CASE REPORT

Growing Endoprosthesis in Management of Bone Tumours in Malaysia

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SUMMARY

This is to report on the use of growing endoprosthesis, also known as lengthening prosthesis in the management of four patients in the paedriatic age group in the Orthopaedic Oncolgy Unit at University Malaya Medical Centre. These are custom made prosthesis, designed and made in India based on measured roentrograms. The ages of these patients vary from 6 to 13 years old. These are cases of Osteosarcoma and Ewing's sarcoma around the knee. This is the first time these custom made prosthesis have ever been used in Malaysia. We feel that this is a feasible option for limb salvage in the treatment of primary bone tumours in growing children.

KEY WORDS:
Growing endoprosthesis, Bone tumours

INTRODUCTION

Amputation was the primary choice of surgical treatment in musculoskeletal oncology in 19th century due to frequent recurrence and high mortality rate following tumour resection[1]. Subsequently, it was discovered survival was very much dependant on chemotherapy regime rather than surgery alone. Thus, with the introduction of better chemotherapy regimes, limb salvage has now become a feasible option in the management of these patients [2,3]. Endoprostheses only emerged after the 2nd World War. They are used for reconstruction of large bone defects in musculoskeletal surgery[3]. The usage of allografts, after tumour resection was initiated by Ottolenghi[4]. Reconstruction of large bone defects in a growing child has always been a challenge. With the invention of lengthening prosthesis, we manage to overcome this problem. This is a description of four such cases involving the lower limbs.

CASE 1

A six year old boy presented with a painful, growing swelling over the left distal thigh for three months. Roentgenogram and magnetic resonance imaging showed features suggestive of Ewing's sarcoma of the distal left femur. The diagnosis was confirmed by core needle biopsy. Computed tomography of the chest revealed no lung lesions. He was given neo-adjuvant chemotherapy. The tumour responded very well and shrunk dramatically. Sixteen centimetres of the distal femur was excised with wide margins and a custom made growing cemented endoprosthesis was inserted.

CASE 2

An eight year old boy presented with a painless swelling over his right knee, progressively increasing in size in the past four months. He was otherwise well without any constitutional symptoms. Core needle biopsy confirmed the roentgenogram and magnetic resonance imaging diagnosis of osteosarcoma of the proximal right tibia (Figure 1). He too was treated with neo-adjuvant chemotherapy, followed by wide excision of the proximal tibia and endoprosthesis replacement (Figure 2).

CASE 3

Another 13 year old boy came complaining of left knee pain and swelling after a trivial fall. He was still able to walk around but with a limp. Roentgenogram showed an osteolytic lesion over the proximal part of the left tibia. MRI revealed extensive involvement of proximal tibia. Core needle biopsy confirmed the lesion as osteosarcoma. Similar to case 2, proximal tibial excision and a growing endoprosthesis was inserted.

CASE 4

A 13 year old boy, presented with swelling of the right thigh. MRI and roentgenograms showed involvement of almost the whole femur. Biopsy confirmed the diagnosis of osteosarcoma. Staging computed tomography of the chest did not reveal any lung metastasis. He underwent a total femur resection and a growing prosthesis replacement.

DISCUSSION

Primary bone tumours like osteosarcoma and Ewing's sarcoma frequently occur around the knee, shoulder and wrist. Limb salvage surgery has now become the standard method of treatment for these tumours. Limb salvage can be carried out with various options such as allograft, allograft implant composite and endoprosthesis. Majority of these patients are children and teenagers, with still potential for growth. Therefore, limb salvage with the objective of preserving the function of the joint in this age group is a challenge. Growing endoprosthesis were introduced to accommodate for the increase in length of the limb due to normal growth. They are custom made prosthesis, template based on patient's own bone. The amount of lengthening it allows is customised according to the patient's age, sex and estimated growth potential.

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Fig. 1: Measured roentgenogram of both tibia, showing Osteoblastic lesion within the proximal tibia with soft tissue extension, codman's triangle and sunburst appearance.

Fig. 2: Growing endoprosthesis in-situ, to replace the proximal tibia.

To date, there are two different types of lengthening mechanism available, the mechanical form that requires invasive procedure to lengthen the prosthesis and the non-invasive form that is magnetic based. Obviously, these implants are very costly as they are custom made and as of late, it was not a feasible option due to the cost. Thus, most of these cases used to be managed by amputation or the use of allograft and fusion of the joints. But with the availability of alternatives from developing nations such as India, we are now able to offer our patients especially growing children an option of retaining their limbs and function.

CONCLUSION

Management of primary bone tumours in growing children in Malaysia can now be managed with the use of growing endoprosthesis which accommodates for their growth and retains the function of the limb.

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