Limb salvage in paediatric bone tumour: 2 cases

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Sri Lanka Journal of Child Health, 2021; **50**(3)**:** 546-549
DOI: http://doi.org/10.4038/sljch.v50i3.9745
(Key words: Osteosarcoma, limb salvage surgery, arthrodesis, endo-prosthetic arthroplasty)

Introduction -
Loss of limb in childhood might be of a devastating nature in multidimensional aspect from present to the future from psychosocial well-being and acceptance, quality of life, family impact with fluctuating financial crisis[1]. Amputation is also an accepted life-saving surgical procedure performed throughout the globe for varied pathologies like traumatic mangled extremities, malignancies and infection saving life but at the cost of compromising its quality later[2]. Selection of type of limb salvage for the malignancy remains challenging till date with its inherent compromises and surprises.

Case 1
A six year old female child, accompanied by her parents, visited the Sri Ramachandra University orthopaedic outpatient department in September 2018 with complaints of pain and swelling in the right knee and thigh, following a history of slip and fall while playing in the school 4 months back. Immediately following the incident, she developed swelling but was able to walk and carry on with her regular daily activity. She was treated at her hometown with native indigenous methods, since the swelling did not subside for 2 weeks and then visited hospital. Radiological investigations were done. X-ray revealed sclerotic lesion over right proximal tibia (Figure 1), which necessitated higher imaging like magnetic resonance imaging (MRI) and computed tomography (CT) scan.

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(Received on 22 August 2020: Accepted after revision on 16 October 2020)

The authors declare that there are no conflicts of interest

Personal funding was used for the project.

Figure 1: ***Initial x-ray showing sclerotic lesion over right proximal tibia***

Paediatric oncologist opinion was obtained, planned for core needle biopsy, which showed features favouring osteosarcoma. Positron emission tomography (PET) scan showed no evidence of distant metastasis. She was started on medical management with two cycles of chemotherapy. Child was on chemotherapy till December 2018. Follow up X-rays were taken in December 2018, which showed aggressive growth on right proximal tibia (Figure 2).

Figure 2: ***Post chemotherapy x-ray showing aggressive growth on right proximal tibia***

Multidisciplinary team approach was carried out involving surgical oncologist, paediatric oncologist, plastic surgeon, anaesthetist and orthopaedic surgeon. Finally, after explaining to the child's parents about the advantages and disadvantages of surgery and getting informed consent, the limb salvage procedure was carried out in January 2019. Surgery consisted of right knee resection arthrodesis

with autogenous left vascularised fibular graft and internal fixation with plate and screws. The child is now ambulatory with full weight bearing, walking with orthotic splint support. Education-wise child is attending online classes temporarily stopped from school 2nd grade by 2018 because of the difficulty in addressing toilet activities at school. Follow up x-rays after surgery are shown in Figures 3 and 4. Figure 5 shows the healed surgical scar on the right leg and figure 6 shows weight bearing.

Figure 3: Immediate postoperative January 2019

Figure 4: Post-operative May 2020

Figure 5: ***Right leg healed surgical scar***

Figure 6: ***Full weight bearing***

Case 2

A 16 year old male child visited the Sri Ramachandra University Orthopaedic OPD in October 2019 with right knee swelling and pain with healed surgical scar over right proximal tibia (Figure 7).

Figure 7: ***Right knee with post-biopsy scar***

He had sustained an injury to his right leg while playing in June 2019, following which he developed swelling over right leg, gradual and progressive onset associated with rest pain and night cries. He was evaluated clinically and radiologically (Figure 8) at another hospital for the same initially, worked with post biopsy and report suggestive of right tibia osteosarcoma and underwent 3 cycles of chemotherapy, presented to us for further management.

Figure 8: ***X-ray suggestive of right tibia osteosarcoma***

Retrospective analysis of the situation was carried and after confirmation of diagnosis, multidisciplinary team approach and discussion was done. Limb salvage procedure (right knee arthroplasty with modular endo-prosthetic reconstruction) was carried out in October 2019 (Figure 9). He defaulted from the first review following surgery and we were unable to establish communication with him thereafter as his contact number was invalid.

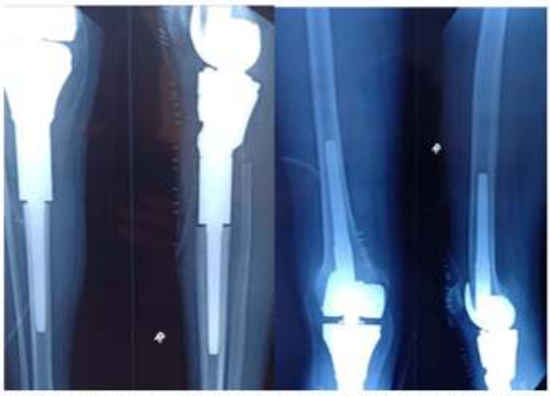

Figure 9: ***Right knee endoprosthetic arthroplasty***

Discussion

Amputation leads to a lifelong need for a prosthetic leg, pain, phantom limb sensation, stump problems like bleeding, stump bony overgrowth, infections and assistive walking devices[1]. Recent multimodal availability of oncological imaging, regimen based chemotherapy and surgical limb sparing give better long-term survival rates. Long-term survivors of bone malignancy have to overcome the negative effects of surgeries, possibility of recurrences and metastases, diminished bone mineral density due to chemotherapy, under-nutrition, reduced physical activity, delayed onset of puberty, increased risk of pathologic fractures, limb length discrepancy and perhaps second primary neoplasms[1]. Arthrodesis includes donor site morbidity, non-union, allograft failure and poor joint activity whereas arthroplasty includes infections, aseptic loosening, wear of joint components, dislocations, prosthesis breakage and fatigue, fractures, revision surgeries and secondary amputation[3,4,5].Limb sparing surgeries yield satisfactory psychological results but different outcomes[6]. Sequelae of surgical choices in childhood bone malignancy is multidirectional, competing with each other with its sequel of benefits and disadvantages.

Limb salvage surgeries in growing bones for malignant tumour with or without functional compromise of limb could be an another alternative with the improved variety of endo-skeletal prosthesis which needs critical selection pertaining to age, survival rate and guidance on tailoring treatment for individual growing long bone malignancies.

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