Use of titanium plate fixation system in late sternal dehiscence repair

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Abstract

Sternal instability with mediastinitis is a very serious complication after median sternotomy. Sternal dehiscence repair together with debridement of the infected tissue is the mainstay of therapy where various modalities are employed. Here, we report the use of titanium plate for sternum stabilization in a patient with sternal dehiscence and superficial wound infection.

Introduction

Sternal dehiscence and superficial wound infection are the most common complications of median sternotomy. Sternal dehiscence incidence is between 0.5% and 5% [1]. It is one of the most important causes of morbidity and mortality. Sternal repair is necessary to prevent paradox chest wall movements and to ensure normal respiratory mechanics. There are different approaches in recurrent cases [1-3]. In this case report, we discussed the use of titanium plate for sternum stabilization in a patient with respiratory distress and chest pain due to late sternal dehiscence.

Case Report

A 69-year-old, diabetic, obese female patient admitted to our clinic with shortness of breath and sternal pain. From the patient’s history, we learned that she had a 3-vessel coronary bypass operation 10 months ago, and due to post-operative sternal infection and dehiscence, the patient was re-operated for sternum stabilization using the Robicsek weave. Upon physical examination, there was the dehiscence of the sternum. There was paradox chest wall movement. There wasn’t evidence of superficial or deep tissue infection in the skin tissue. Shortness of breath and pain were thought to be due to sternal dehiscence. A sternum reconstruction procedure was planned for the patient.

The pre-operative white blood cell count was 6,600/mm³ and C-reactive protein level was 0.4 mg/dl. Sternum wires were broken, and sternum dehiscence was seen in anterior-posterior and lateral chest X-ray. The patient was operated on; there was sternal dehiscence and wires were broken. There was not any sign of infection. The sternum was fixed with 4 horizontal plates for corpus and one titanium plate for manubrium. Each titanium plate was fixed on each side with an average of 4-6 screws (Figure 1). Before fixation, we removed the cartilage or connective tissues within the pseudoarthrosis to provide better sternal healing.

Following sternum fixation, a hemovac drain was placed in the subcutaneous region at both sides. Subcutaneous tissue was closed with 2-0 polyglactin Vicryl, Ethicon, and the skin was closed with 2-0 polypropylene single sutures.

Figure 1. Intraoperative view of titanium fixation plates.
There was a significant improvement in dyspnea and pain upon follow-up of the patient, and there was no sign of infection or sternal dehiscence.

Discussion

Median sternotomy is the most common surgical method to reach the heart and mediastinum. Sternal dehiscence is a rare but bothersome complication of this method. It may lead to mediastenitis, superficial wound infection, and respiratory distress. Furthermore, patients may complain of chest pain due to sternal dehiscence long-term [1].

Sternal dehiscence incidence, with or without infection, is between 0.5% and 5%. The most important risk factors are obesity, osteoporosis, chronic obstructive respiratory disease, diabetes, steroid intake, and non-midline sternotomy [2].

Chest wall defects seen following total or partial sternum resection may cause thoracic instability and paradox chest wall movements. It is difficult to treat this only by muscle flaps. Sternum or chest wall stability can be provided with transverse plate fixation. Thus, the force is evenly distributed on both sides of the ribs. Plate stabilization is performed from the anterior surfaces of costa. The inferior surface of the sternum does not require dissection. In this way, the risk of injury of the heart and great vessels is reduced [3].

The most important advantage of titanium plate fixation is that it allows resection of all of the dead tissue. Even chest wall stabilization can be achieved by complete removal of the sternum [4].

Since the sternum of our patient was not infected, sternal resection was not necessary. Only debridement was performed on the free edge of the sternum until blood supply was regained. Sternum fusion was accomplished with plate stabilization.

Consequently, titanium plate stabilization is a safe and satisfactory fixation method and should be kept in mind for complicated sternal dehiscence cases, although it is at a cost disadvantage.

References