

Thoracic wall reconstruction and pectus bars

Göğüs duvarı rekonstrüksiyonu ve pektus barları

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ABSTRACT

Chondrosarcoma is the most frequently seen malignant tumor of the thoracic wall and resection and reconstruction of the thoracic wall is the most widely used surgical method for its treatment. A 78-year-old male patient consulted our clinic with a complaint of a right flank pain. On his physical examination, a mass 3x3 cm in size was found on the right anterolateral side of his chest. His posteroanterior chest x-ray showed opacity in the right costodiaphragmatic sinus. A soft tissue mass destructing the right 5th rib was seen in his thoracic computed tomography. The patient underwent right anterolateral thoracotomy under general anesthesia. The expansile bone mass was palpated and the mass was resected together with the 4th, 5th and 6th ribs leaving a 4-cm surgical margin around it. The resulting defect was repaired using prolene mesh together with pectus bar. The patient who was diagnosed with chondrosarcoma upon the histopathological examination was still asymptomatic at the end of his 1-year follow-up. The pectus bars used in congenital chest wall deformities is a appropriate prosthetic material that may be preferred in selected cases for reconstruction of the defects which occurred following the resection of chest wall tumors because of its easy procurement, easy to use and have good tissue compatibility.

Keywords: Chest wall tumors, reconstruction, pectus bars

ÖZ

Kondrosarkom göğüs duvarının en sık görülen malign tümörüdür ve tedavide göğüs duvarı rezeksiyon ve rekonstrüksiyonu en sık uygulanan cerrahi yöntemdir. Yetmiş sekiz yaşında erkek olgu sağ yan ağrısı yakınmasıyla kliniğimize başvurdu. Fizik muayenede göğüs sağ anterolaterinde 3x3 cm ebatlarında kitle belirlendi. Posteroanterior akciğer grafisinde sağ kostodiyafragmatik sinüs bölgesinde opasite görüldü. Toraks tomografisinde sağ 5. kostayı destrükte eden yumuşak doku kitlesi mevcuttu. Genel anestezi altında sağ anterolateral torakotomi yapıldı. Ekspansil kemik kitlesi palpe edildi ve 4., 5. ve 6. kaburgalar çevrede 4 cm'lik cerrahi marjin bırakılarak rezekte edildi. Oluşan defektin kapatılmasında prolene mesh ve pektus barı birlikte kullanıldı. Histopatolojik inceleme ile kondrosarkom tanısı konulan olgu 1 yıllık takibin sonunda asemptomatiktir. Göğüs duvarı tümörlerinin rezeksiyonu sonrası oluşan defektlerin rekonstrüksiyonunda konjenital göğüs duvarı deformitelerinde kullanılan pektus barları sağlanmasında zorluk çekilmeyen bir malzeme olması, kolay kullanımı ve doku uyumu nedeniyle uygun olgularda tercih edilebilecek protetik materyallerdir.

Anahtar kelimeler: Göğüs duvarı tümörleri, rekonstrüksiyon, pektus barları

INTRODUCTION

When chondrosarcoma is discovered on the chest wall, surgical treatment should be considered first because this tumor is resistant to chemotherapy, and radiotherapy is applied only to cases where surgery is not possible or to postoperative cases with positive surgical margins. Here, the entire tumoral tissue should be removed with a thoracic wall resection leaving a safe margin of at least 4-5 cm around it¹. Closure of the resulting defect should ensure prevention of a flail chest formation by maintaining the

bone integrity of the chest wall. The prolene, marlex, and polytetrafluoroethylene meshes as well as the methyl methacrylate-mesh combination are the prosthetic materials widely used today for skeletal reconstruction. Which material is to be preferred depends on the site and size of the defect, and the surgeon's experience^{2,3}.

We intended in this paper to present our experiences in using prolene mesh and pectus bar for the repair of congenital chest wall deformities as reconstruction materials in a patient who had a chest wall re-

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section due to a chest wall tumor in the light of the literature data.

CASE REPORT

A 78-year-old male patient consulted our clinic with a complaint of right flank pain. In his physical examination, a sensitive mass approximately 3x3 cm in size, covered with normal skin tissue, and protruding from the surface was found in his right anterolateral thorax. His posteroanterior chest x-ray showed opacity localized close to his right costodiaphragmatic sinus. On his thoracic computed tomogram, a soft tissue mass about 67x42 mm in size was seen in front of the right 5th rib destructing and expanding the rib (Figure 1). A fine-needle aspiration biopsy did not produce any diagnostic yield. The patient underwent a right anterolateral thoracotomy under general anesthesia. The expansile bone mass of lytic appearance with a surrounding soft tissue component that destructed the rib was palpated. The mass was then resected together with the 4th, 5th and 6th ribs leaving a 4-cm surgical margin around it. For repairing the resulting defect in this region, we used our tailored prolene meshes and the pectus bar used in congenital chest wall deformities (Figure 2). Histopathological examination established the diagnosis of chondrosarcoma, and the patient was discharged on the 5th day with-

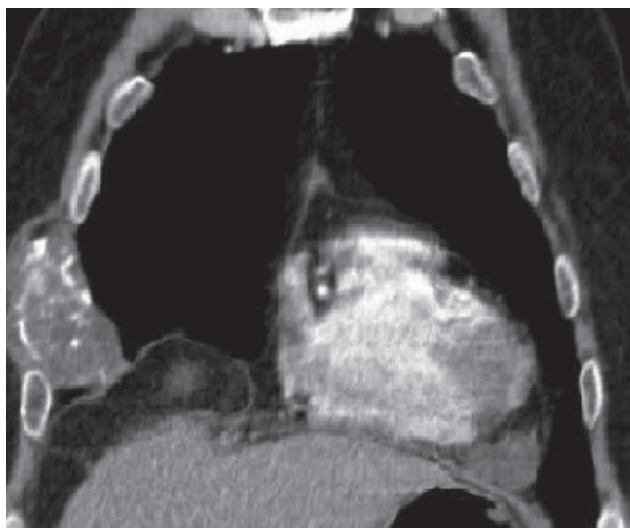


Figure 1. The mass localized in the right 5th rib is seen in the preoperative thoracic tomography.

out any complications and he was still asymptomatic at the end of a 1-year follow-up period.

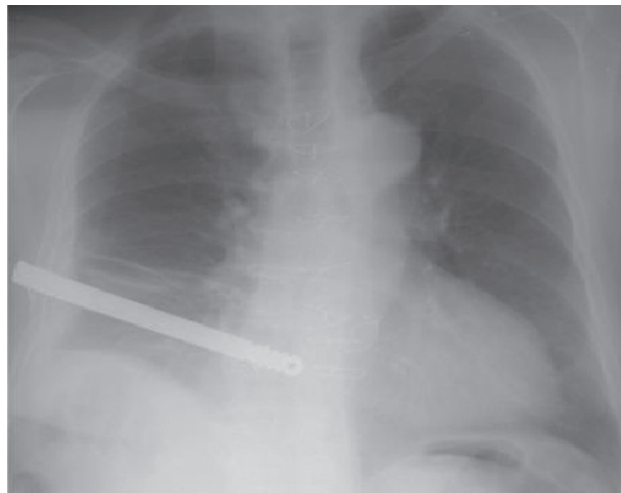


Figure 2. The postoperative posteroanterior chest x-ray of the patient.

DISCUSSION

When the tumoral tissue is being removed during surgical treatment of a chest wall tumor, leaving intact surgical margins is targeted, and to achieve this, extended chest wall resections can be attempted. The way of reconstructing the resulting defect depends on the localization, width, and depth of the resection site. As in our case, the defects localized in the anterolateral wall of the chest may lead to formation of a flail chest and lung herniation to the extent of impairing respiratory functions; therefore, these defects must definitely be closed to ensure chest wall stabilization⁴. The first step in the closure of the defect is skeletal reconstruction. The prosthetic material to be used for this purpose should have the rigidity and durability to ensure the opposite parts of the defect move in harmony with respiratory movements^{2,5}. The nickel-steel alloy or titanium pectus bars have these properties and are widely used recently in the minimally invasive surgical treatment of congenital chest wall deformities. We tried to maintain tissue integrity by first using prolene meshes for the closure of the defect. However, since we saw that adequate chest wall rigidity could not be achieved with the prolene meshes, we implanted appropriately sized, and pre-

viously tailored pectus bars, which we use frequently in our clinic in management of chest wall deformities. Pectus bars have many advantages including being easy to obtain, inexpensive, easy to shape and practical to apply, and allowing choice among various sizes. In the present case, no paradoxical respiration occurred during the postoperative period and the respiratory functions were maintained. Additionally, no problems were encountered regarding the pectus bars in the long-term follow-up of the patient.

In conclusion, pectus bars, which are used in the repair of congenital chest wall deformities, can be preferred for adequate and effective reconstruction of the defects resulting from resections of chest wall tumors as they are easy to obtain, easy to shape, easy to use, and tissue compatible.

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