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FUNCTIONAL OUTCOME OF LIMB SALVAGE SURGERY WITH MEGAPROSTHESIS IN PRIMARY BONE TUMOUR ARROUND KNEE

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ABSTRACT

The knee is the most frequent site of primary bone tumour. A majority of the tumours arising in the knee can be treated with limb salvage surgery and result in good functional outcomes. We evaluated functional outcomes for patients who underwent surgery for resection and megaprosthesis replacement for primary tumours around the knee. We used the Musculoskeletal Tumour Society Scoring System (MSTS) for functional evaluations to compare differences between distal femur and proximal tibia placements. This study was an observational analysis study with cross sectional approach in primary bone tumor knee region which has been done limb salvage surgery. The study sample included 11 cases of distal femur and 6 cases of proximal tibia megaprosthesis replacement. Primary tumours were classified as follows: 5 osteosarcoma, 12 giant cell tumour (GCT). The Patients was subjected to a physical examination to complete MSTS score and then commpared data were obtained. Functional outcomes, as measured by MSTS functional assessment were good to excellent in a majority of study patients. This study shows an unsignificant differences functional outcome using MSTS Score between resection tumour in distal femur and proximal tibia (p >0.05). There were no differences in functional outcomes when comparing distal femur megaprostheses with proximal tibia megaprostheses

KEYWORDS *Primary Bone tumor, MSTS score, limb salvage, megaprosthesis*

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INTRODUCTION

Management of tumors in extremities has undergone many changes in recent years. Since the reconstruction of the femur was first introduced by Buchanan in 1950.1 The Limb salvage method at the time was controversial where the current standard of therapy was amputation. When first introduced with the limb salvage method, a high recurrence rate has been reported. Although in its development in

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the mid-20th century the provision of "adjuvant" therapy can reduce the recurrence rate.

Developments in diagnostic imaging, adjuvant and neoadjuvant chemotherapy and the development of surgical techniques have increased survival rates in the 5 years after endoproshetic installation from 20% to 85% in the last 3 decades.

For more than 3 decades, the focus of experts has changed from the previous controversy in the use of the limb salvage method to become the main therapy in an effort to improve functional and oncological outcomes with. Megaprosthesis has many benefits, among which patients can mobilize immediately with full weight bearing, which is important because according to the data there are 25% of patients living less than 2 years after surgery.

In addition, costs can be reduced.4.5.10,16 Although in general there are complications after surgery, such as infection, aseptic loosening, prosthetic dislocation, joint stiffness or contracture, can give a bad outcome, and the possibility of revision, until the final choice with amputations .5,8,14 In this case we would like to describe some of the treatments of patients with bone tumors that have been reconstructed with megaprotesa for the past 5 years

RESEARCH METHOD

This research is an observational analytic study with cross sectional approach. Sampling was carried out in outpatient polyclinic and medical records section of Prof. orthopedic hospital Dr. R. Soeharso, Surakarta in the period January 2013 - May 2018. The sample used was a musculoskeletal tumor patient who had performed limb salvage with megaprothesis.

Criteria for inclusion of patients diagnosed with primary bone tumors in the distal femur and proximal tibia that have been carried out wide excision and reconstruction with megaprostheis. Patients have radiology, anatomical pathology, and blood laboratory data so that they diagnose primary musculoskeletal tumors.3 through interviews and physical examinations included in the MSTS scoring sheet for proximal tibia and distal femur.

Assessment of clinical outcomes of each limb salvage surgery by megaprosthesis in tumor resection of the distal femur or proximal tibia using MSTS scores. T-test was conducted to determine the effect of each type of action on postoperative clinical outcomes (level of significance: $p < 0.05$).

The total number of samples obtained were 17 patients, 7 women and 10 male patients with a sample age range of 16 years to 58 years. There were tumors in the proximal tibia of 6 patients, and tumors in the distal femur of 11 patients who had undergone limb salvage with megaprosthesis. There are two types of primary tumors, osteosarcoma in 5 patients and giant tumor cells in 12 patients

RESULTS AND DISCUSSION

The total number of samples obtained were 17 patients, 7 women and 10 male patients with a sample age range of 16 years to 58 years. There were tumors in the

proximal tibia of 6 patients, and tumors in the distal femur of 11 patients who had undergone limb salvage with megaprosthesis. There are two types of primary tumors, osteosarcoma in 5 patients and giant tumor cells in 12 patients.

The clinical outcomes were quite good at both locations, with a mean MSTS postoperative score at a mean proximal tibia of 70.55% and a postoperative MSTS score at an average distal femur (mean) of 71.18%. No significant difference was found in limb salvage with megaprosthesis in the distal femur or proximal tibia. Namely with a T score of 0.777.

In detail, the MSTS score can be analyzed consisting of 5 components, namely the pain in the distal femur has an average (mean) of 4.54 when compared with the proximal tibia of 4.16, so there is no significant difference after the treatment, namely the T value of 0.239. The mean (mean) for the function score is the distal femur of 3.90 and the proximal tibia is 4.16. so that when compared statistically there is no significant difference in the T-score of 0.236. Emotionally, according to MSTS, the mean obtained at distal femur was 3.72 while the proximal tibia was 3.16, from the T test results found 0.75 so it was mentioned not significant. For the aid component when mobilizing (support) the outcome of the MSTS score in distal femur patients was 2.63 compared to the proximal tibia 3.33. Where can it be concluded that the patient after having done Limb salvage with megaprosthesis still uses braching or crutches. And there is no significant difference because the T test score is 0.294.

Most patients after surgery have little limitation in walking distance. That is, the average MSTS score is 3.45 on the distal femur. The gait component is obtained at the distal femur of 3.00 compared to the proximal tibia of 3.00. Where only looks minor gait on cosmetic appearance when the patient walks. And there is no significant difference between the distal femur and the proximal tibia, because the T test value is 1.00.

DISCUSSION

The knee is an area that often occurs primary bone tumors and most are in the distal femur. Osteosarcoma is the primary tumor most often affects the knee.4,6 As for giant cell tumors are progressive tumors that require extensive resection to meet local control as therapy, and most are giant cell tumors that have been diagnosed at grade III.10, 19 Limb salvage is a procedure that is often performed when a tumor hits the knee. Amputation can be performed if the tumor affects many soft compartments and soft tissue and neurovascular structures and is considered to pose a high risk of recurrence.6,15 At present megaprosthesis is a new method used to restore knee joint function after extensive resection.3,17

Reconstruction with megaprosthesis in tumors located in the distal femur is expected to be able to direct support on the legs, can restore knee joint motion, and the patient can return to normal activities. Most clinical outcomes have good results with knee joint movements for daily activities are also good.6,14

For proximal tibia it is more difficult to do extensive resection and also for reconstruction, because of the presence of large neurovascular around the proximal tibia, and for soft tissue closure after surgery.10,15 The clinical outcome for reconstruction in proximal tibia when compared with distal femoral reconstruction

is worse. Because there is a greater risk of infection and frequent revision operations and survival rates on the prosthesis of the proximal tibia are shorter than those of the distal femur.

Table 1
Musculoskeletal Tumour Society Score

Location		PAIN	FUNCTION	EMOTIONAL	SUPPORTS	WALKING	GAIT
Distal femur	Mean	4.5455	3.9091	3.7273	2.6364	3.4545	3.0000
Proximal tibia	Mean	4.1667	3.6667	3.1667	3.3333	3.5000	3.0000
Total	Mean	4.4118	3.8235	3.5294	2.8824	3.4706	3.0000

Figure 1
Photograph showing proximal tibia endoprosthesis reconstruction with medial gastrocnemius flap

Figure 2
30 years age man with GCT on right distal femur, after limb salvage with megaprosthesis

CONCLUSION

The knee is an area that often occurs primary bone tumors and most are in the distal femur. Osteosarcoma is the most common primary tumor affecting the knee. As for giant tumor cells, it is a progressive type of tumor that requires extensive resection to fulfill local control as a therapy, and most are giant tumor cells that have been diagnosed at grade III. Limb salvage is a procedure that is often performed when a tumor hits the knee. Amputation can be done if the tumor affects many soft compartments and soft tissue and neurovascular structures and is considered to pose a high risk of recurrence. At present, megaprosthesis is a new method to restore knee joint function after extensive resection

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