

Management of Open Wounds

Lessons from Orthopedic Oncology

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KEYWORDS

• Sarcoma • Wound complications • Hyperbaric oxygen treatment • Silver dressings

KEY POINTS

- Using a multifactorial approach to the management of massive wounds will likely facilitate healing of massive, complex wounds as a result of tumor, trauma, and/or infection.
- The combination of hyperbaric oxygen treatment, wound vacuum-assisted closure therapy, and silver dressings has great potential and seem to reduce the morbidity and cost of wound management.
- Future randomized studies are needed to understand the impact of each modality better.
- Studying sarcoma patients and the complexity associated with wound care due to soft tissue loss, prior radiation exposure, and immunosuppression from chemotoxicity will likely lead to future improvements and the development of other modalities to improve wound care.

WOUND COMPLICATIONS IN SARCOMA TREATMENT

For most sarcoma patients, limb-sparing surgery is the standard of care. Functional outcome and quality of life are major concerns when considering surgical resection and reconstruction. Radiation is an effective means to reduce the incidence of recurrence, particularly in high-grade soft tissue sarcoma. However the combination of radiation and limb salvage has created its own set of complications in terms of wound complications.^{1,2} Pelvic and sacral resections remain a challenge for wound complications. A multidisciplinary approach is often needed to optimize the patient's functional and cancer outcome successfully; early referral to a sarcoma center is important (Fig. 1).

Radiation administered in conjunction with surgery is designed to eliminate tumor recurrence from close or positive margins. The risk of recurrence can be substantially reduced by using either preoperative or postoperative adjuvant radiation. The traditional method of providing radiation in

conjunction with surgery is to begin radiation after surgery once postoperative wound healing is completed. However, postoperative radiation treatment requires that the entire surgical wound be radiated. The field size is much larger than the field size that would be provided with preoperative radiation. In addition to the larger field size, the poorly oxygenated postoperative field requires a higher dose of radiation than the well-oxygenated tumor before surgery. In contrast, the use of preoperative radiation is associated with lower total radiation dose and lower volume of tissue exposed to radiation (Fig. 2). The reason for the decreased field size is that the radiation can be contoured to the tumor itself, maximizing treatment of the viable peripheral cells that can implant in the wound, rather than treating the entire postoperative wound. Because the dose and field size are reduced, preoperative radiation may be associated with better functional outcomes and a lower fracture risk, especially if the periosteum is removed to obtain a negative surgical margin.

Disclosures: Paid consultant for Stryker and Corin.

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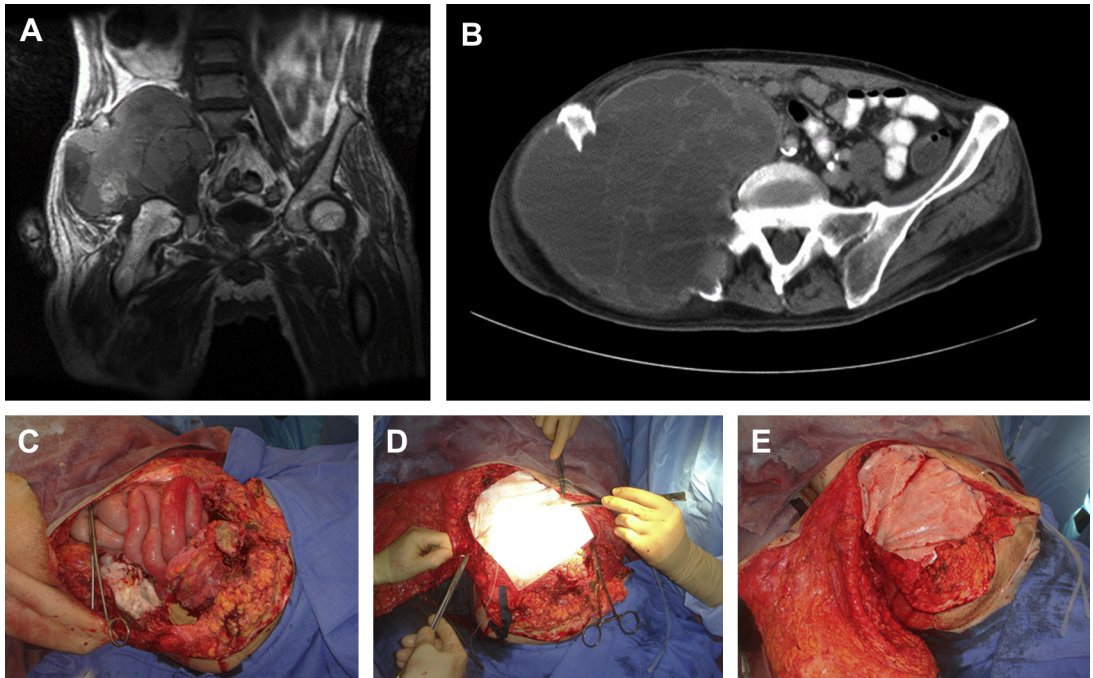


Fig. 1. (A) Coronal magnetic resonance imaging of the pelvis shows a massive telangiectatic osteosarcoma. The right hemipelvis is involved. The patient was treated with neoadjuvant chemotherapy followed by external hemipelvectomy. (B) CT scan showing a destructive lesion involving the right hemipelvis. No evidence of metastatic disease was noted on staging studies. (C) Intraoperative photo of resected right hemipelvis before abdominal wall reconstruction. Frozen section was performed at the margins of the mass and was negative for malignancy. (D) Soft tissue reconstruction was performed with a synthetic mesh graft. (E) The mesh graft was used to support the abdominal muscles and allows for neovascularization due to its porosity.

However, giving radiation before surgery is associated with a higher risk of wound-healing complications after surgery (Fig. 3).³ Intensity modulated radiotherapy has the potential to reduce the surgical complication rate following preoperative radiation by protecting the superficial tissues that heal the wound as well as the underlying bone. However, intensity modulated radiotherapy requires a

collaborative team of surgeons, radiation oncologists, and physicists to permit precise targeted radiotherapy delivery to very select volumes. This review covers the application of wound vacuum-assisted closure (VAC), silver-plated dressings, and hyperbaric oxygen treatment (HBOT) in the orthopedic oncology patient with a complex open wound.

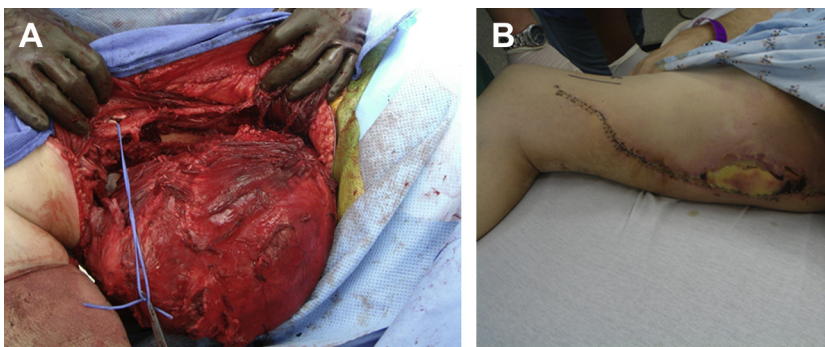


Fig. 2. (A) Large high-grade soft tissue sarcoma involving adductor compartment of thigh. The patient underwent preoperative radiation treatment. (B) Two-week postoperative picture showing sutures in place and a zone of skin necrosis. This wound required a debridement, wound VAC treatment, followed by delayed closure.

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