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Technical note

A technical note to prevent superficial tumor cell dissemination at fungating soft tissue tumor resection

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ABSTRACT

Dissemination of the tumor within surgical field increases the risk of local recurrences. Fungating soft tissue tumors present a special risk of contamination in the attempt to perform wide resections. We hypothesized that adequate tumor coverage at resection could prevent tumor spilling and superficial dissemination in the operation field. For this purpose we used swabs to soak secretions. Incise drapes were put over swabs to seal the tumor. Double row skin staples were placed at the edge of the adhesive drapes for lift-off-prevention. We present eight patients treated with wide resection (3 myxofibrosarcomas, 2 malignant melanomas, 1 spindle cell sarcoma, 1 basal cell carcinoma, and 1 exulcerated lipoma). No complications were observed using this technique. An intraoperative local control, confirmed histologically, was achieved in all patients. Tumor covering could help local tumor control at fungating tumor resection.

1. Introduction

Soft tissue sarcomas (STS) are rare malignancies, arising mostly deep to the fascia. Only less than one third of STS are located in the subcutaneous tissue, while the skin involvement and fungating of the tumor tissue is very rare [1,2]. Adequate surgery of soft tissue sarcomas and other malignant soft tissue tumors remain the mainstream of patient treatment [3–5]. While the tissue-sparing limb-saving surgery has become the gold standard in recent decades, removal of the malignant tumor with tumor-free margins can be challenging. Preventing intraoperative tumor spilling and thus preventing a tumor contamination must be the primary goal for surgeons.

Here, we describe a surgical technique for covering the fungating part of a soft tissue tumor, and as thus preventing tumor cells dissemination. A documentation of a case series of eight patients with fungating soft tissue tumors is presented. To our knowledge, no surgical technique was published suggesting on how to prevent a local contamination at fungating tumor resection.

2. Surgical technique

Resection is planed according to the actual preoperative MRI; a wide resection with tumor-free margins is considered as a main goal of the operation. Disinfection is performed from peripheral to central to prevent tumor tissue dissemination from the fungating part superficially to the nearby area. Every contact with the tumor is considered a contamination of the disinfectant swabs, and the swabs are disposed immediately.

The coverage of the fungating part of the tumor is performed using incise drapes, swabs and skin staples. We use adhesives drapes (Opsite® incise drape, Smith & Nephew, or 3 M™ Ioban™ Surgical Drapes), surgical compresses of various sizes (Mull Compression RK® or Gazin® RK, Lohmann & Rauscher), and Visistat® skin stapler (Teleflex®), but any similar product could fit this purpose. The number of applied swabs depends on local conditions. Important for this procedure is to cover the fungating lesion completely by swabs with a high absorbency. The swabs are held in position, and the incise drape is placed over. The size of the incise drape dressing around the contaminated tumor area depends on the local findings and must be decided individually. To reach a sufficient adhesion function and consequently a good sealing effect, enough adhesive expanse around the swab is required. In order to prevent displacement of the incise drapes because of accumulated fluids, a second fixation measure with circularly overlapping double-rowed skin staples is performed. The surgical tumor resection follows; according to the safety distance to the tumor, the

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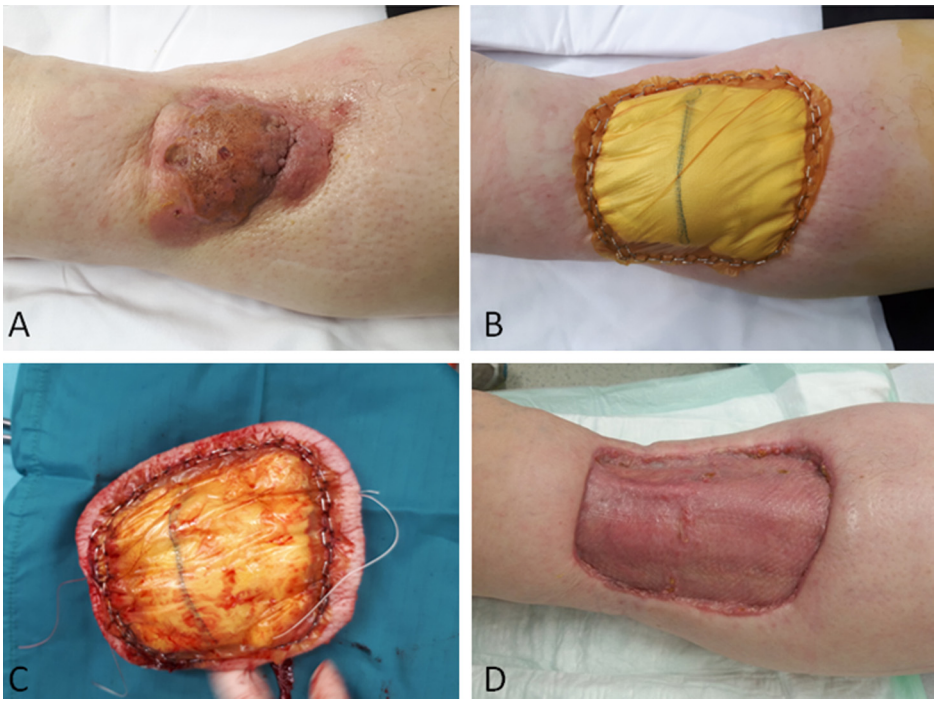

Fig. 1. A. A 66-year old patient with a fungating spindle cell sarcoma localized on the ventral part of the lower leg. B. Surgical field: the tumor is covered by using swabs, iodine coated incise drape and skin staples. C. Resected tumor with intraoperatively wide margins, about 1 cm around staples. The tumor was sent for histopathological examination and confirmed a tumor-free margins. D. Local status 6-weeks after surgery.

skin incision is performed around, outside of the skin staples area (Fig. 1). Resection in the deep follows the sarcoma surgery principles. The surgical specimen is subsequently submitted to the pathology analysis.

3. The series

Eight patients treated at the Department of Orthopaedics and Trauma, Medical University of Graz at an average age of 71 years (range: 43–89) were reviewed (Table 1).

Histology reports confirmed tumor free margins in all patients except one with myxofibrosarcoma in occipital region of the head. Here a subperiosteal resection resulted in resection margins < 1 mm. None of the patients had a local recurrence at an average follow-up of 17.6 months (range: 6–36). Neither tumor spilling or leakage was observed intraoperatively, nor reported at pathology findings. One patient with malignant melanoma and multiple lymph node metastasis died of disease 6 months after the operation. There were no infections.

4. Discussion

In the absence of effective adjuvant or neoadjuvant treatments of most malignant soft tissue tumors, a proper surgical treatment is the only curative option. A surgical approach should aim for tumor-free resection margins without any restrictions [6]. Despite wide

Table 1
The series.

Number	Sex, age (years)	Follow-up (months)	Diagnosis	Localisation	Tumor size (cm)	Tumor-free margins	Metastasis at presentation	Local recurrence	Regional metastasis (months)	Distant metastasis –localisation (months)	Final result (ANED, AWD, DOD)
1	M, 43	10	BCC	Shoulder	22 × 20	Yes	No	No	No	No	ANED
2	F, 66	11	SCS G3	Lower leg	13 × 8	Yes	No	No	No	No	ANED
3	M 88	11	MFS G2	Head, occipital	7 × 5	Basal < 1 mm	No	No	No	No	ANED
4	M 89	16	MFS G2	Lower leg	9 × 4	Yes	No	No	2	Inguinum (3)	AWD
5	M 83	18	MM	Infrascapular	7 × 8	Yes	Axillar lymph nodes	No	No	Multiple lymph nodes, thorax, brain (8)	AWD
6	F, 88	33	MFS G3	Thigh	12 × 10	Yes	No	No	No	No	ANED
7	M 57	36	Lipoma	Gluteal	17 × 12	Yes	No	No	No	No	ANED
8	M 55	6	MM	Lower leg	17.5 × 14	Yes	Multiple lymph nodes intraabdominal, inguinal	No	No	At presentation	DOD 6 M after index OP

M: male; F: female; BCC: basal cell carcinoma; SCS: spindle cell sarcoma; MFS: myxofibrosarcoma; MM: malignant melanoma; ANED: alive with no evidence of disease; AWD: alive with disease; DOD: died of disease.

resections with large safety margins, some tumors - like myxofibrosarcoma - recur frequently [7].

Reports about survival of patients with fungating STS are rare, but clearly worse than for non-fungating STS [1,2]. Local tumor control is considered important, but is not the only prognostic factor. Tumor stage, histopathologic diagnosis, grade, size, site, and depth are proven prognostic factors for survival [4].

By the application of swabs, incise drapes, and skin staples, a local superficial tumor spilling and a surgical area contamination can be prevented. The described technique seems feasible, efficient, relatively cheap and in our series with no local complications.

Disclosure of interest

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Authors' contribution

Study design MB, EM, AL. Implementing surgical technique: MB, JF, EM. Data acquisition and analysis: MB, MS, JF. Drafting the manuscript: EM, MB, MS. Revising the manuscript: EM, MB, AL, JF. Approval the final manuscript version: all.

Ethical review committee statement

No local Ethics committee approval was requested for this study or this publication.

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