

## Cardiac Stab Injury by a Bodkin

Mamoru Munakata, MD, Hiroyuki Itaya, MD, and Yuichi Ono, MD

**A 46-year-old male had a cardiac stab injury resulting in cardiac tamponade as a result of a suicide attempt using a bodkin, a sharply pointed instrument for making holes. The patient was transferred to our hospital about 12 hours after the injury. Pericardiotomy at the emergency operation revealed the penetration of the right ventricle and the hole was repaired following removal of the bodkin. Postoperative course was uneventful. (Ann Thorac Cardiovasc Surg 2006; 12: 365–7)**

**Key words:** cardiac injury, cardiac tamponade

### Introduction

A cardiac stab injury is life-threatening and requires urgent surgical treatment. In particular, cardiac tamponade can result in poor prognosis. We present a case of a male who had a cardiac stab injury caused by a bodkin with cardiac tamponade that successfully underwent repair of the right ventricle 13 hours after the injury.

### Case Report

A 46-year-old male attempted suicide by stabbing himself in the left chest wall using a bodkin, a sharply pointed instrument for making holes. He called the ambulance about 10 hours after the injury, leaving the bodkin in the 5<sup>th</sup> intercostal space. He was conscious and hemodynamics had not worsened at the time of admission to the hospital. However, computed tomography revealed cardiac tamponade with the bodkin sticking into the heart (Fig. 1). After the bodkin was fixed in place on the chest wall by tapes, so it would not be pulled out, the patient was transferred to our hospital on fluid therapy. Electrocardiogram showed no obvious ischaemic change and he-

moglobin was 12.5 g/dl. Although hypotension was not recognized before surgery, central venous pressure was very high (21 cmH<sub>2</sub>O). Packs of blood for transfusion were prepared prior to surgery and the surgery commenced an hour after the patient's arrival to hospital. When the pericardium was opened, a large amount of clotted blood was in the pericardial space and the central venous pressure dropped from 21 cmH<sub>2</sub>O to 7 cmH<sub>2</sub>O soon after removal of the clot. The bodkin was sticking into the right ventricle (RV) wall about 7 mm beside the left anterior descending artery. When the bodkin was pulled out, bleeding from the RV wall occurred and it was controlled by placement of a finger. The hole in the RV was closed by a Teflon-pledgetted 3-0 polypropylene suture (Fig. 2). Irrigation in the pericardial space was performed using 5 L saline. Debridement of the wound on the chest wall was performed by cutting tissue around the bodkin. Drains were placed in the pericardial and the anterior mediastinal spaces. The needle part of the bodkin was 7.5 cm (Fig. 3) and 6.5 cm was inserted from chest wall. Cefazolin sodium was administered until the 5<sup>th</sup> postoperative day. Postoperative course was uneventful and all cultures (pericardial effusion, stab wound and drainage tubes) were negative. Echocardiography showed neither intracardiac shunt nor valve problem. The patient was discharged at the 14<sup>th</sup> postoperative day.

### Discussion

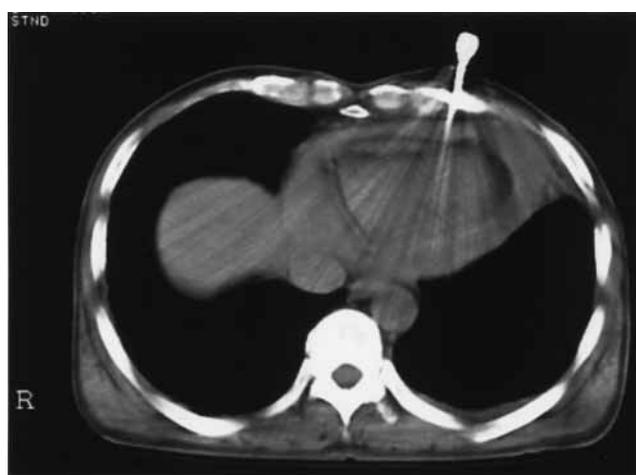
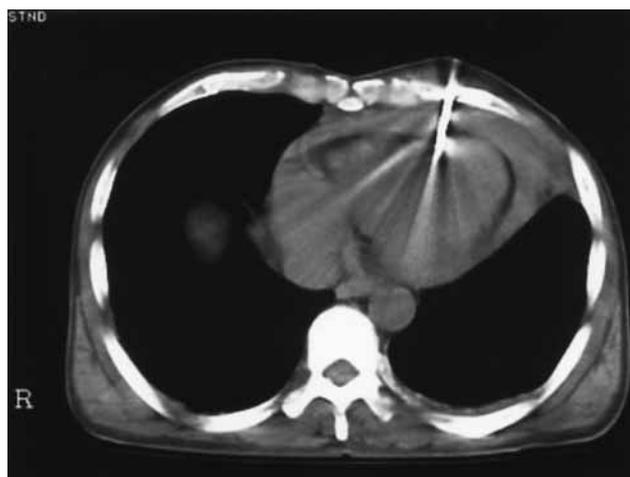
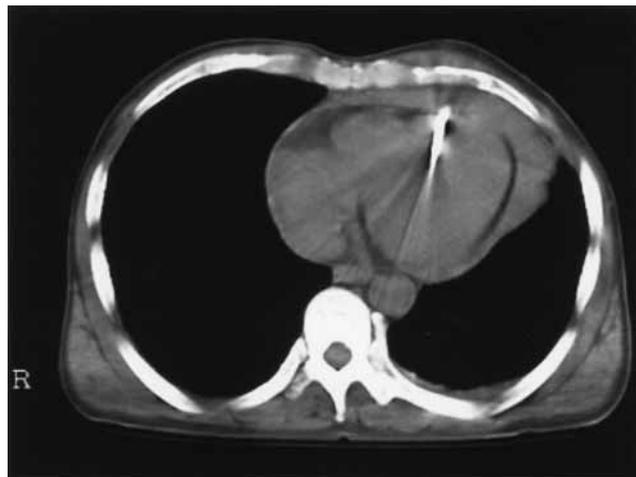
Penetrating cardiac injury by stab wound has had high

---

*From Department of Cardiovascular Surgery, Aomori Rosai Hospital, Hachinohe, Japan*

Received January 16, 2006; accepted for publication February 17, 2006.

Address reprint requests to Mamoru Munakata, MD: Department of Cardiovascular Surgery, Aomori Rosai Hospital, 1 Minamigaoka, Shirogane-machi, Hachinohe, Aomori 031–8551, Japan.



**Fig. 1.** Preoperative computed tomography revealed a bodkin in the cardiac chamber and pericardial effusion.

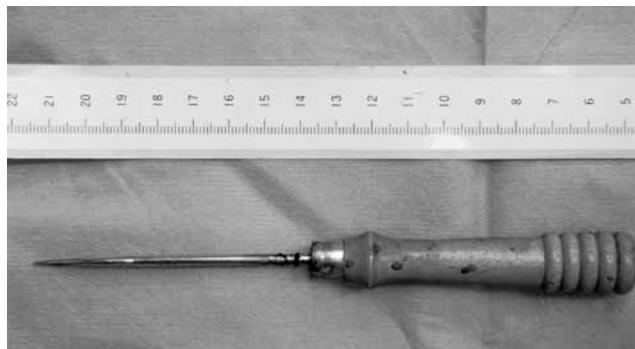
mortality ranging from 12 to 62%.<sup>1-8)</sup> Immediate treatment including emergency room thoracotomy is necessary to rescue those patients who have a cardiac stab injury. Rapid transfer of the patient to the hospital within 20–30 minutes is recommended to rescue them in some reports.<sup>2,3)</sup> However, this case was delayed for over 13 hours before undergoing the cardiorrhaphy. The main factors that allowed the patient to remain hemodynamically stable were that the patient did not pull out the bodkin himself. The medical staff in the previous hospital fixed the bodkin by taping it securely to the chest wall, so it could not be pulled out, and the bodkin was left in the chest wall until the patient had arrived in the operation room. The successful outcome in this case suggests why the instrument in a penetrating chest wall injury should not be removed until the pericardiotomy after median sternotomy or thoracotomy can be performed whenever there is a possibility of penetrating cardiac injury.

Cardiac tamponade is a critical factor and should be released as soon as possible to hemodynamically rescue a moribund patient. However, the tamponade may at times contribute to prolong the presence of vital signs. Moreno et al.<sup>2)</sup> reported improved survival in the presence of pericardial tamponade compared to the absence of it, but it is still controversial. Attar et al.<sup>3)</sup> subsequently denied that the presence of tamponade was a favorable prediction for survival, and Asensio et al.<sup>6)</sup> also denied it in a prospective study. Recently, Tyburski et al.<sup>7)</sup> reported a higher survival rate in patients with stab wound with tamponade in the study of 154 patients. The second factor contributing to survival in this case might be the tamponade resulted in temporal hemostasis with hemodynamic stability.

Infection is a potential risk factor after prolonged exposure time following a penetrating injury. Attar et al.<sup>3)</sup> reported 19.4% incidence of infection in patients who sur-



**Fig. 2.** Operative view. The cardiorrhaphy was performed.



**Fig. 3.** The bodkin.

vived after penetrating cardiac injury. The patient in this report was protected from infection by persistent irrigation and debridement of the wound on the chest wall in the operation and perioperative administration of antibiotics. Consequently, the patient was discharged from our hospital without signs of infection. Infection may not be a frequent problem when the exposure time is short following penetrating injuries, but careful treatment for prevention of infection is favorable.

## References

1. Ivatury RR, Shah PM, Ito K, Ramirez-Schon G, Suarez F, Rohman M. Emergency room thoracotomy for the resuscitation of patients with "fatal" penetrating injuries of the heart. *Ann Thorac Surg* 1981; **32**: 377–85.
2. Moreno C, Moore EE, Majure JA, Hopeman AR. Pericardial tamponade: a critical determinant for survival following penetrating cardiac wounds. *J Trauma* 1986; **26**: 821–5.
3. Attar S, Suter CM, Hankins JR, Sequeira A, McLaughlin JS. Penetrating cardiac injuries. *Ann Thorac Surg* 1991; **51**: 711–6.
4. Velmahos GC, Degiannis E, Souter I, Saadia R. Penetrating trauma to the heart: a relatively innocent injury. *Surgery* 1994; **115**: 694–7.
5. Arreola-Risa C, Rhee P, Boyle EM, Maier RV, Jurkovich GG, Foy HM. Factors influencing outcome in stab wounds of the heart. *Am J Surg* 1995; **169**: 553–6.
6. Asensio JA, Berne JD, Demetriades D, et al. One hundred five penetrating cardiac injuries: a 2-year prospective evaluation. *J Trauma* 1998; **44**: 1073–82.
7. Tyburski JG, Astra L, Wilson RF, Dente C, Steffes C. Factors affecting prognosis with penetrating wounds of the heart. *J Trauma* 2000; **48**: 587–91.
8. Mandal AK, Sanusi M. Penetrating chest wounds: 24 years experience. *World J Surg* 2001; **25**: 1145–9.