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Original article

Extensive limb-sparing surgery with reconstruction for sarcoma of the hand and wrist



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ABSTRACT

Background: Sarcoma rarely involves the hand or wrist. Extensive surgical excision is the current standard of care. At the extremities, such as the hand and wrist, limb-sparing surgery with reconstruction to provide optimal function is increasingly performed. A descriptive case-series study of 16 patients with sarcoma of the hand and wrist managed using limb-sparing surgery is reported here.

Material and methods: Of 19 patients with sarcoma of the hand or wrist treated between 1999 and 2012, 16 were managed using limb-sparing surgery. These were consecutive patients managed at a single-centre and studied retrospectively. The tumour involved the hand in 7 patients and the wrist in 9 patients. The procedure was primary in 6 patients, whereas 10 patients underwent secondary revision surgery. In 12 patients, reconstruction was performed for one or more of the following structures: nerves ($n=2$), tendons ($n=3$), bone ($n=3$), and/or skin ($n=8$). After surgical excision, the margins were R0 in 15 patients and R1 in 1 patient. At last follow-up, survival, pain, and function as reflected by the DASH and MSTs scores were assessed.

Results: After the median follow-up of 4.5 years [1–13], 15 patients were alive with no local recurrence and 1 patient had lung metastases. Mean values were 18 [0–49] for the DASH score and 88.8% [53–100] for the MSTs score.

Discussion: Limb-sparing surgery reconciles the need to achieve complete tumour excision with the need to restore function. No limits should be placed on tumour excision, given the availability of effective reconstructive methods. The functional outcome depends on the tolerance of adjuvant treatments, most notably radiotherapy.

Level of evidence: IV, retrospective study.

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1. Introduction

Sarcomas are malignant tumours that only rarely involve the hand and wrist. Their histological features vary widely. In all histological types, the current standard of care is extensive surgery to ensure tumour-free margins. Limb-sparing procedures are being increasingly used [1–3].

Challenges raised by the treatment of hand and wrist sarcomas include the large tumour volume and the proximity of critical anatomic structures. Nevertheless, the apparently conflicting goals of achieving both complete excision and good function can be reconciled by performing limb-sparing and reconstructive procedures.

Here, a case-series study of 16 patients with hand or wrist sarcoma is reported. The objective was to assess the effectiveness of limb-sparing tumour excision with reconstructive procedures as needed.

2. Materials and methods

In this single-centre retrospective study, 19 consecutive patients managed for sarcoma of the hand ($n=9$) or wrist ($n=10$) were managed between 1999 and 2011. Among them, 16 underwent limb-sparing surgery (Table 1); in the remaining 3 patients, (2 with osteosarcoma and 1 with synovial sarcoma), limb-sparing surgery was considered not feasible and amputation was therefore performed. For each patient, the treatment strategy was developed during a multidisciplinary meeting. None of the patients had distant metastases.

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Table 1
Limb-sparing surgery for sarcoma of the hand.

Patient no.	Age at diagnosis, years	Location	Management	Histological type	Margins	Reconstruction	Neoadjuvant treatment	Adjuvant treatment
1	46	Carpal tunnel	Revision	Peripheral sheath tumour FLNCC grade 2	Specimen 4.2 g 42*30*25 mm, Revision 10*3*3 cm, tumour measuring 3 cm	<i>Flexor tendons</i> 2-stage Hunter (STG for the second stage) <i>Median nerve</i> 2 sural grafts on 2 hemi-pads thumb/forefinger and radial edge of D3 D4	None	Radiotherapy 54 Gy 60 Gy to tumour bed
2	29	Carpal tunnel	Revision	Biphasic synovial sarcoma FLNCC grade 3	NA	<i>Flexor tendons</i> 2-stage Hunter (PL on D2, flexor longus on D3, direct suture for D4, no reconstruction of D5) <i>Median nerve</i> 2 sural grafts on 2 hemi-pads thumb/forefinger and radial edge of D3	Chemotherapy 2 MAID courses	Chemotherapy 4 MAID courses
3	78	Carpal tunnel	Primary	Well differentiated liposarcoma	59 g, 9*6.5*2.5 cm		None	None
4	40	Extensor pollicis longus	Primary	Biphasic synovial sarcoma FLNCC grade 2	Nodule 3*2.5*1 cm Specimen 7*5 cm	<i>Tendons</i> PL/ECRL and ECRB, EIP/EPL, hemiFCR/APL <i>Skin</i> Posterior inter-osseous flap	Chemotherapy 4 MAID courses	Chemotherapy 4 MAID courses
5	22	1st web space	Primary	Epithelioid sarcoma FLNCC grade 3	Lesion 5*3.5 cm Specimen 53 g 7*6 cm	<i>Bone</i> 1st ray/iliac graft + screw-plate <i>Skin</i> Posterior inter-osseous flap	None	Radiotherapy 54 Gy 60 Gy to the tumour bed
6	35	1st intermeta-carpal space	Revision	Leiomyosarcoma FLNCC grade 2	NA		None	None
7	32	1st web space	Revision	Epithelioid sarcoma	NA	<i>Skin</i> Posterior inter-osseous flap	None	Radiotherapy 54 Gy 60 Gy to the tumour bed
8	60	Ulnar edge	Revision	Clear-cell sarcoma	Induration 5 cm Specimen 10 cm	<i>Skin</i> Full-thickness skin graft	None	Chemotherapy 6 anthracycline courses
9	60	Ulnar edge	Revision	Undifferentiated superficial pleomorphic sarcoma	Specimen 5*3*1.5 cm	<i>Skin</i> Full-thickness skin graft	None	Radiotherapy 54 Gy 60 Gy to the tumour bed
10	75	Palmaris longus	Revision	Pleomorphic leiomyosarcoma FLNCC grade 3	NA	<i>Skin</i> Split-thickness skin graft	None	Radiotherapy 54 Gy 60 Gy to the tumour bed
11	50	Dorsal aspect	Primary	Myxofibrosarcoma FLNCC grade 2		<i>Bone</i> Radio-metacarpal arthrodesis, iliac graft, locking screw-plate	Chemotherapy 4 MAID courses	Radiotherapy 54 Gy 60 Gy to the tumour bed
12	77	Dorsal aspect/ulnar edge	Revision	Undifferentiated sarcoma High grade	NA		None	Radiotherapy 54 Gy 60 Gy to the tumour bed
13	44	Dorsal aspect/ulnar edge	Primary	Monophasic synovial sarcoma FLNCC grade 2	Revision specimen 6*4*1.5 cm		Chemotherapy 2 MAID courses	Chemotherapy 4 MAID courses
14	72	Dorsal aspect/ulnar edge	Revision		6*7*4 cm	<i>Skin</i> Skin graft	None	Radiotherapy 54 Gy 60 Gy to the tumour bed 1
15	63	Dorsal aspect/ulnar edge	Revision		9*1.5 cm	<i>Skin</i> Chinese flap	None	Radiotherapy 54 Gy 60 Gy to the tumour bed
16	15	Anterior aspect/Radial edge	Primary	Chemotherapy/Ewing Protocol	Chemotherapy/Ewing Protocol	Chemotherapy Ewing Protocol	Chemotherapy	Chemotherapy Ewing Protocol

NA: not available; STG: semitendinous and gracilis graft; D: digit; PL: palmaris longus; ECRB: extensor carpi radialis brevis; ECRL: extensor carpi radialis longus; EIP: extensor indicis proprius; EPL: extensor pollicis longus; hemiFCR: hemi-flexor carpi radialis; APL: abductor pollicis longus.

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