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Case Report / Olgu Sunumu

Sternal metastasis from uterine leiomyosarcoma treated by near-total sternectomy and reconstruction with titanium sternal stabilization and fixation system

Tama yakın sternektomi ve titanyum sternum stabilizasyonu ve sabitleme sistemi ile rekonstrüksiyon yoluyla tedavi edilen uterus leiomyosarkomu kaynaklı sternum metastazı

Ömer Soysal,[1] Sedat Ziyade,[1] Selma Sönmez Ergün,[2] Nur Büyükpınarbaşılı,[3] Osman Cemil Akdemir[1]

Departments of [1]Thoracic Surgery, [2]Plastic, Reconstructive and Aesthetic Surgery and [3]Pathology, Medical Faculty of Bezmialem Vakıf University, İstanbul, Turkey

ABSTRACT

Uterine leiomyosarcomas are rare soft tissue neoplasms. Although they have a tendency to metastasize to distant organs, most commonly to the lung, liver and brain, rarely, sternal metastasis from a uterine leiomyosarcoma can occur. In this article, we report a 50-year-old female patient whose uterine leiomyosarcoma was treated with total abdominal hysterectomy and bilateral salphingo-oopherectomy, and who developed sternal metastasis five years later, which was completely resected and successfully repaired during the same session.

Keywords: Leiomyosarcoma; metastasis; sternum.

ÖZ

Uterus leiomyosarkomları nadir görülen yumuşak doku tümörleridir. Sıklıkla akciğer, karaciğer ve beyin gibi uzak organlara metastaz yapmasına rağmen, nadiren, uterus leiomyosarkomu kaynaklı sternum metastazı meydana gelebilir. Bu yazıda uterus leiomyosarkomu, total abdominal histerektomi ve iki taraflı salpingo-ooferektomi ile tedavi edilen ve beş yıl sonra sternum metastazı gelişen ve bu metastazı tamamen çıkarılıp aynı seansta onarımı başarıyla yapılan 50 yaşındaki kadın hasta sunuldu.

Anahtar sözcükler: Leiomyosarkom; metastaz; sternum.

Primary and metastatic tumors of the sternum are uncommon, but either carcinomatous or sarcomatous malignant tumors may metastasize to this area.[1] While surgery is the preferred treatment for the majority of primary sternal tumors, it is controversial for metastatic tumors that reflect disseminated disease. Most cases of sternal metastasis cannot be cured by surgical resection, but curative resection may be possible when the sternum is the only site of metastasis, complete resection with negative margins is possible, and the primary site of the malignant disease is under control.[2]

After a wide local excision, rigid prosthetic replacement is necessary to protect the heart, major vessels, and lungs as well as to prevent the paradoxical movement of the resected sternum. Titanium rods are normally used for rigid sternal stabilization because this metal has the advantage of a high strength-to-weight ratio. In addition, and it can aid in the osseointegration process. Furthermore, titanium causes less interference with computed tomography (CT) and can be used safely with magnetic resonance imaging (MRI) due to its nonferromagnetic characteristics.[3]

Herein, we present the case of a female patient with a metastatic sternal tumor that was successfully reconstructed via the use of moldable titanium bars and rib clips for sternal stabilization and the application of prolene mesh. Additionally, the bilateral pectoralis major muscle flaps were advanced to cover the soft tissue defect.

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Correspondence: Selma Sönmez Ergün, M.D. Bezmi Alem Vakıf Üniversitesi, Plastik, Rekonstrüktif ve Estetik Cerrahi Anabilim Dalı, 34093 Fatih, İstanbul, Turkey.
Tel: +90 212 - 453 17 00/1698 e-mail: selmasonmezergun@yahoo.com

CASE REPORT

A 50-year-old woman was admitted to our clinic with a slow-growing soft tissue mass on sternum and a physical examination revealed a hard, immobile soft tissue mass located on the sternum that measured 4x3.5 cm in size. The skin over the mass had a pinkish hue.

The patient had previously undergone a total abdominal hysterectomy and bilateral salphingo-oopherectomy five years earlier because of uterine leiomyosarcoma, and the peritoneal fluid cytology had tested positive for malignant tumor cells at that time. She also had a history of diabetes mellitus (DM) which was being regulated with oral antidiabetics.

After her admission to our facility, systemic and laboratory examinations revealed no additional pathology, but a chest X-ray and CT confirmed that the lesion had eroded the sternum and was now occupying two-thirds of it. In addition, positron emission tomography (PET) revealed a fluorodeoxyglucose (FDG) accumulation in the lesion (SUV maximum: 4.0), but there was no accumulation elsewhere in the body. An incisional biopsy of the mass was performed, and the histopathology revealed hypercellularity with spindle-shaped tumor cells that featured an interlacing pattern. They also had acidophilic cytoplasms along with "cigar-shaped" nuclei and some mitotic figures. These findings were typical for metastatic leiomyosarcoma and were similar to those of the uterine lesion that had been resected five years earlier.

Under general anesthesia, we then performed a wide surgical excision with 5 cm safety margins and a partial sternectomy involving the corresponding third and fourth ribs, but a small portion of the sternum at the bilateral upper tip of the first two ribs and the xiphoid process were left behind. Moreover, there was no invasion of the mediastinal structures. We improved the sealing by placing a 10x5 cm piece of prolene mesh over the area and applying rib clips to the third and fourth ribs in which we took into account the angulation and contour of the ribs and sternum. Two titanium bars were then inserted between the clips to provide rigid sternal stabilization (StraTos™ Strasbourg Thoracic Osteosyntheses System, MedXpert GmbH, Eschbach, Germany) (Figure 1). Afterwards, the advancement of the pectoralis major muscle flaps was performed bilaterally (Figure 2), and the skin was approximated primarily. Atrial fibrillation and congestive heart failure occurred postoperatively, but these were controlled successfully with medical treatment (Figure 3).

The macroscopic specimen contained cutaneous, sternal bone, and tumor tissue measuring 12x6 cm, 7x7 cm, and 5x4 cm, respectively, and a microscopic examination revealed metastatic uterine leiomyosarcoma with negative surgical margins. Mediastinal drainage continued for two weeks, and wound revision and debridement were necessary in the postoperative period. No evidence of recurrence was seen after 15 months of follow-up.

DISCUSSION

Uterine leiomyosarcomas are uncommon neoplasms with a mesodermic origin that account for 1-3% of all uterine malignancies. They are known for their local recurrence and have a high incidence of metastasis in the lungs, liver, and peritoneum, as was the case with our patient. However, metastasis in the bones is

Figure 1. Surgical view showing the placement of the prolene mesh to improve sealing and the titanium bars to provide rigid sternal stabilization.

Figure 2. Surgical view showing the defect after bilaterally advancing the pectoralis major muscle flaps.

Figure 3. Chest X-ray of the patient after the operation. Note the position of the titanium bars.

seldomly seen. When uterine leiomyosarcoma recurs or metastasizes, it can rarely be cured.[4]

Surgical resection of sternal metastases always leaves bone and soft tissue defects that require reconstruction. After a wide sternectomy, restoration of skeletal stability is often needed to protect the intrathoracic organs and restore ventilatory mechanics, and soft tissue reconstruction is essential to seal the pleural space, protect the intrathoracic contents, and prevent infection. Although autogenous tissue is more usable than synthetic tissue, it may not be adequate at the time of the operation, thus necessitating the use of prosthetic materials for sternal stabilization. Resections of tumors larger than 5 cm that involve two or more ribs have classically been treated with some type of patch. Many prosthetic materials, such as knitted polypropylene (Marlex) or polytetrafluoroethylene (PTFE), can be used to stabilize the chest wall, and biological patches composed of dehydrated dura or autologous muscle flaps are often used for this same purpose. Bone grafts, titanium rods, and methyl methacrylate cement may also be utilized to add rigidity to the chest wall.[3,5-7]

More rigid reconstruction is mandatory after a wide sternectomy, and a methyl methacrylate sandwich is commonly used in such cases. However, handling methyl methacrylate is difficult because it needs to be adapted to the shape of the patient's chest and placed directly onto bony structures. Moreover, complications such as infections, dislocations, and implant fractures related to the use of this compound have been reported.[3,5,8] In addition, the use of titanium bars for sternal reconstruction after subtotal sternectomies has occasionally been reported in the literature.[3,7] The advantage of a titanium bar and rib clip system is that it has molding and bending properties that allow for micromovements, better tolerance, and less pain. It also allows for a firm reconstruction and is easy to handle.[3,8] In addition, this type of system does not interfere with subsequent CT scans or MRIs. Hence, because of these benefits, we selected the StraTos™ system, which features both titanium bars and rib clips, for our patient.

In conclusion, current advances and developments in prosthetic devices and flap surgery make it possible to perform tumor resection with wider safety margins, allowing for the repair of larger defects. Sternal reconstruction can successfully be performed via the use of titanium bars and rib clips in such cases.

Declaration of conflicting interests

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