References

1. Beneditt DG, Ferguson DW, Grubb BP, Kapoor WN, Kugler J, Lerman BB, et al. Tilt-table testing for assessing syncope. An American College of Cardiology expert consensus document. J Am Coll Cardiol 1996; 28: 263-75.
2. Brignole M, Menozzi C, Del Rosso A, Costa S, Gaggioli G, Bottoni N, et al. New classification of haemodynamics of vasovagal syncope: beyond the VASIS classification. Europace 2000; 2: 66-76.
3. Vardas PE, Auricchio A, Blanc JJ, Daubert JC, Drexler H, Ector H, et al. Guidelines for cardiac pacing and cardiac resynchronization therapy. The Task Force for Cardiac Pacing and Cardiac Resynchronization Therapy of the European Society of Cardiology. Eur Heart J 2007; 28: 2256-95.
4. Mathias CJ, Deguchi K, Bleasdale- Barr K, Smith S. Familial vasovagal syncope and pseudosyncope: observations in a case with both natural and adopted siblings. Clin Auton Res 2000; 10: 43-5.
5. Serletis A, Rose S, Sherldon AG, Sheldon RS. Vasovagal syncope in medical students and their first degree relatives. Eur Heart J 2006; 27: 1965-70.
6. Márquez MF, Urias KI, Hermosillo AG, Jardón JL, Iturralde P, Col´n L, et al. Familial vasovagal syncope. Europace 2005; 7: 472-4.
7. Connolly SJ, Sheldon R, Thorpe KE, Roberts RS, Ellenbogen KA, Wilkoff BL, et al. Pacemaker therapy for prevention of syncope in patients with recurrent severe vasovagal syncope: second vasovagal pacemaker study (VPS II). JAMA 2003; 289: 2224-9.
8. Raviele A, Giada F, Menozzi C, Speca G, Orazi S, Gasparini G, et al. The vasovagal syncope and pacing trial (Synpace). A randomized placebo-controlled study of permanent pacing for treatment of recurrent vasovagal syncope. Eur Heart J 2004; 25: 1741-8.
9. Sutton R, Brignole M, Menozzi C, Raviele A, Alboni P, Giani P, et al. Dual-chamber pacing in treatment of neurally-mediated tilt-positive cardioinhibitory syncope. Pacemaker versus no therapy: a multicentre randomized study. Circulation 2000; 102: 294-9.
10. Brignole M, Sutton R, Menozzi C, Garcia-Civera R, Moya A, Wieling W, et al. Lack of correlation between the responses to tilt testing and adenosine triphosphate test and the mechanism of spontaneous neurally-mediated syncope. Eur Heart J 2006; 27: 2232-9.

Ventricular septal diverticule and ventricular septal defect after penetrating cardiac trauma

Penetran kardiyak travmadan sonra gelişen ventriküler septal divertikül ve ventriküler septal defekt

F. Ayşenur Paç, Deniz N. Çağdaş

Section of Pediatric Cardiology, Yüksek İhtisas Education and Research Hospital, Ankara, Turkey

Introduction

Traumatic ventricular septal defects are rarely encountered. The incidence of ventricular septal defect (VSD) is about 4.5% among the cardiac traumas (1). We report a case of traumatic ventricular septal defect after a penetrating cardiac trauma causing pericardial tamponade and cardiac rupture.

Case Report

A 14-year-old boy was recalled to the emergency department because of a penetrating chest trauma due to stab in the 4th intercostal space. After 1 hour, he was admitted to the emergency service. Initial examination revealed dyspnea, tachycardia (125/min), and hypotension (60/30 mm Hg). Urgent echocardiographic examination revealed pericardial effusion and thrombus-like appearance in the pericardial space. The patient underwent surgery via a left anterior thoracotomy. A perforation was noted in the right ventricle, and a small amount of blood was seen in the pericardial cavity. The perforation was repaired with direct suture closure using Teflon pledgets. No other cardiac injury was noted at the time of that operation.

Several months after the operation, control physical examination revealed a new systolic murmur. By two-dimensional transthoracic echocardiography (TTE) a very small muscular ventricular septal defect was seen. So, cardiac catheterization and angiography were performed 5 months after the cardiac trauma. It revealed a saccular lesion at the upper interventricular septum, elonging to the right ventricle. Very little contrast media was crossing to the right ventricle from the centre of this lesion (Fig. 1).

The murmur of the ventricular septal defect was still present on physical examination one year after the trauma. Ventricular septal defect was also confirmed by echocardiography.

Discussion

Penetrating cardiac trauma in children is rarely reported in the literature. It is life-threatening and often requires urgent surgical intervention. It is not always limited to the free wall of the heart or the great arteries; it can cause damage in more than one of the cardiac structures. It may also involve the interventricular and interatrial septa, cardiac valves, coronary arteries, and conduction system (2). Traumatic injuries of heart reported before are atrioventricular valve insufficiency, aortic

Address for Correspondence/Yazışma Adresi: Prof. Dr. F. Ayşenur Paç, Yüksek İhtisas Education and Research Hospital, Section of Pediatric Cardiology, Ankara, Turkey Phone: +90 312 306 17 24 Fax: +90 312 312 41 20 E-mail: aysepac@gmail.com

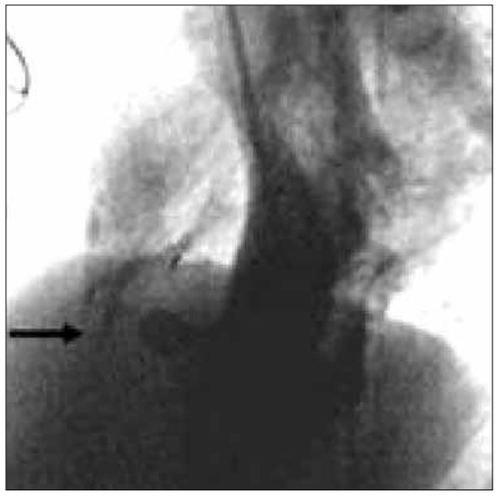

Figure 1. Left ventricle angiogram in the 60º lateral and 30º cranial projection. The posttraumatic ventricular septal defect was shown by left ventricular angiogram. A little contrast media crossed the ventricular septum from the centre of a saccular protrusion

insufficiency, VSD, atrial septal defect, coronary artery injury, hemopericardium, cardiac rupture and cardiac contusion (3, 4).

When cardiac trauma is suspected, echocardiography is useful preoperatively. It can provide both the anatomic details and the diagnosis, and guides the surgical approach (5, 6). But, echocardiographic examination may be time consuming in the traumas requiring urgent surgical approach. When there are thoracic injuries like pneumothorax, an adequate transthoracic examination can be technically impossible. Therefore all the cardiac structures effected in the trauma can not be detected at the beginning.

On the other hand, if more than one cardiac structure is involved in the injury, some of the damage may not be identified at the initial urgent operation.

Because of these difficulties, many of the cardiac lesions become clinically detectable only at a later stage, sometimes weeks or months later (7). Skoularigis and associates (8) reported the incidence of subsequently found intracardiac lesions in patients who had survived a penetrating cardiac injury to be 20.9% (9 of 43).

The patient presented here had a penetrating cardiac trauma consisting of more than one of the cardiac structures; pericardium, right ventricular free wall and the interventricular septum. Murmur heard 2 months after the urgent operation was the clue for additional traumatic lesion in the present patient. By detailed echocardiographic examination ventricular septal defect was found.

Ventricular septal defects can shrink or even spontaneously close with time (9). Hemodynamically insignificant, isolated VSDs with a low left-to-right shunt ratio can be followed up with echocardiography. Surgical repair should be performed for hemodynamically significant lesions. The shunt of the ventricular septal defect, which was from the centre of the saccular lesion at the upper interventricular septum, was very small that we decided to follow up the patient clinically. Matthews et al. (10) reported a case of ventricular septal defect and subvalvular aneurysms following blunt trauma to the chest. As far as we know, ventricular septal defect and a ventricular septal saccular lesion due to a penetrating chest trauma was not reported before.

Conclusion

Patients with the history of penetrating trauma to the heart should be followed-up. On the follow-up, new murmurs or persistent hemodynamic instability of the patient will raise a suspicion of an additional cardiac injury.

References

1. Pesenti-Rossi D, Godart F, Dubar A, Rey C. Transcatheter closure of traumatic ventricular septal defect: an alternative to surgery. Chest 2003; 123: 2144-5.
2. Genoni M, Jenni R, Turina M. Traumatic ventricular septal defect. Heart 1997; 78: 316-8.
3. Baum VC. Cardiac trauma in children. Paediatric Anaesthesia 2002; 12: 110-7.
4. Asensio JA, Stewart BM, Murray J, Fox AH, Falabella A, Gomez H, et al. Penetrating cardiac injuries. Surg Clin North Am 1996; 76: 685-724.
5. Goldberg SE, Parameswaran R, Nakhjavan FK, Ablaza SG. Echocardiographic diagnosis of traumatic ventricular septal defect. Am Heart J 1984; 108: 416-7.
6. Choo MH, Chia BL, Chia FK, Johan A. Penetrating cardiac injury evaluated by two-dimensional echocardiography. Am Heart J 1984; 108: 417-20.
7. Symbas PN. Residual or delayed lesions from penetrating cardiac wounds. Chest 1974; 66: 408-10.
8. Skoularigis J, Essop MR, Sareli P. Usefulness of transesophageal echocardiography in the early diagnosis of penetrating stab wounds to the heart. Am J Cardiol 1994; 73: 407-9.
9. Doty JR, Cameron DE, Elmaci T, Salomon NW. Penetrating trauma to the tricuspid valve and ventricular septum: delayed repair. Ann Thorac Surg 1999; 67: 252-3.
10. Matthews RV, French WJ, Criley JM. Chest trauma and subvalvular left ventricular aneurysms. Chest 1989; 95: 474-6.