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Case Reports

A patient with scapular Ewing sarcoma; 5-year follow-up after extracorporeal irradiation and re-implantation of the scapula, a case report



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ABSTRACT

In 2007 a 9½-year-old boy was treated with resection, extracorporeal irradiation and re-implantation of the right scapula. He also received chemotherapy.

During five year follow-up shoulder function remained largely intact. Subtotal resorption of the scapula occurred, leaving only the glenohumeral joint intact. Sensibility and strength are intact. To date there is no sign of local or metastatic recurrence.

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1. Case

In September 2007 a 9½-year-old boy was diagnosed with a Ewing sarcoma (EWS-FL1 translocation positive) of the right scapula. MRI showed a tumor of 8.0 × 2.9 × 6.2 cm located in the right scapula with dorsal displacement of the infraspinatus and teres minor muscles (Fig. 1). The tumor extended in to the glenoid, but the shoulder joint was not contaminated. Staging, including bone scan (Fig. 2) and CT-imaging, did not show metastatic lesions. The child was treated with chemotherapy according to the EURO-EWING 99 protocol [1]. After 6 VIDE courses soft tissue involvement was absent on MRI. Intraoperative extra-corporeal irradiation (IEI) was chosen since functional results with scapula prostheses are poor [2]. After the resection of the scapula pathologic samples were taken from the specimen: vital tumor cells were seen on the surface of the dorsal part of the periosteum. The resected scapula was irradiated with a tumoricidal dose of 120 Gy by means of 6 MV photons (Fig. 3), creating dead autologous bone graft of the correct dimensions for re-implantation and reconstruction [3].

During irradiation the scapula was kept in a plastic bag filled with sterile fluid. After resection the scapula was re-implanted into the body. Tendons and muscles were re-inserted. The boy was treated with postoperative chemotherapy according to the earlier mentioned protocol.

During follow-up regular MRI and radiographic imaging was performed to check for local or metastatic recurrence of the Ewing sarcoma.

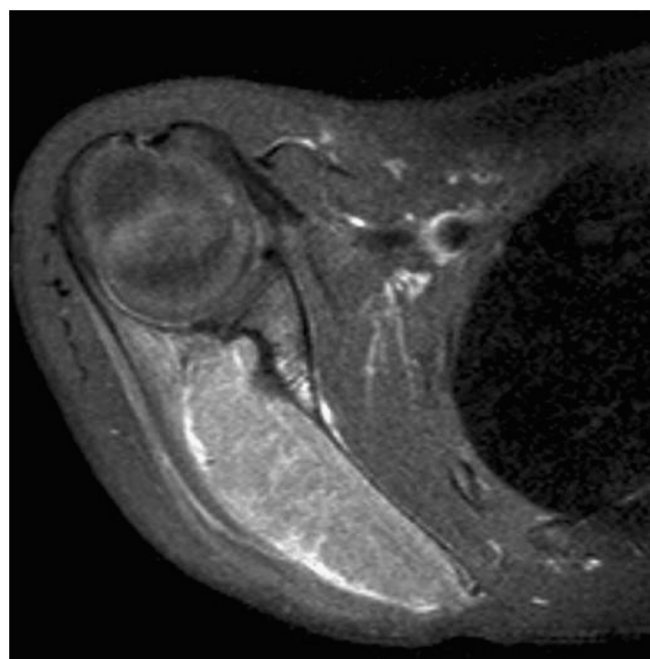


Fig. 1. MRI showed a 8.0 × 2.9 × 6.2 cm tumor in the right scapula.

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Postoperative examination of shoulder function gives ante-flexion of over 160°, abduction of over 160° (Fig. 4), exorotation to 60°, endorotation to the left scapula as shown in Fig. 4. Sensibility and strength are intact.

At five year follow-up there has been subtotal resorption of the scapula (Fig. 5), leaving the glenohumeral joint intact. Remaining shoulder function gives ante-flexion of over 120°, abduction of 100°, exorotation to 60°, endorotation to the left scapula as shown in Fig. 6. Sensibility and strength are intact.

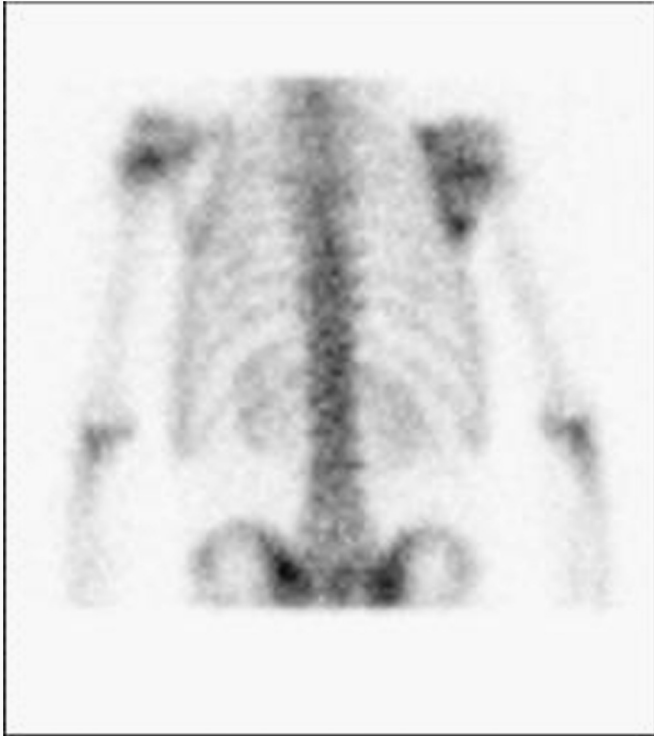


Fig. 2. Bone scintigraphy showed no sign of metastasis.



Fig. 3. Extracorporeal irradiation with 120 Gray dose.



Fig. 5. Subtotal resorption of the scapula, leaving the glenohumeral joint intact.



Fig. 4. Post-operative range of motion.

2. Discussion

Malignant tumor of the scapula is a rare condition. Several surgical treatment types are available, such as total scapulectomy, constrained prosthesis and scapular allograft. All of these surgical treatment options result in very little or no shoulder function [2,4–7].

Resection, extracorporeal irradiation and re-implantation (IEI) is described in literature as a treatment option for bony malignancy [3,8–15]. It has been used in incidental cases, both in Ewing Sarcoma and other bone tumors [3,9,11–15]. As far as we know IEI had never been described in a child with a scapular Ewing sarcoma.

Types of cancer affecting the scapula described in literature are chondro sarcoma, synovial sarcoma, Ewing sarcoma (ES) and metastasis [4–7,16,17]. Modern treatment of ES of bone in children and adults consists of chemotherapy and local treatment by surgery or radiotherapy or a combination of both. If possible,



Fig. 6. Range of motion at five year follow-up.

surgery with appropriate margins alone is the preferred local treatment.

Resection, IEI and re-implantation of the scapula combined with chemotherapy has proven to be a successful treatment option in this young patient with malignancy of the scapula and without metastatic disease. This case shows that shoulder function can remain largely intact at 5 year follow-up because of preserved glenohumeral joint function.

Contributions of authors

D. Hoornenborg and E. S. Veltman were responsible for drafting the manuscript and reviewing the literature. F. Oldenburger was responsible for the radiotherapy. G. R. Schaap treated the patient as orthopaedic surgeon. G. R. Schaap and J. A. M. Bramer were responsible for the final review of the manuscript.

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