Implantation metastasis in a 13-year-old girl: A case report

C Singh, S Ibrahim
Department of Orthopaedics and Traumatology, Hospital University Kebangsaan Malaysia, Cheras, Kuala Lumpur, Malaysia
KS Pang
Department of Pathology, Hospital University Kebangsaan Malaysia, Cheras, Kuala Lumpur, Malaysia
S Shanti
Department of Radiology, Hospital University Kebangsaan Malaysia, Cheras, Kuala Lumpur, Malaysia

ABSTRACT

We report a case of a 13-year-old girl with an osteosarcoma of the right humerus, which had been diagnosed as an aneurysmal bone cyst at our institution. She underwent curettage and bone grafting of the lesion, which resulted in implantation metastasis of the tumour to the ilium. She died 15 months after presentation owing to pulmonary metastases. This report highlights the possibility of metastasis occurring by direct implantation to a graft donor site. We strongly recommend that a biopsy be performed in cases of presumed benign lesions before proceeding with the definitive surgery.

Key words: neoplasm metastasis; osteosarcoma; transplants

CASE REPORT

A 13-year-old Malay girl presented to the Hospital University Kebangsaan Malaysia, Kuala Lumpur, Malaysia in February 1999, with pain and swelling of the right arm after a fall. She had had vague pain at the right shoulder for about one month before the fall. The pain was dull and intermittent, and had no obvious relieving or precipitating factors. The patient had no loss of appetite or weight. There was no family history of bone tumour.

Physical examination revealed a healthy well-built adolescent, with a swelling of 3 x 3 cm at the upper third of her right humerus. The swelling was diffuse, smooth, and hard in consistency. It was warm, tender, and fixed to the underlying structures. The axillary and cervical lymph nodes were not palpable, and there were no signs of neurovascular deficit. In addition, the range of motion of the right shoulder joint was reduced because of pain.
Results of all the laboratory tests were within the normal ranges; these included a full blood cell count, renal profile, erythrocyte sedimentation rate, and a liver function test. A radiograph of the right humerus revealed an expansile lytic lesion within the proximal metaphyses, and a pathological fracture (Fig. 1).

The patient was treated initially with analgesics (tab Diclofenac sodium 50 mg, 3 times a day) and a Plaster of Paris U-slab. She returned to the emergency department before her next appointment owing to the sudden onset of pain and increase in the size of the swelling.

A preoperative diagnosis of aneurysmal bone cyst was made at our institution on the basis of the clinical examination results, X-rays, and magnetic resonance images. Surgical management consisted of curettage, biopsy, and bone grafting using a graft taken from the left iliac crest. Intra-operatively, it was noted that the lesion had a thin cortical shell, and was fleshy and vascular. The diagnosis of telangiectatic osteosarcoma was only made postoperatively following histopathological examination of the specimen from the humerus, which revealed pleomorphic tumour cells producing osteoid and prominent vascular spaces (Fig. 2). However, computed tomography of the lungs and bone scanning did not reveal any metastatic lesions. The patient was referred to an oncologist and underwent 3 courses of adjuvant chemotherapy.

A surgeon from another hospital performed limb-salvage surgery at another institution 3 months after the primary operation. The right humerus was reconstructed using an allograft (preserved bone from the local bone bank) and an endoprosthesis. This endoprosthesis was augmented with a vascularised fibular graft and a latissimus dorsi flap. Histopathological examination of the resected humerus specimen confirmed the diagnosis of telangiectatic osteosarcoma. There was moderate tumour necrosis.

Five months later, the patient presented with an abscess over her right arm and a swelling at the left ilium overlying the bone graft site. X-ray of the pelvis showed destruction of the left ilium. The abscess on the right arm was drained and an incisional biopsy of the left ilium was performed. Culturing of samples from the right arm yielded *Staphylococcus aureus*. Histopathological examination of the left ilium swelling showed similar pathology to the right humerus—telangiectatic osteosarcoma—and a diagnosis of tumour metastasis was made. The left iliac swelling increased in size, and was associated with
pain and nocturnal pyrexia. Palliative radiotherapy was given to the left ilium but the response was poor, and the left iliac mass progressively increased in size and ulcerated (Fig. 3). A chest X-ray showed multiple pulmonary metastases. The patient developed pneumothorax, haemorrhagic pleural effusion, and severe anaemia, and died 15 months after presentation owing to pulmonary metastases.

**DISCUSSION**

Implantation metastasis is defined as metastasising tumour that seeds into a wound or tissue; a significant number of viable malignant cells need to be implanted to the wound.\(^2\) Two theories might explain how this happened in our case. Firstly, the lesion may have arisen as a result of contamination of the original donor site. Secondly, the tumour may have arisen as a result of direct haematogenous spread to the pelvic area, which was rich in blood supply.

To the best of our knowledge, there are only 2 reports in the literature of metastasis from a tumour to the bone graft donor site. The first case is similar to this one—a patient who had undergone curettage and resection of a presumed benign lesion of the tibia (later recognised as osteosarcoma) had probable iatrogenic transplantation of tumour to the contralateral ilium, which had served as donor site for a bone graft.\(^1\) In the second case, a patient with pelvic osteosarcoma was treated by resection and vascularised fibular grafting.\(^3\) The patient developed metastasis at the donor site of the bone graft. We therefore strongly recommend that a biopsy be performed in cases of presumed benign lesions before proceeding with the definitive procedure.

**REFERENCES**