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Follow-up assessment of patients undergoing surgical treatment of Ewing's sarcoma: An observational study

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Abstract
Background: *One of the most common bone cancer affecting the paediatric population and adolescents is Ewing's sarcoma. Hence; we planned the present study to carry out follow-up assessment of patients undergoing surgical treatment of Ewing's sarcoma.*
Materials & Methods: *We planned the present retrospective study on 25 patients with Ewing's sarcoma of the bone, who underwent surgical treatment for the same. We recorded the complete radiographic investigation details of all the patients from their respective record files. Surgical intervention included resection followed by intercalary reconstruction. Detailed radiographic records of all the patients were obtained on follow-up at different time intervals. All the records were assessed by SPSS software.*
Results: *ES was present at the extremeties in 24 patients while in a single case, ES was present in the axial location. Deep wound infection was present in single patients while superficial wound infection was present in 2 patients on follow-up. Local recurrence was seen in 1 patient. Recurrence with distant metastasis was found to be present in 1 patient. Implant failure occurred in 1 patient.*
Conclusion: *Improvement in the prognosis of patients with ES occurs in patients when adequate adjuvant chemotherapy, radiotherapy and surgery are used.*
Keywords: *Ewing Sarcoma, Surgical, Treatment.*

Introduction

The second most common bone cancer affecting the paediatric population and adolescents is Ewing's sarcoma (ES). It accounts for approximately one tenth of all primary bone tumours. Most of the affected patients are between 10 to 20 years of age.[1-3]

With the advancement in the diagnostic radiological techniques such as magnetic resonance imaging (MRI), extra skeletal tissues can be depicted clearly and the tumor area can be accurately evaluated. Due to improvements in intensive chemotherapy, the prognosis of ES patients has improved markedly. The current chemotherapy protocols used to treat ES include various combinations of the following six drugs: doxorubicin (DOX), cyclophosphamide (CPM), vincristine (VCR), actinomycin-D (ACT-D), ifosfamide (IFO), and etoposide (ETO).[4, 5]

Local ES lesions are usually treated via surgical excision or radiotherapy, or a combination of both. In cases in which surgical excision is not possible due to the large size of the tumor, its anatomical location, or the fact that the acquired surgical margin is not sufficient to achieve local control, pre- or postoperative radiotherapy is usually selected.[6, 7] Hence; we planned the present study to carry out follow-up assessment of patients undergoing surgical treatment of Ewing's sarcoma.

Materials & Methods

We planned the present retrospective study on 25 patients with Ewing's sarcoma of the bone, who underwent surgical treatment for the same. Inclusion criteria for the present study included:

- Subjects in which complete follow-up details was available from the data records.
- Data records of the patients who were histopathological diagnosed with ES of bones excluding craniofacial bones,
- Patients in which follow-up data records of atleast 2 years was available

Complete demographic and clinical details of all the patients were obtained from the data records. We recorded the complete radiographic investigation details of all the patients from their respective record files. Initially, all the patients underwent neoadjuvant chemotherapy. As per data record, radiotherapy was also given to patients with significantly large tumours. On the basis of the age of the patient and site and size of the tumour, surgical planning was done. Surgical intervention was carried out. Examination details of the wound on the postoperative follow-up were obtained at different time intervals. Detailed radiographic records of all the patients were obtained on follow-up at different time intervals. All the records were assessed by SPSS software, followed by evaluation by chi-square test for assessing the level of significance.

Results

A total of 25 patients of ES were included in the presnet study. Mean age of the patients of the present study was 14.6 years. Among these 25 patients, 15 were males while remainig 10 were females. Metastatsis was present in 5 patients at the time of presentation. ES was present at the extremeties in 24 patients while in a single case, ES was present in the axial location. Deep wound infection was present in single patients while superficial wound infection was present in 2 patients on follow-up. Local recurrence was seen in 1 patient. Recurrence with distant metastasis was found to be present in 1 patient. Implant failure occurred in 1 patient.

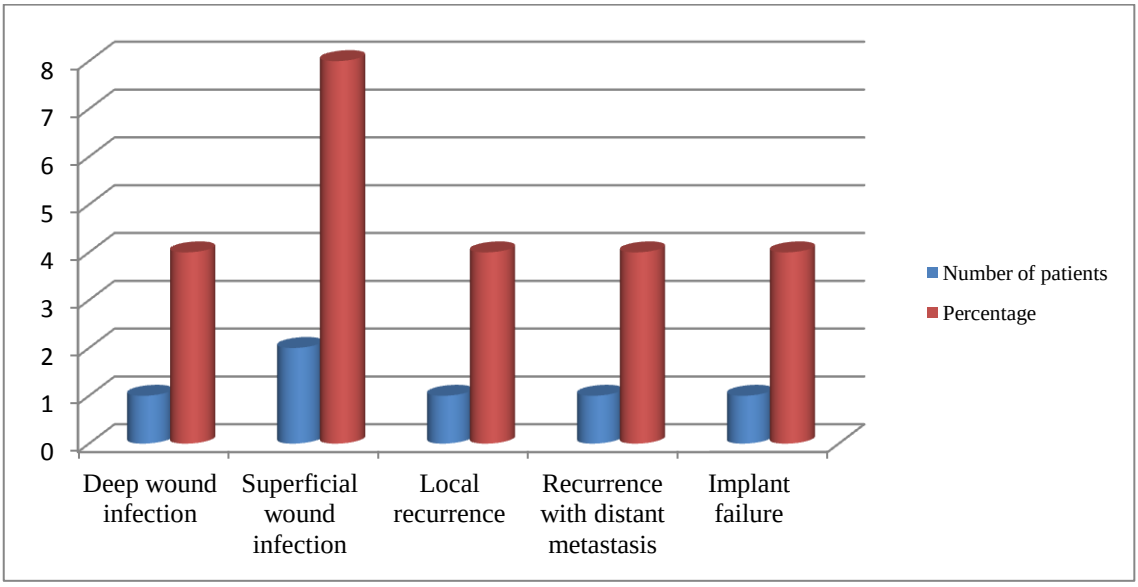
Table 1: Details of the patients included in the present study

Parameter		Value
Mean age (years)		14.6
Gender	Males	15
	Females	10
Metastasis at presentation	Present	5
	Absent	20
Site	Axial	1
	Extremities	24

Table 2: Complications

Complication	Number of patients	Percentage
Deep wound infection	1	4
Superficial wound infection	2	8
Local recurrence	1	4
Recurrence with distant metastasis	1	4
Implant failure	1	4

Graph 1: Description of complications



Discussion

In the presnet study, we analyzed a total of 25 patients of ES. Deep wound infection was present in single patients while superficial wound infection was present in 2 patients on follow-up. Local recurrence was seen in 1 patient. Recurrence with distant metastasis was found to be present in 1 patient. Implant failure occurred in 1 patient.

In one of the previous study, Tiwari A et al assessed the prognosis of outcome of multimodality treatment of ESFT of the extremities. They evaluated 32 hisotpathologic cases of Ewing's sarcoma who received treatment for the same. The majority of patients had involvement of the femur (35%), followed by tibia (17%), fibula and foot (15% each), humerus (12%) and soft tissue of thigh (6%). Twenty-nine patients presented with localized disease (Enneking stage II B) while five patients presented with metastases (Enneking stage III). All patients received Vincristine, Actinomycin D, Cyclofosfamide + Ifosfamide and Etoposide (VAC+IE)-based chemotherapy and local treatment was offered to all but three patients having multicentric disease. Radiation therapy and combination of surgical and radiation therapy were the local treatment offered in their study patients. They analysed the oncological outcome in all the patients by assessing their clinical, radiological and functional profile. They did assessment of outcome by using musculoskeletal tumor society (MSTS) score. These outcomes were correlated with age, sex, size of tumor, stage at presentation, modality of local treatment and site of relapse. At the final follow-up (mean, 26 months; median, 17 months; range, 3–97 months), the overall and event-free survivals were 47 ± 12% and 34 ± 9%, respectively. Sixty-two percent of the patients presented with a tumor size more than 8 cm. On correlation with age, sex, size of tumor, stage at presentation, modality of local treatment and site of relapse, no correlation of survival was seen with any of the variables except event-free survival with size of the tumor. The functional outcome of all the patients was satisfactory (MSTS score >16 out of 30). No patient underwent amputation. Although the demographic profile, stage at presentation and the local and systemic treatment regimen followed in our study was similar to the world literature, the outcome of Ewing's sarcoma in Indian patients were found to be inferior to that reported in the western literature.[8]In one of the previous studies, Laffosse JM et al described their experience with long bone reconstructions in paediatric patients and young adults after resection of initial neoplastic osseoustumors. They analysed a total of

13 subjects with mean age of 12 years. Ewing tumor, osteogenic sarcoma and neuroepithelioma were predominant pre-surgical diagnosis. Preoperative and postoperative chemotherapy was given to all the patients except for one patient. Adjuvant radiotherapy was given to four patients. A gap was created by tumour resection. Vascularized fibular flap along with complemented corticocancellous autograft were used for all reconstruction procedures. In all the cases, complete carcinological resection was done. For a time period of 5 months, follow-up of all the patients was done. They didn't find any case of local recurrence. Pulmonary metastasis was present in 3 patients. Complications observed in their study were skin necrosis, non-union, disassembly, and spontaneous fracture which healed. There were four donor site complications: retraction of the hallux flexor (n=3), regressive paresia of the common fibular nerve (n=1). The rate of healing in this series was similar to earlier reports. Healing was always achieved for the distal focus but not for the proximal focus which receives its blood supply from a branch of the anterior tibial artery which is not harvested.[10] Following malignant tumour resection, in one of the previous studies, authors assessed the survival of pedicled vascualrized fibula graft in reconstructing middle and distal tibia defects. From the results, they concluded pedicled vascularized fibula is a significant instrument in the limb salvage surgical protocol. The procedure is of shorter duration, comparatively cost effective with minimal adverse effects.[11]

Conclusion

Under the light of above obtained data, the authors conclude that improvement in the prognosis of patients with ES occurs in patients when adequate adjuvant chemotherapy, radiotherapy and surgery are used. However; further longitudinal studies are recommended for better exploration of the results.

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