

Cardiac Tamponade After Removal Of The Epicardial Pacing Wires And Successfully Managed With Emergency Exploratory Sternotomy (EES). A Case Report*

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Summary

We are presenting a case of removal of pacing wire post operatively in an anticoagulated lady with double valve replacement (tissue valves), who developed cardiac tamponade and collapsed, and was successfully resuscitated after emergency exploratory sternotomy (EES). Careful insertion of epicardial wire, careful removal of the wire especially in anticoagulated patient, keen observation of the patient by nursing staff and emergency exploratory sternotomy (EES) is mandatory in routine cardiac surgery.

Introduction

Every case of the open heart surgery almost needs epicardial wires. It should be carefully inserted and carefully removed. The reported case developed cardiac tamponade post operatively after removal of epicardial pacing wire in an anticoagulated lady who developed cardiac tamponade and emergency exploratory sternotomy (EES) saved her life.

Case Report

A 25 years old lady was having shortness of breath with palpitation for the last 5 years. Her disability was NYHA III. She was having clinically signs of mitral stenosis and aortic regurgitation. Her echocardiography and cath studies revealed, severe mitral stenosis with aortic stenosis and aortic regurgitation. She was operated on 29/9/1990. Heavily calcific mitral valve was removed and replaced with 27 mm Carpentier

Edward valve and incompetent and moderately stenotic valve was replaced with 19 mm Carpentier Edward valve. Her ICU course was smooth. She was on oral anticoagulants post operatively. She was running low grade temperature for few days and was staying in the ward. On 11/10/1990 in the morning round her epicardial pacing lead was removed at 1000 hours. Two hours after the removal of the wire she was not feeling well, gradually her pressure started dropping and she was restless. Her chest X-ray revealed it to be enlarged mediastinal shadow. when we were considering that most probably she was developing cardiac tamponade, she collapsed in the ward and was immediately explored through subxiphoid approach which improved the condition to some extent and then shifted to operation theater. Reopening revealed a big collection in the mediastinum with clots amounting to nearly 1.5 liters. The pacing lead site was not actively bleeding though there was small raw area at that site. She was successfully resuscitated with replacement of blood loss. Her post operative course was smooth. She is doing well even in 5/1/1997.

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Discussion

The incidence of pulling the pacing wire occurred 13 days after the operation in an anticoagulated patient. The insertion and removal of the pacing wires require a special protocol. Epicardial pacing wire removal (EPWR)¹ is a procedure performed on postoperative cardiac surgery patients. Nurses who assist with or perform this procedure need to be aware of its possible complications; these include bleeding, pericardial or mediastinal tamponade, ventricular dysrhythmias, wire fragment migration, and infection secondary to retained wire fragments. Patients undergoing EPWR should be monitored for signs of complications; appropriate emergency equipment should be readily available, and nurses should educate patients on possible problems and interventions. Smith JA et al² as reported rare event of cardiac perforation by an epicardial pacing wire being an extremely rare event. A case of right atrial perforation occurring 10 hours after coronary artery bypass grafting is reported. Another cause of bleeding and cardiac tamponade after cardiac operation is therefor illustrated.

Our patient was anticoagulated postoperatively and was having more chances of getting tamponade. In a study by Malouf-JF et al³ for finding the relationship of anticoagulation and tamponade in 141 cases with the help of echo, echocardiography and clinically concluded that unlike small or medium-sized effusions, large pericardial effusions and tamponade are more likely to occur among anticoagulated patients, especially if they are excessively anticoagulated.

For diagnosis of the pericardial pressure and decision for emergency exploratory sternotomy (EES) Kay-PH et al⁴ have used a small solid state transducer to measure pericardial pressure (PP) in 13 pediatric patients (mean age 18 months) at hourly intervals for 24 hrs., following cardiac surgery. The results confirm that PP is a mathematical function of the expansible forces of the heart and the restricting forces of the pericardium and mediastinum. Patients with pulmonary regurgitation or pulmonary hypertensive crisis leading to increased right ventricular end diastolic dimension or a space occupying conduit have a high PP and are therefore at risk of atypical tamponade. In this situation splinting open the chest may reduce PP and break the cycle of falling cardiac output.

Pericardial effusions may be present in a variety of clinical situations, often presenting challenging clinical diagnostic and therapeutic problems. Although several imaging modalities are available, ECHO has become the diagnostic method of choice due to its portability and wide availability. CT and MRI may also be employed and may be more accurate. A pericardial effusion under pressure may result in hemodynamic compromise and tamponade. Although there are several echocardiographic clues to tamponade (including diastolic chamber collapse, Doppler flow velocity paradoxus, and inferior vena cava plethora), the diagnosis remains a clinical and hemodynamic one. The clinical signs include elevated jugular venous pressure, hypotension, tachycardia, and pulsus paradoxus. Hemodynamic measurements include equalization of diastolic pressures and decreased cardiac output. Treatment of tamponade involves drainage of the effusion and prevention of reaccumulation. Early detection and treatment of cardiac tamponade is crucial in management of patients after cardiac surgery⁵. The presentation of cardiac tamponade after cardiac surgery if acute may be very crucial and catastrophic but atypical presentation is more common⁶. The presentation can be very atypical as Bryan-AJ et al⁷ have reported a case of late cardiac tamponade seen with progressive dysphagia 15 days after aortic valve replacement is reported. The diagnosis was confirmed echocardiographically and successful pericardiocentesis was followed by immediate alleviation of the dysphagia. Russo-AM et al⁸ reviewed of 510 consecutive patients who underwent cardiac surgery. The incidence of postoperative cardiac tamponade was 2.0 per cent (10/510 patients) and occurred following valvular, bypass, and aortic surgery. Nine of ten patients had either atypical clinical, hemodynamic, and/or echocardiographic findings.

TEE has emerged recently to be an essential tool for the management of cardiac tamponade¹¹. Schoebrechts-B et al¹⁰ have reported two patients with large pericardial thrombi following cardiac surgery presented as having right cardiac tamponade. Transesophageal echocardiography (TEE) identified a large pericardial hematoma compressing the right atrium and was well tolerated by these critically ill patients. These case reports demonstrate the diagnostic value of TEE in the identification of this severe complication in the late postoperative period. Oppizzi-M et al¹¹ have

investigated the role of monoplane transesophageal echocardiography (TEE) in rapid decision making process in 115 critically ill patients (pts) with early postoperative complications after cardio-thoracic surgery (hypotension, central venous pressure and/or wedge pressure elevation, electrocardiographic S-T segment elevation). TEE was useful in 91% of cases (105/115 pts), incomplete in 2.3% (3/115 pts), not diagnostic in 2.3% (3/115 pts) and misleading in 3.4% of cases (4/115 pts). TEE findings made major therapeutic changes necessary in 66.9% (77/115 pts); there was a shift from medical to surgical therapy in 28% (41/115 pts); in 14.7% (17/115 pts) minor changes in drug therapy were made.

Cicek-S et al¹² studied 119 TEE performed in unstable cardiac surgical patients evaluated in the emergency setting. Their results suggest that TEE is highly diagnostic for most of the abnormalities responsible for hemodynamic instability in the perioperative period and facilitates decision making in cardiac surgical emergencies.

When the tamponade has been established there are 3 ways to tackle it: 1. 2D-echo guided pericardiocentesis, 2. subxiphoid surgical pericardiotomy and emergency exploratory sternotomy (EES). The first two techniques are used when the emergency situation is not there and echo have revealed a compressing collection of fluid around the heart but EES is a crashing attack for the acute catastrophe.

Susini-G et al¹³ in a retrospective study of there 42 patients with acute cardiac tamponade due to pericardial effusion evaluated following cardiac surgery, and the pericardial fluid was drained by one of two alternative methods: two-dimensional echocardiographic-guided pericardiocentesis (2D-echo) or subxiphoid surgical pericardiotomy. During the first period (from 1982 to 1986), one of the two methods was chosen by the treating physicians, whereas in the second period (from 1986 to 1991), 2D-echo-guided pericardiocentesis was the treatment of choice. Percutaneous pericardiocentesis was performed using local anesthesia in 29 patients. A Tuohy needle was inserted at the left xiphoid-costal junction and, when fluid was obtained, 6 mL of saline solution was injected during 2D-echo contrast monitoring and a multiple-hole, 6F, 30-cm catheter was inserted by means of a guidewire and positioned into

the posterior pericardium, as near as possible to the atrioventricular groove. Complete drainage of pericardial fluid by percutaneous pericardiocentesis was obtained in 26 patients (89%). This procedure also allowed the evacuation of posterior and loculated effusions. Complications included two right ventricular punctures, which were immediately recognized by 2D-echo contrast and produced no serious consequences. Sixteen patients who underwent surgical pericardiotomy had complete evacuation of pericardial fluid without major complications (two of them suffered atrial arrhythmias during the procedure). The average amount of fluid drained, as well as the localization of the effusions, were the same for both groups. 2D-echo-guided pericardiocentesis was found to be a useful, safe, and simple technique. It can be used as an alternative treatment to subxiphoid pericardiotomy for cardiac tamponade due to postoperative pericardial effusions.

Emergency exploratory sternotomy (EES)¹⁴ is a life saving measure after cardiac surgery and all the doctors and nursing staff should be trained and be used to the procedure. Emergency exploratory sternotomy (EES) is a life saving procedure performed in the recovery room or ICU within the first 24 hours following cardiac surgery. Complication that may necessitate this procedure include tamponade, hemorrhage, acute profound hypotension, atypical tamponade, coronary artery spasm, clotted grafts, refractory dysrhythmias and cardiac arrest. The nurse plays an important role in the recognition of these life threatening situations and therefore must be able to recognize clinical signs that may preclude the need for EES. The 4 scenarios which the nurse sees are: (1) cardiac tamponade (2) acute profound hypotension where the etiology is unclear (3) cardiac arrest which is unresponsive to normal CPR and (4) acute massive hemorrhage where tamponade is not the primary presenting condition. Every unit must have information, education, training and protocol of EES to respond effectively during this life threatening event.

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