Surgical outcome of soft tissue sarcomas of the adductor compartment

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ABSTRACT

Purpose. To review outcomes and complications of 25 consecutive patients with soft tissue sarcomas in the adductor compartment.

Methods. Records of 11 men and 14 women aged 20 to 83 (mean, 56) years who underwent resection for soft tissue sarcomas in the adductor compartment were reviewed. Two of the patients had undergone inadequate resection of the tumour elsewhere. No patient had metastases. 20 and 2 patients underwent neo-adjuvant and postoperative radiotherapy, respectively. The interval between radiotherapy and surgery was at least 3 weeks. No neo-adjuvant chemotherapy was given. 24 patients underwent limb salvage surgery and one had external hemipelvectomy. 21 patients had direct wound closure; in 4 a microsurgical free flap was used.

Results. The overall survival rate was 81% and 72% at 3 and 5 years, respectively, and remained unchanged until the end of follow-up. Four patients died from pulmonary metastases and one died from liver metastases. One patient had local recurrence, and 7 (26%) developed major complications. Five patients underwent revision surgery.

Conclusion. Good survival and local control rates can be achieved in patients with soft tissue sarcomas in the adductor compartment using limb salvage and radiotherapy.

Key words: limb salvage; radiotherapy, adjuvant; soft tissue neoplasms

INTRODUCTION

Despite advances in neo-adjuvant and adjuvant treatments, resection remains the mainstay treatment for soft tissue sarcomas. Resections used to be very aggressive and amputations more frequent, but margins have become narrower over the years, without negative effects on local or systemic recurrence or survival.1–3 Most sarcomas can now be safely resected with wide margins without sacrificing...
the affected limb, but tumours arising from certain anatomic regions often pose technical difficulties for limb salvage.\textsuperscript{6} 

Sarcomas arising within the adductor compartment are difficult to treat. They are usually large at presentation and displace the major neurovascular structures (e.g., those near the ischium may involve the sciatic nerve). When they reach the proximal adductor compartment, the hip joint, the pubic ramii or the obturator membrane (including the obturator nerve and vessels) may be involved. In addition, major lymphatic vessels to the lower limb run along the saphenous and superficial femoral veins. Wound complications after resections are frequent and can afflict up to 36% of the patients.\textsuperscript{1,7,8}

We reviewed outcomes and complications of 25 consecutive patients with soft tissue sarcomas in the adductor compartment.

**MATERIALS AND METHODS**

Records of 11 male and 14 female consecutive patients aged 20 to 83 (mean, 56; standard deviation [SD], 19) years who underwent resection for soft tissue sarcomas in the adductor compartment between 1995 and 2005 were reviewed. Two of the patients had undergone inadequate resection of the tumour elsewhere. No patient had metastases.

Radiography, magnetic resonance imaging (Fig. 1), computed tomography (including that of the chest), and in most patients a \textsuperscript{201}Thallium scan were performed. The mean largest dimension of the tumours was 10 (SD, 5; range, 3–19) cm (Table 1), with a calculated mean volume of 505 (SD, 686) cm\textsuperscript{3}. In 8 patients major nerves had been invaded or displaced; 3 entailed the obturator, 3 the sciatic, one the femoral, and one the saphenous nerves. Histological diagnoses were made after computed tomography–\textbf{guided true cut} needle biopsies; 20 were high-grade and 5 were low-grade lesions (Table 2).

20 and 2 patients underwent neo-adjuvant (28 fractions with a total dose of 50.4 Gy) and postoperative radiotherapy, respectively. The interval between neo-adjuvant radiotherapy and surgery was at least 3 weeks. No neo-adjuvant chemotherapy was given.

24 patients underwent limb salvage surgery and one had external hemipelvectomy (owing to advanced disease). One patient had the proximal femur resected (owing to tumour invasion) and reconstructed with a proximal femoral megaprosthesys (hemiarthroplasty). 21 patients had direct wound closure; in 4 a microsurgical free flap was used. Two patients had a prophylactic intramedullary nail inserted. Surgical margins were clear in 23 and marginal in 2 patients (with low-grade lesions).

**Table 2**

| Histological diagnoses | No. of patients |
|------------------------|-----------------|
| Malignant fibrous histiocytoma | 9 |
| Liposarcoma | 8 (4 were low grade) |
| Leiomyosarcoma | 4 |
| Synovial sarcoma | 3 |
| Lymphoma | 1 |

* Two patients who had undergone inadequate resection of their tumours elsewhere were excluded
RESULTS

22 patients were available for follow-up. The mean follow-up period was 42 (SD, 33; range, 6–119) months. The overall survival rate was 81% and 72% at 3 and 5 years, respectively, and remained unchanged until the end of follow-up (Fig. 2). Four patients died from pulmonary metastases (3 had malignant fibrous histiocytomas and one a leiomyosarcoma) and one died from liver metastases (of a dedifferentiated liposarcoma). One patient underwent re-resection followed by radiotherapy for recurrence of a high-grade malignant fibrous histiocytoma, and remained free of disease after 42 months.

Seven (26%) patients developed major complications; 3 had infections (one at the donor site of a free latissimus dorsi flap, one had a deep wound infection and underwent a surgical wash-out, and one had an acute infection after hemiarthroplasty), one developed wound breakdown necessitating debridement and re-closure, one developed a giant haematoma and underwent drainage, one developed severe permanent lymphoedema, and one underwent intra-operative catheterisation for femoral artery spasm.

Five patients underwent revision surgery; one had re-resection for recurrence of the malignant fibrous histiocytoma, one had implant removal and multiple wash-outs for an infected megaprosthesys, and 3 had wound revision (one of whom had drainage of a giant haematoma).

DISCUSSION

Tumours in anatomic regions near major neurovascular structures (e.g. adductor compartment,7 cubital or popliteal fossae10–13) are difficult to resect. Major nerves, blood and lymphatic vessels traverse the adductor compartment, and if involved, may result in severe wound complications.8

In a study of 184 patients undergoing tumour resection of the adductor compartment in 3 centres, the mean local recurrence rate of 3 centres was 17% (range, 5–28%) and the mean overall survival at these 3 centres was 65% (range, 58–74%) at 5 years.7 In our study, the overall survival was 72% and the local control rate was 96% at 5 years. Results of both studies are comparable to those reporting sarcomas in other anatomic regions.14

The rate of major complications in our study (26%) was lower than in others (36%7 and 43%).9 Nonetheless, comparisons should be interpreted with caution, as the grading system for complications was not the same. In our study, only major complications deemed to require surgical intervention or leading to permanent disabilities (such as lymphoedema) were counted. Less severe complications (wound ooze or local cellulitis) were not reported.

Neo-adjuvant radiotherapy may increase the risk of wound complications,8 but in our study most patients underwent neo-adjuvant radiotherapy to contain the lesions and had a lower complication rate. Surgery was performed at least 3 weeks after radiotherapy to let local inflammation recede, and might be delayed up to 6 weeks if inflammation persisted. Complication rates did not differ significantly in patients undergoing post-, pre-, and intra-operative radiotherapy.7

Sacrificing motor nerves of major vascular structures to achieve wide margins does not per se exclude limb salvage.15 In a series of 172 patient with soft tissue sarcomas of the lower limbs treated with limb salvage, large tumour sizes, bone resection, motor nerve resection, and complications were predictive of a lower functional outcome16,17 as measured by the Musculoskeletal Tumor Society Rating Scale.18 In our study, lesions involving the proximal adductor compartment at the level of the obturator foramen and pubic ramii were associated with a worse functional outcome.

Indications for the use of soft tissue flaps appear
to be inconsistent. Flaps were used in 31% of 184 patients in 3 centres, but in each centre the range was 0 to 53%. Soft tissue in the adductor compartment is very susceptible to wound complications, even if the loss of soft tissue or skin is small. This is due to the presence of major lymphatic vessels. Further studies are needed to delineate the indications for microsurgical soft tissue coverage.

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