GCTAB Column

Autogenous rib graft for reconstruction of sternal defects

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Abstract: Those who have undergone sternum resection need graft to stabilize the sternum with steel wire, titanium mesh or polypropylene mesh. The current study reports a case of using autogenous rib graft to reconstruct the sternum after resection. A 53-year-old man, whose chest computed tomography (CT) identified expansive lesions and the presence of osteocytes lesions in the sternum, with no apparent involvement of the mediastina structures, come to our medical center due to pain and a lump of the anterior chest wall. The patient underwent tumor radical resection and sternal reconstruction with autogenous rib graft, and the histopathological examination of the surgical specimen determined the diagnosis of osteosarcoma. The patient has recovered well after the surgery.

Keywords: Autogenous rib graft; sternal defects; sternum tumor

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Introduction

The resection of a large portion of the sternum requires a careful reconstruction to avoid secondary complications. The requirements of an ideal replacement for reconstruction of the sternum are availability, durability, non-reactivity, and resistance to infection. There is steel wire, titanium mesh or polypropylene mesh that can be used for reconstructing the sternum after resection; however, we describe our use of autogenous rib graft to reconstruct the segment defect of the sternum in a patient who had undergone partial resection.

A 53-year-old male, with no notable medical history, was admitted to our hospital due to pain and a lump of the anterior chest wall. Before the operation, a chest computed tomography (CT) scan reconstruction identified the abnormal mass on the manubrium sterni (size, 6 cm × 4 cm in diameter). An aspiration needle biopsy was not conducted; however, the patient underwent tumor radical resection and sternal reconstruction using autogenous rib (*Figure 1*). With the final histopathology showing osteosarcoma, negative margin. Postoperative courses are uneventful, clinical and radiologic follow-up 2 months after surgery showed excellent morphological and functional outcome.

Figure 1 Radical resection of sternal tumor and reconstruction with autogenous rib graft (1).
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Operative techniques

In the operating theatre, two incisions were made, which one was made over the anterior portion of the sternum, another made through the left anterior lateral. We detected the specific position of the tumor, and confirmed the target lesion based on the preoperative chest CT. After being dissected skin and soft tissue, then the sternal lesion

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dissection was performed. After being dissected and isolated in the bilateral sternocostal joints, the lower edge of the sternal lesion was dissected and cut off by fret-saw, and then the tumor was removed from the sternum, which resulted in a vertical defect of 5.0 to 6.0 cm.

The rib graft that was designed to reconstruct the sternal defects were obtained from the sixth rib after it was stripped of its periosteal and divided into two parts. The two rib grafts were then placed vertical to one another with sternal wires, which the size and shape of the implant were designed to reconstruct the sternum after the resection. Then the implant was placed in situ and fixed to the ribs and sternum with sterna wires. The chest wall was then closed.

Comments

The reconstruction of sternum defects is a challenging problem for thoracic surgeons. The location and the size of the defect play a major role when selecting the method of reconstruction, while acceptable morphological and functional results remain the primary goal. Currently, titanium mesh or polypropylene mesh is widely used in the reconstruction of sternum defects. In our case, the autogenous rib graft was successfully used to reconstruct sternal defects after partial resection. With the advantages, such as biocompatibility, stabilization, strength, and lack of risk of disease associated with prosthetic materials and myoplasties, autogenous rib graft could be very suitable for reconstruction in sternal defects, we consider that the autogenous rib grafts could be a viable alternative for patients who had sternal defects due to infection, tumor, or trauma need graft to stabilize the sternum.

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