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Use of tissue expander in pelvic Ewing's sarcoma treated with radiotherapy

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Abstract

Introduction: The local treatment option for pelvic Ewing sarcoma (ES) remains uncertain and challenging as surgery is often disabling while radiotherapy alone has a higher risk of local recurrence but not necessarily a worse survival. The aim is to analyse the outcome of patients with pelvic ES after radiotherapy as the primary local treatment in combination with a temporary intrapelvic surgically placed tissue expander (TE) to reduce bowel complications.

Materials and methods: 20 patients were retrospectively analysed. All patients had neoadjuvant and adjuvant chemotherapy. We identified survival, time to develop local recurrence and metastasis, dose of radiotherapy administered, local complications related to the use of the tissue expander and bowel effects of radiotherapy.

Results: The median follow-up was 41 months. 14 patients were stage IIb and six stage III. There were no problems after insertion of the TE and only one patient who developed mild diarrhoea. Local recurrence occurred in six patients. At the last follow-up 12 patients have died from sarcoma, five are disease free and three have had recurrent disease.

Conclusions: In this paper we reviewed pelvic Ewing sarcoma with all the special considerations that this entails. We think that tissue expander can be safely used when radiotherapy is chosen to treat pelvic ES. It does appear to prevent bowel problems and is a low morbidity procedure. New treatment approaches should be considered to give a chance of cure to those patients with "bad prognostic" pelvic ES.

Keywords: Pelvic Ewing sarcoma; Tissue expander; Bowel effects of radiotherapy

Introduction

With current multimodal treatment protocols, local control and the survival rate for Ewing sarcoma (ES) has improved significantly. In the case of pelvic ES however there remains uncertainty about the best option for local treatment.[1] Most series report a worse outcome for pelvic compared to limb ES and this is due to the large size of pelvis ES at the time of diagnosis and the greater incidence of metastatic disease, as well as the histologic response to chemotherapy and the anatomical site.[2] Local control is also far more of a challenge in pelvic ES as surgery is often disabling whilst it is generally accepted that radiotherapy alone has a higher risk of local recurrence but not necessarily a worse survival.[3]

Pelvis ES tumours are often very large, even extrapelvic or crossing the midline and they invade the neurovascular bundle or surround the sciatic or femoral nerves. The extension and invasion of these structures may limit resectability. Surgical excision is technically demanding, with high morbidity and inadequate margins. Functional results are often poor.[1] On the other hand, radiotherapy has short-term adverse effects (skin, bowel) as well as long-term effects (radioinduced sarcoma, bone and bowel damage).[4,5]

If radiotherapy is chosen as the local treatment in pelvic ES, the bowel is a dose-limiting structure in this region.[4,5] Many surgical and non-surgical methods have been used to

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move away the bowel to reduce the incidence and duration of acute morbidity.[6]

The aim of this study was to retrospectively analyse the outcome of patients with pelvic Ewing sarcoma when radiotherapy was used as the primary local treatment in combination with a temporary intrapelvic surgically placed tissue expander (TE) intended to reduce bowel complications.

Material and methods

During the last 25 years we identified 27 patients with pelvic ES treated locally with radiotherapy that had a TE inserted prior to that treatment. Seven patients were not included in the study because of insufficient data. 20 patients were retrospectively analysed. There were 12 women and eight men, with a median age at presentation of the tumour of 16.5 yrs (range, 10–49). None of them had previously received any local treatment. Patients were staged before biopsy, re-staged after two cycles of chemotherapy and discussed at a multidisciplinary team meeting to assess the best treatment option for each patient. Radiotherapy was identified as best treatment in this group of patients because the tumours were usually of large size and surgical resection would have resulted in major morbidity, often with an involved margin of excision or due to patient choice.

Radiotherapy was delivered as primary local treatment in all patients. The median dose of radiotherapy was 54.4 Gy (range, 27.2–59.4 Gy). Two patients received palliative dose of 27.2 and 30 Gy. The former had skip metastasis at diagnosis and the latter developed lung metastasis during chemotherapy.

A TE was used following discussion with the clinical oncologists about the likelihood of severe radiotherapy induced damage to the bowel. The most common indication was to move the ileocaecal valve out of the way of the radiotherapy field for tumours involving the right ilium.

Surgical technique

Once radiotherapy was decided as definitive local treatment, the patient was scheduled to have a TE inserted between chemotherapy cycles. The TE used was manufactured by Nagor®. It was inserted under general anaesthesia with the patient prone but with a sandbag under the affected side. An incision was made just anterior to the superior iliac crest. The muscle layers of the abdominal wall were separated and the retroperitoneal space entered, anterior to iliacus, taking great care not to breach the tumour or the peritoneum. The TE was then placed anterior to psoas and iliacus and was filled with saline in different quantities depending on the size of the patients, though 500 ml was the most common volume used. The TE has a small port which can be used to either withdraw or insert more fluid and this part of the device was left subcutaneously, just in case further filling would be necessary during radiotherapy planning (Figs. 1 and 2). The wound was closed in layers and the patient allowed up the next day. All patients went home within 48 h of the surgery. The TE was usually removed once all chemotherapy and radiotherapy was completed. The incision was reopened, the fluid withdrawn and the TE deflated and then removed and the wound closed.

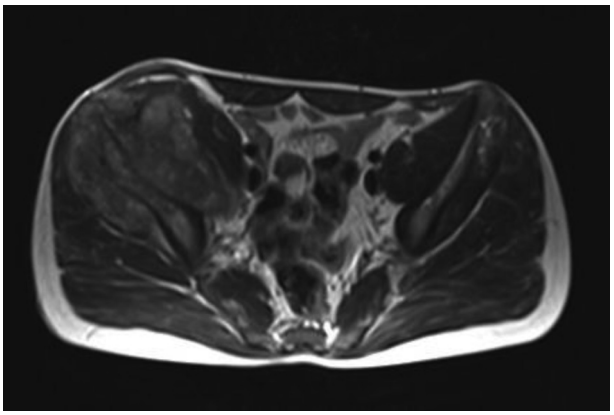

Figure 1. Axial MRI of the pelvis showing a Ewing sarcoma of the right ilium with a large soft tissue component involving iliacus and gluteus minimus.

Specific treatment

After insertion of the TE, they subsequently continued with chemotherapy and then had radiotherapy, once the wound healed. All patients received neoadjuvant and adjuvant chemotherapy. The protocols varied depending on the

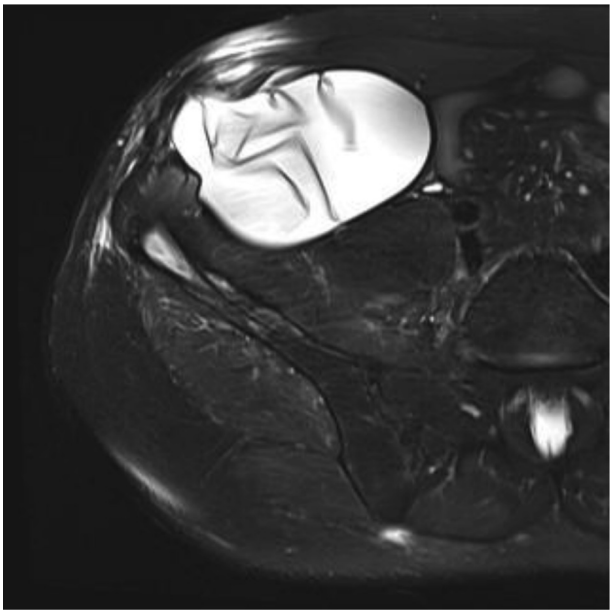

Figure 2. Following neoadjuvant chemotherapy a tissue expander was inserted in the right iliac fossa. This MRI taken following radiotherapy shows how the tissue expander has displaced the bowel out of the radiotherapy field. There has been dramatic shrinkage of the tumour following chemo/radio-therapy.