Case report

Sharp incision of the anterior mitral leaflet due to penetrating trauma
Report of a case and long-term follow-up

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Abstract

A case is described of sharp incision of the anterior leaflet of the mitral valve, due to penetrating trauma to the chest with a knife. The lesion of the mitral leaflet was diagnosed with echocardiography and successfully repaired with autologous pericardial tissue. Follow up after 15 years showed normal mitral valve function. © 1998 Elsevier Science B.V.

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1. Introduction

Cardiac injury due to blunt or penetrating trauma to the chest is a well known entity. Involvement of cardiac valves is less common and is mostly present after blunt trauma to the chest. [1,2] We describe a case of a sharp incision of the anterior leaflet of the mitral valve due to penetrating trauma of the chest with a knife. The lesion of the mitral leaflet was diagnosed by echocardiography and successfully repaired with autologous pericardial tissue. During a follow-up of 15 years, the function of the mitral valve was well preserved. We believe this is the first report of a solitary sharp incision of the anterior mitral leaflet after penetrating trauma to the chest, which was repaired with autologous pericardial tissue with a long term follow-up of 15 years.

2. Case report

A 17 year old boy was admitted to general surgery in a local hospital after sustaining a stab wound in the left hemithorax with a knife (blade length, 11.5 cm; blade width, 1.3 cm.) The patient was brought in unconscious and no peripheral arterial blood pressure was measurable. By auscultation, the heart rate was 150 bpm and regular. A left thoracotomy was immediately performed on the boy; a perforation of the left ventricular anterior wall was successfully closed by direct suture. The postoperative course was uneventful, but a loud systolic murmur was heard at the apex of the heart. Without further investigation, the patient was discharged in good clinical condition. Ten months after surgery the patient was admitted to our department because of complaints of progressive dyspnea. Upon examination, the blood pressure was 115/90 mmHg and the heart rate regular, 100 bpm. On palpation, a systolic thrill was found precordial and at the apex. There was a grade V/VI holosystolic murmur at the apex. The electrocardiogram showed increased voltages of the left atrium and left ventricle. Plain chest X-ray showed enlargement of the heart with slight congestion of the pulmonary vasculature. Transthoracic echocardiography revealed that both the left atrium and the left ventricle were enlarged. In the long-axis view, an interruption in the anterior mitral leaflet was seen during
Fig. 1. Anterior view of the left ventricle of the heart showing the pathway of the knife. AML, anterior mitral leaflet.

systole; this was confirmed by the short axis-view of the left ventricular outflow tract. At cardiac catheterization, equal pressures were measured on the right and left side of the heart. The wedge pressure was 30 mmHg. At cardiac surgery, through a median sternotomy and with standard cardiopulmonary bypass, a sharp 12 mm long incision was found in the anterior mitral leaflet. Surprisingly, the knife had not damaged the chordae and papillary muscles (Fig. 1). A small patch of autologous pericardium was sutured to the edges of the incision in the anterior leaflet of the mitral valve with Prolene 6-0 (Ethicon, Norderstedt, Germany). Echocardiography after repair revealed thickening of the anterior leaflet of the mitral valve caused by the pericardial patch. Mitral regurgitation was no longer present. The postoperative period was uneventful. The patient was discharged in good clinical condition. After 15 years, in May 1997, the patient remains clinically well and is asymptomatic. Echocardiography shows thickening of the anterior leaflet of the mitral valve at the side of the pericardial patch, however, with a very flexible aspect (Fig. 2). No mitral regurgitation is present.

3. Discussion

A total of 10% of the victims of penetrating chest trauma have cardiac injuries [2]. The first successful repair of a penetrating cardiac wound was completed by Rehn in 1896 [3]. Penetrating cardiac wounds are often lethal and most of the patients die before admission to a hospital. The involvement of cardiac valves...
in penetrating trauma of the heart, as presented in our case, is very rare [1,2,4,5]. Only three cases were reported in literature with injury of the anterior mitral leaflet due to penetrating trauma, but without any information on the long-term outcome [1,4,5]. In our patient initially, primary closure of the perforation of the left ventricular wall was performed. The appearance of a loud systolic murmur after the first operation might have indicated additional cardiac pathology. It is obvious that the main reason for missing the diagnosis of additional injury of other cardiac structures in an early stage was the failure to employ other diagnostic measures. In patients with penetrating cardiac trauma, involvement of intra-cardiac structures is often concomitant [4]. Therefore, we stress the importance of echocardiography in these patients in order to rule out concomitant intra-cardiac injuries. This case history clearly demonstrates that surgical repair of the anterior mitral leaflet with autologous pericardial tissue, as performed in our case, is well-tolerated. Follow-up at 15 years showed a good functioning flexible mitral valve without any regurgitation. In summary, patients with penetrating cardiac trauma often have concomitant intra-cardiac injuries and therefore, further echocardiographic examination is necessary. Surgical repair of sharp incision of the anterior mitral leaflet with pericardial tissue as described in our case is well-tolerated.

References