Which Should Be Considered For The Clear Surgical Margin Of Postradiation Malignant Fibrous Histiocytoma: Tumor-Free Or Radiation-Free Margin?

C Parsak, I Kara, O Demircan, G Sakman, A Uguz, S Ozbarlas

Citation

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Abstract

Malignant fibrous histiocytoma is one of the most common soft tissue sarcomas originating from extremities. Its presentation after radiation, especially in chest wall, is a very rare event. The prognosis is poor due to its aggressiveness and local recurrence rate is high. Its main treatment is surgical excision. The presented case describes postradiation malignant fibrous histiocytoma treated with repetitive extensive resection and reconstruction of the chest wall in a patient diagnosed with breast cancer ten years ago with long survival. We suggest that patients who undergo wide excision with negative margins (radiation-free) have long survival.

INTRODUCTION

Malignant fibrous histiocytoma (MFH) is one of the most common soft tissue sarcomas arising from differentiation of fibroblasts and histiocytes ([1]). Firstly, it was defined by O'Brien and Stout in 1964. The incidence in middle and advanced ages is high. Its most common locations are extremities (70%) and retroperitoneal space (12-14%) ([1,2]). MFH in the chest wall is a very rare entity, especially in patients previously treated with radiation for breast cancer, and it is rarely reported in the literature ([3]). Restricted surgery is not recommended for the treatment of MFH of the chest wall, because of the high incidence of local recurrence and distant metastasis. The main recommended treatment is aggressive radical surgery performed after diagnosis ([4]). The rationale of this article is to discuss the aggressive surgical treatment of postradiation MFH of the chest wall with long survival and to review the related literature.

CASE

A forty-one-year-old woman was hospitalized for a mass of the left anterior chest wall. She had undergone left modified radical mastectomy for infiltrative ductal carcinoma 10 years before. The disease stage was T1NM0 and estrogen, progesterone receptors and c erb B2 expression were negative. She had antracyclin based chemotherapy and radiation therapy in the postoperative period at a dosage of 40 Gray (Gy). She was in remission without any problem during the past 10 years of survey. Six months ago, she was admitted because of a 7cm mass located at the mastectomy incision. A limited excision was performed. The pathological examination revealed a MFH. Three months later she was referred to our institution because of tumor relapse reaching a diameter of 5cm within 10 days. We performed a large excision of the tumor, including the major and minor pectoral muscles with intact surgical margins (tumor free). The defect was reconstructed with a split thickness skin graft. Two months later, she was rehospitalized because of a rapidly growing mass with a diameter of 10 cm in its largest dimension. The ulcerated, hemorrhagic and stinking mass, restricting the abduction of the arm and rotations, was determined on the left chest wall. It was surpassing the clavicula, coming down to the level of the sixth rib, 3cm away from the sternum at the medial margin. Laterally, it invaded the left forearm, medially it reached the posterior axillary line (Figure 1). Magnetic resonance examination of the thorax revealed a mass of 7x9x11cm in the upper part of left hemithorax. There was no metastasis to the other parts of the body or invasion to the chest detected. Extensive surgery was planned for the removal of the mass. The patient had been informed and she accepted the operation. The clavicula was excised; the left subclavian artery and vein were tied and cut. Together with the scapula, the left arm, the former grafted location and the

tumor tissue was excised completely (a flap containing the lateral surface of the arm from deltoid muscle to tumor-free area has been prepared). The part exposed to radiation was excised together with the tumor with a surgical margin (histopathologically verified) of 4cm (Figure 2). There was no invasion on ribs. The defect was restored with a deltoid flap (Figure 3). In the postoperative period, chemotherapy has been planned for the patient, but she did not accept. During five years of follow-up, no local recurrence or distant metastasis has been observed.

Figure 1

Figure 1: Gross view of the tumor

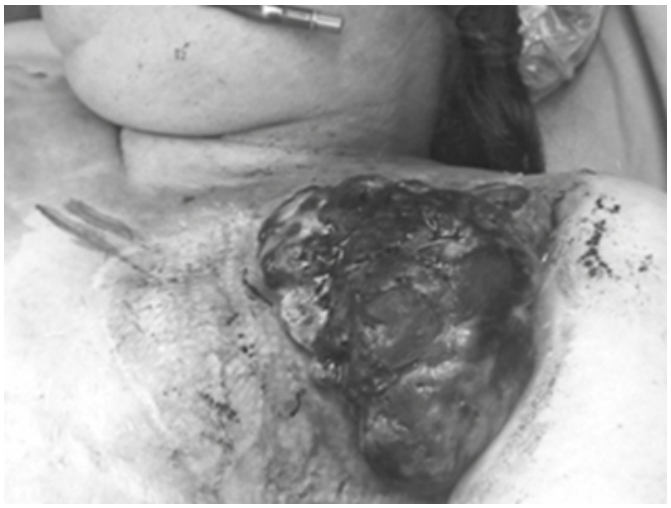

Figure 2

Figure 2: Diffuse fibrous areas developed secondary to radiotherapy (showed with continuous arrow) and tumor infiltrated to the fibrous area (showed with discontinued arrow) (H-E x 100).

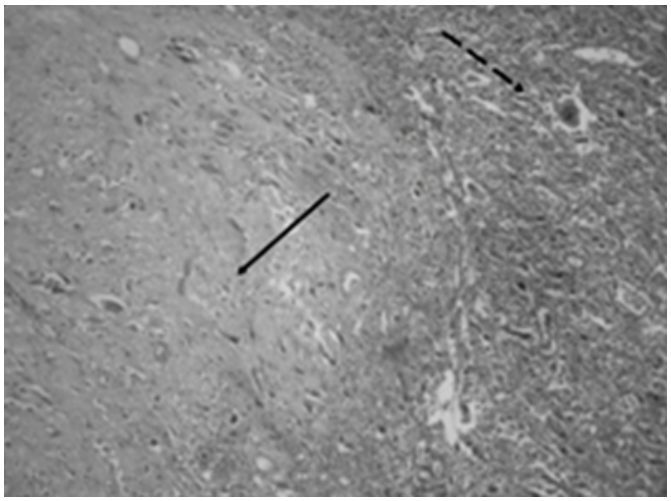

Figure 3

Figure 3: Intraoperative view of the deltoid muscle flap after excision.

DISCUSSION

A high incidence of postradiation MFH has been reported in the literature. Diagnostic criteria of postradiation sarcoma (PS) have first been defined by Chan ([5]) in 1948 as follows: (1) radiation therapy history, (2) PS arrising from radiated area, (3) a long latency period and (4) histologic confirmation of the sarcoma. Our case fulfilled these criteria, and therefore, we accepted it as PS. The dose of radiation given ranged from 42 to 55 Gy with a minimal dose of 10 Gy in standard fractionation due to breast cancer ([6]). There was a correlation between the recieved radiation dose and sarcoma development ([4]). The latency period in the reported study ranged from 3 to 20.3 years. The interval between irradiation and occurence of sarcoma ranged from 2 to 50 years for breast irradiation. Shorter latency periods have been attributed to megavoltage usage rather than orthovoltage radiotherapy ([7]).

In the long term monitoring of Kirova ([6]) on 13.472 cases exposed to radiation for treatment of breast cancer, it was reported that 35 cases had sarcoma development, average radiation dose was 50-55 Gy and latency period was between 3 and 20 years. However, there was no correlation reported between sarcoma incidence, length of latency period and radiation dose. Our case was in harmony with the literature information with 40 Gy radiation due to breast cancer and 10 years of latency period.

Primary treatment of MFH is wide surgical excision. In cases where the chest wall is invaded, the most recommended surgical approach is complete resection.

However, high rate of local recurrence and distant metastasis can occur in the short term ([4, 8]). The resection margin should be at least 4 cm ([8]). The tendency of local recurrence, especially with histopathological aggressiveness, has restricted radical surgeons in finding an opportunity for reexcision of the tumoral tissues. Apart from the radical curative surgical attempt, in rapidly developing local recurrences, differentiation of tumor, mitotic rate, grade and patient specific factors have prognostic value ([4,8]). Histopathological evaluation, which is an obligation for the definition of negative surgical margins, causes difficulties especially in frozen section examinations in cases with wide excision. The frozen section evaluation of surgical margins appearing clean macroscopically is insufficient in most of the cases.

In postradiation sarcomas, it is proved that radiation dose has an effect on sarcoma development, but there is no clear information about an effect on local recurrence. Therefore, in postradiation sarcomas, the question “is histopathological negative margin sufficient in curative surgical attempts?” arised. There is no sufficient data about the effect of excision of all possible radiation exposed tissues including tumor location on local recurrence and survival. In determination of surgical margins, radiation clear surgical margin definition can be useful in decreasing local recurrence risk. Therefore, randomized studies have to be carried out. Our case had rapid and aggressive local recurrence causing tumor development despite two radical curative surgical excisions within six months. An excision with a 4cm safe margin from radiation exposed area (verified histopathologically) was performed. In the postoperative follow-up period, no recurrence was observed as expected.

In sarcomas of the chest wall, for repairing the defect after surgical excision, skin grafts, synthetic grafts, bone grafts and muscle transpositions can be used. Musculus pectoralis major, Musculus latissimus dorsi, Musculus rectus abdominis and Omentum majus can be used ([8]). In our case, since the pectoral muscle had been excised in a previous operation and Musculus latissimus dorsi was in the operative field, a pedicle deltoid flap on the tumor-free side of the left arm was prepared and performed. We have to state that this method with low tension and blood circulation risk has never been used before for closing chest wall defects and can be used only in emergency situations.

We performed a wide surgical procedure, including left arm amputation, for a recurrent case of MFH developed after radiotherapy. We reached a five years' healthy survival with mandatory extremity loss by defining a clean surgical margin not only related to the tumor, but by including non radiation exposed area. We closed the defect by a pedicle flap with tumor-free left deltoid muscle. We aimed to discuss this case to retain that the only curative opportunity in MFH cases is aggressive radical surgery, that our surgical technique may decrease recurrence risk and that a deltoid flap may be performed to close the defect successfully.

CORRESPONDENCE TO

Cem Kaan PARSAK, M.D., Cukurova University School of Medicine, Department of General Surgery, 01330 Balcali, Adana-Turkey Email: cparsak@yahoo.com E mail 2: cparsak@cu.edu.tr Fax: +90 322 3386432 Phone: 90.322.3386432

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Author Information

Cem Kaan Parsak, M.D.
Department of General Surgery, Cukurova University School of Medicine

I. Oguz Kara, M.D.
Department of Oncology, Cukurova University School of Medicine

Orhan Demircan, M.D.
Professor, Department of General Surgery, Cukurova University School of Medicine

Gurhan Sakman, M.D.
Department of General Surgery, Cukurova University School of Medicine

Aysun Uguz, M.D.
Department of Pathology, Cukurova University School of Medicine

Serdar Ozbarlas, M.D.
Professor, Department of Orthopedics and Traumatology, Cukurova University School of Medicine