Prior, proper planning prevents poor performance

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There isn't much time to ready oneself after receiving a call for a penetrating wound to the heart. The time to research and think through the problem has passed. Penetrating cardiac trauma is a rare but highly lethal injury, with mortality approaching 80% in those that survive to the hospital.¹ Hemorrhage, tamponade, and pump dysfunction are the mechanisms leading to death. These develop from perforation of a cardiac chamber or chambers, injuries to valves, injuries to the coronaries, and injuries to the conduction system.

Because of its infrequency outside of war, the average cardiac surgeon encounters penetrating cardiac trauma only a few times in his or her career. Bagai and colleagues' unique case and its accompanying imaging in their report in this issue of the *Journal*, "Management of right coronary artery fistula from nail gun trauma,"² demonstrate adherence to basic principles of surgery and trauma. Furthermore, incorporation of technology not available when the principles were developed was used to deal with a complication.

In this case, a 42-year-old man shot himself in the chest with a nail gun. The nail was removed after the patient was prepared and draped for surgery. Computed thoracic imaging had been obtained, and transesophageal echocardiography was used to assess the patient in the operating room. When hemopericardium developed after removal of the nail, the patient was opened, and the right ventricular outflow tract and right atrial laceration were repaired. A stable hematoma was observed in the atrioventricular groove but was left untouched. Ten days after discharge, the patient was seen for night sweats and rigors. Evaluation did not reveal any infectious source, but a right coronary artery pseudoaneurysm with fistulous tracts to the right ventricle and atrium was diagnosed. The injured coronary artery was treated with a covered stent.

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Central Message

Developing a plan for the management of penetrating cardiac trauma can be lifesaving.

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Briefly reviewing the role of cardiac surgery in trauma across time reveals the potential for change in expert opinion and general consensus as the specialty, experience, and technology evolved. In the early 18th century, Herman Boerhaave considered all penetrating cardiac trauma to be fatal.³ Theodor Billroth delivered his famous quotation, "The surgeon who attempts to suture a wound of the heart may be sure of losing the esteem of his colleagues for ever,"⁴ around 1880. By the early 20th century, however, case reports of successful treatment of cardiac injuries began surfacing. During World War II, it was first recognized that cardiac tamponade could be managed with pericardiocentesis, and more complicated repairs became possible after the introduction of cardiopulmonary bypass in the early 1950s. Although mortality remains high today, attempted repair is generally recommended.

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