Sternal resection for primary presternal and retrosternal mediastinal liposarcoma

Abstract In a 34-year-old patient, sternal resection was necessary for complete removal of a primary mediastinal myxoid liposarcoma grade I, which had grown around the right sternal border. Reconstruction was by the methylmethacrylate sandwich technique. Five months postoperatively part of the device had to be removed due to persistent inflammation. Two years after the initial operation there is no evidence of local recurrence or distant metastases.

Key words Liposarcoma · Soft tissue sarcoma · Mediastinal tumor · Sternal resection · Methylmethacrylate sandwich technique

Introduction

Primary mediastinal liposarcomas are rare tumors and most are found in the posterior mediastinum [5]. Symptoms are usually due to compression of the mediastinal structures by the enlarging tumor. A peculiar case of an anterior mediastinal liposarcoma is described which had grown around the sternum into the subcutaneous tissues where it presented as a painful mass. Complete excision involved removal of the sternal body.

Case report

A 34-year-old male patient was investigated for a painful right parasternal mass, which had been present for 1 year. Chest radiograph and computed tomography showed an anterior mediastinal mass which had grown around the right sternal border and extended between the costal cartilages into the subcutaneous presternal fat (Fig. 1). Further staging revealed no distant metastases. Biopsy of the lesion demonstrated myxoid liposarcoma. The patient was referred for surgical treatment. Via an elliptic skin incision, en bloc excision of the tumoral mass was performed. This included its smaller subcutaneous part in continuity with the right pectoralis major muscle, the sternal body including the right third to seventh costal cartilages, and the intrathoracic part of the tumor which was completely covered by mediastinal and parietal pleura. Both internal mammary arteries were ligated. The total defect measured 19×15×8 cm. For reconstruction of the bony thorax a methylmethacrylate sandwich was used with two Marlex meshes[1] which were sutured to the bony edges. This prosthesis was covered by a myocutaneous latissimus dorsi flap. Pathological examination showed a completely removed myxoid liposarcoma (Fig. 2), grade I according to Coindre [2]. Postoperative recovery was uneventful.

Four months later there were normal postoperative findings on computed tomography of the chest (Fig. 3). However, 1 month later the patient was reoperated on because of persistent inflammation at the left lateral border of the myocutaneous flap. An effusion was...
Fig. 1 Computed tomography of the chest demonstrating anterior mediastinal tumor with presteernal extension (arrows)

Fig. 2 Microphotograph of myxoid liposarcoma showing loose matrix containing scattered abnormal mesenchymal cells, some of which have features of lipoblasts (arrow). Tri-chrome - Masson stain, magnification 100x

Fig. 3 Computed tomography of the chest 4 months postoperatively showing the methylmethacrylate plate in the ventral thoracic wall covered by a latissimus dorsi flap

found between the methylmethacrylate plate and the posterior Marlex sheet. The latter was completely incorporated and surrounded by a thick fibrous capsule. This posterior sheet was left in place and the remainder of the sandwich was removed. Cultures remained sterile.

Two years after the initial operation the cosmetic result is acceptable without evidence of local recurrence or distant metastases.

Discussion

Liposarcomas are mostly found in the lower extremities, retroperitoneum and gluteal region. They rarely occur in the mediastinum, with only 60 cases having been described [5]. The average age is 45 years with equal sex distribution [9]. Most patients are symptomatic due to the invasion or compression of mediastinal structures [5, 9]. Enzinger and Winslow described four histologic types: well differentiated, myxoid, round cell and pleomorphic [3]. Regarding soft tissue sarcomas, Coindre has suggested 3 grades according to tumor differentiation, mitosis count and the degree of tumor necrosis [2].

In our patient a bizarre growth pattern was present with the tumor extending from the anterior mediastinum into the subcutaneous presteernal plane without invasion of the bony structures. Although most liposarcomas have ill-defined borders, complete and wide surgical excision should be attempted as it offers the best prognosis [3]. Repeated resection of recurrent liposarcoma should also be considered [6]. Radiotherapy is reserved for unresectable cases, palliation of symptoms (as in superior vena caval obstruction), and for postoperative adjuvant therapy in cases of incomplete excision. Although radiotherapy seems to decrease the local recurrence rate, no survival advantage has been shown [1]. Chemotherapy is of limited value. In the case of a large initially unresectable tumor, combined preoperative radiotherapy and chemotherapy may be beneficial to allow subsequent complete surgical excision [1]. The most effective drugs are doxorubicin, ifosfamide and dacarbazine [10]. Long-term survival is highest with well-differentiated, pseudoencapsulated tumors where surgical resection is complete [9].

Sternal resection was necessary in our patient for complete removal of the tumor. For a solid reconstruction of the bony thorax, the sternum was replaced by a methylmethacrylate sandwich which was covered by a latissimus dorsi flap [4, 8]. This provides a good cosmetic result, gives sufficient stability and reduces paradoxical motion. Due to persistent inflammation the methylmethacrylate device was removed 5 months after operation, except for the posterior Marlex sheet which was completely covered by a solid fibrous capsule.
Mansour reported 21 patients in which partial or complete sternal resection was necessary, mainly for infection and recurrent breast cancer [7]. For closure of the defect, musculocutaneous flaps plus Prolene or Vicryl meshes were mostly used. In one patient undergoing a reoperation for pectus excavatum, a methylmethacrylate sandwich was employed. Eight months postoperatively the prosthesis was removed due to pain and limitation of motion. The cosmetic result remained excellent [7]. Two other cases were described where removal of the sandwich was necessary 6 and 12 months following chemotherapy [8]. In these cases, too, a dense fibrous capsule was present which maintained the slope of the chest.

In conclusion, aggressive surgical treatment of mediastinal liposarcomas offers the best prognosis. In the case of sternal resection, a solid reconstruction is obtained with the methylmethacrylate sandwich technique. When indicated, removal of the device several months postoperatively is possible. When a dense fibrous capsule has formed around the device no further reconstruction is necessary.

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References