

Quality of Life and Functional Outcome of Patients Treated with Revision Limb Salvage Surgery and Amputation: A Cross-Sectional Study

M S Satish¹, Srinivasan Vijay¹, Anand Raja², Surendran Veeraiah³

Abstract

Context: Despite the advances in surgical treatments and chemotherapy, obtaining an optimal outcome in the treatment of musculoskeletal tumors or sarcomas is still quite challenging. This can be managed by improving various factors such as survival and recurrence rate, longevity of the prosthesis, functional outcome, and quality of life (QOL) of patients. However, not much attention has been given to this issue in India.

Aims: The aim of the study was to examine the QOL and functional outcome of musculoskeletal cancer patients who were treated with revision limb salvage surgery (LSS) and those who underwent above-knee (AK) amputation followed by rehabilitation with Akprosthesis.

Settings and Design: A cross-sectional study was carried out between May 2015 and April 2016 at Physiotherapy Out patient Department of Cancer Institute, Chennai.

Materials and Methods: Thirty-two patients aged between 15 and 60 years, treated with revision LSS (n=15) and those rehabilitated with prosthesis after AK amputation (n=17) were assessed for QOL and functional outcome. Cancer Institute QOL questionnaire was used to assess QOL and Musculoskeletal Tumor Society score was used to find the functional outcome of these patients.

Statistical analysis: Descriptive statistics, student's t-test, and Chi-square test were used to analyze the data using SPSS version 13.

Results: The revision LSS patients were found to have a better functional outcome as well as QOL than the amputees. Yet another aspect of QOL, namely, fear of recurrence was much lesser among AK amputees than revision LSS patients.

Conclusions: The findings of this study imply that revision LSS has higher advantages in terms of functional outcome and QOL of patients compared to amputation, though patients treated with revision LSS were found to have increased fear of recurrence and pain than the amputees.

Keywords: Revision limb salvage surgery, quality of life, functional outcome, amputation, musculoskeletal tumor.

Introduction

The management of musculoskeletal tumors has remarkably improved with the revolution of chemotherapeutic drugs and technological advancements. From an era of amputation, these developments have facilitated limb salvage surgery (LSS) in about 90% of sarcomas [1]. There is also an improved trend of patient survival ranging between 60% and 70% [2]. In a low resource country when investing on modular type prosthesis is tough, custom mega prosthesis (CMP) comes in handy. However, serious complications are likely to occur with a recurrence rate of 20–36% [3] including loosening, breakage and infection where the breakage of CMP is reportedly caused by

increased patient activity and loosening of the stem [4] which needs to be managed by revision LSS with CMP or amputation.

Regardless of the survival and recurrence rate, any loss or damage to the body especially amputation tend to have a traumatic effect on one's overall wellness, namely, physical, psychological, and social well-being as well as the wellness of their family members [5,6]. Conventionally, the medical team believed that LSS has a better functional outcome, quality of life (QOL) and cosmetic advantage over amputation in regard to body image, though the literature is ambiguous [7,8,9]. Psychological acceptance of LSS and amputation is reportedly similar [7,10,11]; however, several studies throw evidence for

superior function in patients who have undergone LSS [8, 9]. Patients who have already underwent LSS, might have compromised muscle mass and functional outcome, but when prosthesis fails and revision LSS surgery done, the anatomical supports of the compromised musculature are again debatable. At times even with regular protocol based exercise therapy, the functional outcome is not as desired. Greater understanding of the QOL, functional outcome and fear of recurrence of limb salvaged patients has the potential to impact treatment decision making. Therefore, we sought to compare the functional outcome and fear of recurrence along with the QOL of patients who underwent above-knee (AK)

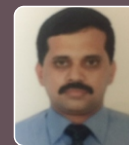
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© 2019 by Journal of Bone and Soft Tissue Tumors | Available on www.jbstjournal.com | doi:10.13107/jbst.2454-5473.428

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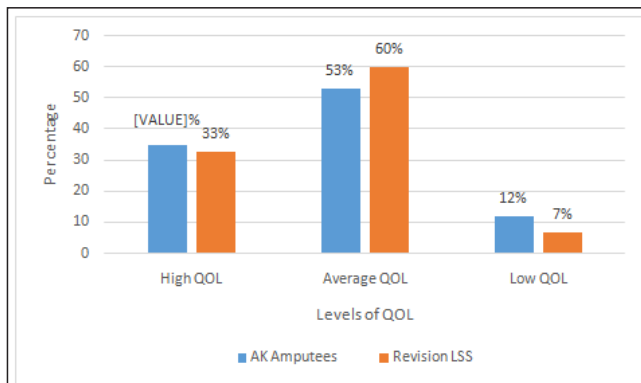


Figure 1: Level of quality of life among amputee and revision LSS patient.

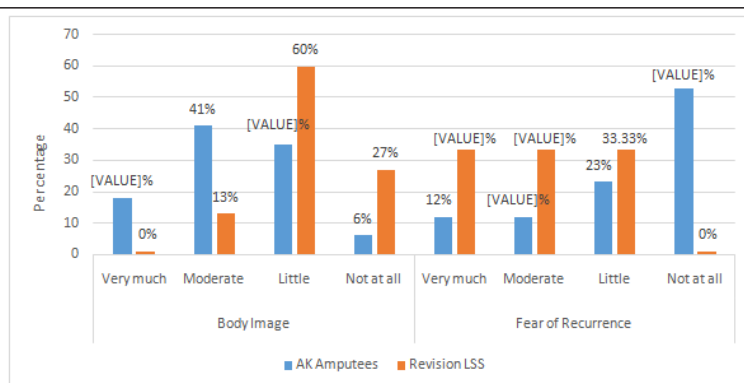


Figure 2: Body image and fear of recurrence- domains of quality of life QOL among AK above knee amputees and revision limb salvage surgery LSS patients.

amputation and revision LSS for musculoskeletal cancer. We hypothesized that functional outcome, body image and fear of recurrence scores will be better among revision LSS patients than amputee; there will be no difference in QOL between the groups and its subdomain of general well-being, physical well-being, psychological well-being, sexual well-being, and personal well-being.

Materials and Methods

Participants

A cross cross-sectional study was conducted among musculoskeletal cancer patients who underwent AK amputation and got rehabilitated with above knee AK prosthesis or underwent revision LSS to rectify a failed LSS done using CMP.

A total of 53 patients (31 amputees and 22 revision LSS patients) reported to the Physiotherapy out patient Outpatient Department OPD, Cancer Institute, Chennai, for their routine follow follow-up between May 2015 –and April 2016, of which 17 AK amputee patients and 15 revision LSS patients were included for the study based on the pre-set inclusion criteria (Age: 15–60 years; Post-surgery phase: 6–18 months). Informed consent was obtained from the study participants.

Measures

The demographic details of the patients were collected using semi-structured proforma. A one-time Psychosocial assessment was done to evaluate their functional status and Quality of Life (QOL). The functional status of the patients was evaluated using the musculoskeletal tumor society (MSTS) score system[12] where numerical values (0–5) for each subdomain (Pain, function, emotional acceptance, gait, support, and walking ability) were assigned. Greater the sum of scores of all domains, better the functional outcome of the respective patient. In order to measure the QOL quality of life of cancer patients, the Cancer Institute QOL Questionnaire (CI-QOL-Q) [13] was used. This tool was developed specifically for the Indian population. It has 11 dimensions, namely, general well-being, physical well-being, psychological well-being, interpersonal relationship, sexual and personal well-being, cognitive well-being, optimism, economic well-being, informational support, patient-physician relationship, and body image. Based on the scores, QOL quality of life is categorized into 5 five levels: Very low, low, average, high, and very high. Out of the 11 dimensions present in CI-QOL-Q, only 6 six dimensions such as general well-being, physical well-being,

psychological well-being, sexual well-being, personal well-being, and body image were chosen to be assessed as they are known to reflect the QOL of cancer patients. Consequently along with the above dimensions, another important aspect, namely, fear of recurrence was assessed using CI-QOL-Q due to the absence of a separate tool.

Statistical Analysis

Demographic characteristics were analyzed using descriptive statistics, and student “t” test was carried out to analyze the difference between revision LSS and AK amputee patients on their Functional outcome and QOL. Chi-square test was done to study the association among functional outcome’s subdomains and domains of QOL using Statistical Package for the Social Sciences Software (SPSS, IBM Inc. version 13) where P<0.05 was considered to be statistically significant.

Results

Of 32 patients, the majority were male with mean age of 29.28 years. Most of the AK amputees (77%) and revision LSS patients (73%) were found to have osteosarcoma, where as distal femur was the highest prevalent site of disease (Table 1).

Table 1. Characteristics of Patients with AK

Variable	AK amputation(n=17)	Revision LSS(n=15)	Total sample(n=32)
Age (Mean ±SD)	28.82(14.52)	29.80(10.59)	29.28(12.64)
Months from surgery (Mean ±SD)	15.53(2.55)	13.13(2.53)	14.41(2.78)
Gender n (%)			
Male	13(76.48)	9(60)	22(66.8)
Female	4(23.52)	6(40)	10(31.2)
Type of cancer n (%)			
Osteosarcoma	13(76.48)	11(73.3)	24(75)
Soft tissue sarcoma	4(23.52)	4(26.7)	8(25)
Site n (%)			
Distal femur	11(64.71)	8(53.3)	19(59.37)
Proximal tibia	6 (35.29)	7(46.7)	13(40.63)

Dimensions of QOL	AK amputees(n=17) Mean(SD)	Revision LSS(n=15) Mean(SD)	“t”	P
General well-being	21.88(4.58)	23.27(3.58)	0.94	0.353
Physical well-being	34.71(4.88)	34.53(4.19)	0.11	0.916
Psychological well-being	24.65(4.92)	22.53(5.45)	1.15	0.258
Sexual well-being	5.47(1.84)	4.53(1.36)	1.62	0.116
Body image	2.41(0.94)	3.13(0.64)	2.5	0.018*
Fear of recurrence	2.00(0.85)	3.23(0.66)	4.62	0.000**
Overall QOL	141.94 (14.23)	139.13(11.69)	0.61	0.55

**Significant at 0.01 level; *Significant at 0.05 level

Table 3: Comparison of functional outcome of patients with AK amputation and revision LSS

Domains of functional outcome	AK Amputees(n=17) Mean(SD)	Revision LSS(n=15) Mean(SD)	"t"	P
Pain	96.47(7.80)	89.33(12.79)	1.93	0.64
Function	68.24(15.9)	72(10.14)	0.79	0.438
Emotional acceptance	64.71(19.40)	88(12.5)	3.96	0.000**
Support	68.24(21.28)	93.33(14.47)	3.84	0.001*
Walking Ability	64.70(16.63)	69.33(12.79)	0.873	0.39
Gait	60(15.81)	70.66(22.51)	0.026	0.128
Musculoskeletal tumor Society total	70.39(11.24)	80.44(6.77)	3.01	0.005*

**Significant at 0.01 level; *Significant at 0.05 level

Amputation and revision LSS

Overall Quality of Life

With respect to QOL, similar percentages for the high QOL category were found for AK amputees patients and revision LSS patients -- 35% and 33%, respectively (see Figure. 1). A higher percentage (60%) of the revision LSS patients had an average QOL than AK amputees (53%). A higher percentage of amputees than LSS patients were found to have a low level of QOL -- 12% and 7%, respectively.

With respect to QOL, (Figure. 1) shows that 35% of AK amputees had a high QOL compared to revision LSS patients (33%), whereas 60% of the revision LSS patients had an average QOL than AK amputees (53%). On the other hand, 12% of amputees were found to have low low-quality life whereas only seven percent revision LSS patients fell into the low QOL category.

Sub-domains of Quality of Life, fear of reoccurrence and body image

All the patients who underwent revision LSS were found to have higher fear of recurrence and better body image than AK amputees (Table 2). Though Although no significant difference was found between AK amputation and revision LSS patients in other dimensions of QOL, namely, general well-being, physical well-being, psychological well-being, and sexual well-being.

However, there were significant differences in body image and fear of recurrence. The majority of revision LSS patients had superior body image, whereas among AK amputees 76% of them had moderate to little body image issues and 18% had severe issues with their body image. With respect to fear of recurrence, 53% of AK amputees had no fear of recurrence, while 66.6% of revision LSS

patients had moderate to severe fear of recurrence (Figure. 2).

Functional outcome

The functional outcome score, as measured by the Musculo Skeletal Tumour Society MSTS Scale for all the patients ranged from 53.3% to 100% with a mean score of 75.1%. There was a significant difference between AK amputees and revision LSS patients where the latter was found to have higher emotional acceptance, support, and better functional outcome as a whole than the AK amputees (see Table 3).

The recorded MSTS score for all the patients ranged from 53.3% to 100% with a mean score of 75.1%. From Table 3, there was a significant difference between AK amputees and revision LSS patients where the latter was found to have higher emotional acceptance, support and better functional outcome as a whole than the AK amputees.

A significant association of dimensions of functional outcome, namely, emotional acceptance, function, and gait with QOL category ($\chi^2=59.81$; $P=0.018$, $\chi^2=64.37$; $P=0.006$, $\chi^2=88.67$; $P=0.001$) was found. Also, significant association was evident for body image with domains of functional outcome, namely, walking ability and function ($\chi^2=19.895$; $P=0.019$, $\chi^2=20.062$; $P=0.018$). Furthermore, the result showed that pain is associated with general well-being and physical well-being, domains of QOL ($\chi^2=49.137$; $P=0.015$, $\chi^2=44.465$; $P=0.002$).

Discussion

The findings of the present study suggest that the revision LSS patients had a marginally increased difference in terms of QOL and superior body image compared to the AK amputee patients. Similar studies have reported that there were no differences in QOL between LSS patients and amputees

[14, 15]. However, a study conducted by Mason et al. (2013) reported a better QOL among LSS patients than the amputees [16]. With respect to body image, the results of the present study indicated superior body image among revision LSS patients than AK amputee which is supported by Robert et al. (2010) where body image was found to be poorer among amputees [7]. Another domain of QOL, namely, fear of recurrence was higher among revision LSS patients than AK amputees. This might be due to the presence of the salvaged limb which is the remaining segment of cancer affected segment.

Functional outcome was found to be better among patients who have undergone limb salvage procedures compared to amputees. Although statistically not significant, the mean value of other domains of functional outcomes such as gait, walking ability, social, and recreational activities was found to be in favor of LSS than amputation. This finding is consistent with other studies that have found better functional status after LSS than after amputation [17, 18, 19, 20, 21, 22, 23]. Furthermore, patients with salvaged revision surgeries of lower limbs were very much enthused by the preservation of limb and reported better emotional acceptance which was determined by their perception of functional result. The superiority of LSS over amputation was reported in the functional evaluation of support where similar findings were interpreted [8].

The overall QOL of patients was found to be associated with certain functional outcome domains such as emotional acceptance, function, and gait. The other domains of functional outcome (walking ability and function) were similarly associated with body image, thereby stating that better the walking ability and function, higher the body image. With regard to pain, evident association was observed with general and physical well-being of patients.

Conclusions

The findings of this study imply that revision LSS has higher advantages in terms of functional outcome and QOL of patients compared to amputation. However, patients who underwent amputations were found to have decreased fear of recurrence and pain than with revision LSS.

was not accomplished. Yet another drawback lies with the CI-QOL-Q. Being a generic subjective QOL tool for cancer patients, CI-QOL-Q does not consider the unique factors that are relevant to a musculoskeletal tumor. Therefore, the construction of a separate tool for analyzing the QOL specific to musculoskeletal tumors is recommended.

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Conflict of Interest: NIL
Source of Support: NIL

How to Cite this Article

Satish M S, Vijay S, Raja A, Surendran V. Quality of Life and Functional Outcome of Patients Treated with Revision Limb Salvage Surgery and Amputation: A Cross-Sectional Study. *Journal of Bone and Soft Tissue Tumors* May-August 2019;5(2): 11-14.