular septum

COMMENTS

Projectiles retained in the heart can be partially or totally embedded in the myocardial or can be found free inside the heart chambers, pericardial cavity, or lodged by the side of the great vessels. They can also arrive in the heart through venous vascular injuries and remain free in the right heart chambers or stay embedded in the RV trabeculae.

The immediate manifestation of bleeding with a build up inside the pericardial sack or pleural space can be slight, as in the case present; however, symptoms of valvar insufficiency, communication defects between the heart chambers and disorders of electric stimulus conduction can occur immediately. Late manifestations include systemic or pulmonary embolization of the projectile, acute myocardial infarction, ventricular aneurism, endocarditis, pericarditis and cardiac neurosis. These complications are related to the type, size, form, localization of the projectile and its relationship to the heart muscle [1].

SYMBAS et al. [1] made a wide-ranging review of published cases, since World War II (1940 to 1988) and reported 201 patients with 222 projectiles retained in the heart (Group 1), together with their personal series of 24 patients (1968 to 1988) – (Group 2). In total, 114 projectiles were removed from the two groups. There were six deaths of patients in Group 1 who had intracavitary, intrapericardial or partially intramyocardial projectiles, the removal of which was not attempted or was unsuccessful. The authors concluded that large projectiles and intrapericardial projectiles and those partially embedded in the heart muscle should be removed and that the completely embedded projectiles in asymptomatic patients do not require intervention. However, complications have been reported in these cases, such as pericarditis, embolization, endocarditis and RV coronary fistulae.

WALES et al. [2] reported a case of a projectile retained in the RV and IVS, where the patient was submitted to surgery after four years due to cardiac arrhythmias and much anxiety. STOLF et al. [3] described their experience with two patients who presented with projectiles lodged in the IVS and were operated on under cardiopulmonary bypasses. Another question that should be mentioned is the possibility of saturnism. Many authors have reported the development of this complication in consequence of the permanence of lead projectiles in the organism over many years [4].

Although the patient remained asymptomatic, we decided to remove the projectile because of its localization in the IVS and the possibility of the aforementioned complications. [2,5]

CONCLUSION

The authors considered that the therapeutic conduct towards retained projectiles in the heart in asymptomatic patients, although this is a controversial subject, can be surgical in specific cases. These cases include those that involve large projectiles, intrapericardial projectiles or those partially embedded in the myocardium, with the aim of preventing possible complications. This conduct is motivated by the diagnostic precision obtained with computed tomography, angiocardiology and principally, pre-operative or intra-operative transesophageal echocardiography and by the low surgical risk, considering the possibilities that cardiovascular surgery offers nowadays, in the intra-operative management of the heart, in off-pump procedures and with the development of heart stabilizers [6].

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