

Prevalence, Indications, Levels and Outcome Limb amputations at University Teaching Hospital-Butare in Rwanda.

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Background: Amputation is one of the oldest surgical procedures with artificial limbs identified from over 2000 years ago. Amputation is still often viewed as a failure of treatment but can be the treatment of choice and life saving procedure for severe trauma, vascular disease and tumors. The aim of this study was to determine the prevalence, indications and levels of limb amputation at the University Teaching Hospital Butare (UTH-B) from 1st January 2009 to 31st March, 2012.

Methods: The records of 107 limb amputations performed in patients admitted at UTH-B over a period of 2 years and 3 months were reviewed.

Results: Out of 3466 operated cases in Surgery Department, there were 107 limb amputations accounting for 3.08% of all operations performed during the study period. Females accounted for 29.9% cases. The mean age was 44.7±21.5 years. The commonest indication was gangrene in 43.95% especially dry gangrene with 22.43%.The most common level was below knee amputation (BKA) with 37.38% of cases. The outcome of the 107 patients amputated: 87.9% had uneventful recovery, 7.5% were re-operated and 4.7% died.

Conclusion: The prevalence of limb amputation was 3.08% with the commonest indication as gangrenes most often secondary to peripheral vascular disease. Below knee amputation was the most performed procedure. The majority (87.9%) of the patients had uneventful recovery. The postoperative mortality rate was 4.7%.

Key words: Limb, Amputation, Prevalence, Indications, Levels, outcome

Introduction

Limb amputations have been done since time immemorial. The first surgical description of a leg amputation was by Hippocrates (460-377 BC). Although prostheses are not mentioned in medical literature from ancient times, they were indeed made and used as depicted from the non-medical books and pictures¹.

The indications for limb amputations are generally considered as the three Ds: dead limb, deadly limb and a damn nuisance of a limb. The most common indications for limb amputation vary from study to study but trauma; complications of diabetes mellitus and peripheral vascular disease are the most prevalent². Limb loss has a devastating impact on patients. Its impact can be frightening and challenging for the amputees and their families. Amputees become the responsibility of the health service and if not well looked after, they may continue crippled for life.³ The objective of this study was to highlight the prevalence, levels, indications and outcome of limb amputations and the problem related with patient rehabilitation after discharge from hospital.

Patients and Methods

This was a retrospective study of limb amputations done at the University Teaching Hospital in Butare, Rwanda, from 1st January, 2009 to 31st March, 2012. Case notes of all patients who had limb amputations within the study period were examined. The following variables were extracted: patient's age, sex, occupation, affected limb, indications for amputation, levels of amputation, patient rehabilitation and outcome of treatment on leaving the hospital. All patients had been consented before the operation. No consent was obtained for this study given no patient identifiers were extracted from the hospital records. Every patient receiving limb amputation either emergently or electively at UTH-B in the period of our study was included. Patients whose files were severely incomplete were excluded.

Data was collected from the operating room registry, patient medical files, and registry from physiotherapy department. A data collection questionnaire was used to collect patients' socioeconomic and clinical data. A total of 107 patients' records were retrieved from the hospital records and operating room register. Data regarding the patients' rehabilitation such as crutches or prosthesis was obtained from the physiotherapy department registry. The data was analyzed using the SPSS computer package.

Results

Between 1st January, 2009 and 31st March, 2012 inclusive, a total of 3466 cases were operated in the Surgery Department at UTH-B. Of these, 107 were limb amputations accounting for 3.08%. Males accounted for 75(70.09%) and 32(29.91%) were females. The male to female sex ratio was 2.3 to 1. Their ages ranged between 1 and 93 years old with a median of 44 years. Most (87.9%) of the patients came from rural area and only 11.2% come from urban area. Epilepsy and Diabetes mellitus were the most commonly associated medical conditions accounting for 16.8% and 10.3% respectively.

Table 1. Indications of amputation

| Condition | Frequency | Percent |
|-------------------------------------------|-----------|-------------|
| Dry gangrene | 24 | 22.4 |
| Wet gangrene* | 18 | 16.8. |
| Unspecified | 5 | 4.7 |
| Total Gangrene | 47 | 43.9 |
| Malignancy | 31 | 29.0 |
| Necrotizing fasciitis | 3 | 2.8 |
| Burns | 3 | 2.8 |
| Necrosis or infection of amputation stump | 3 | 2.8 |
| Chronic osteomyelitis | 1 | 0.9 |
| Useless limb | 1 | 0.9 |
| Peripheral artery disease | 1 | 0.9 |
| Dupytren's contractures | 1 | 0.9 |
| Diabetic foot | 2 | 1.9 |
| Trauma | 14 | 13.1 |
| Total | 107 | 100.0 |

*2 cases specified as Gas gangrene

Burns were the most common past surgical condition in 18.7% followed by tumour excision (4.7%), skeletal trauma (3.7%), previous amputation (2.8%), incision and drainage (1.9%) and chronic osteomyelitis (0.9%). The lower limb was amputated in 76.6% and upper limb in only 23.4%. The commonest indication was gangrene accounting for 43.9% (Table1). Of the 18 (16.8%) cases with wet gangrene, 2 were specified as being gas gangrene. Gangrene was followed by malignancy as being the second most common indication for amputation and accounted for 31 (28.9%) of the cases. Below

knee amputation (BKA) done in 37.38% of patients was the most frequently performed procedure and this was followed by above knee amputation (AKA) in 35.5% (Table 2). The postoperative mortality rate was 4.7% (Table 3).

Table 2. Levels of Amputation

| Type of Amputation | Frequency | Percent |
|------------------------|-----------|---------|
| Above elbow amputation | 6 | 5.6 |
| Above knee amputation | 38 | 35.5 |
| Below elbow amputation | 9 | 8.4 |
| Below knee amputation | 40 | 37.4 |
| Disarticulation | 13 | 12.1 |
| Finger amputation | 1 | 0.9 |
| Total | 107 | 100.0 |

Table 3. Outcome of Management

| Outcome of Management | Frequency | Percentage |
|-----------------------|-----------|------------|
| Discharge | 94 | 87.9 |
| Died | 5 | 4.7 |
| Re-operated | 8 | 7.5 |
| Total | 107 | 100.0 |

Discussion

In our study, ages ranged between 1 and 93 with a median of 44 years. This shows that the majority of our patients were young adults. Our results compared with what Ofiaeli et al⁴ in Nigeria found where the ages ranged between 7 and 80 years with the mean age of 54.4±18 years. In our study, the male to female sex ratio was 2.3 to 1 which was comparable to the male to female ratio of 2.6 to 1 reported by Bushra, Doumi and Ali. This may in part be explained by the fact that the male sex is at higher risk of trauma such as RTA and burns; and higher risk of soft tissue tumors³.

The majority of our population is from rural area with 87.9% and only 11.2% came from urban area. This is not a surprise as a great majority of patients referred from district hospitals in UTH-B catchment zone are all in rural areas.

The majority of our patients (67.3%) had no past surgical history and if any, burns was the most common with 18.7% and tumor excision accounted for 4.7%, trauma for 3.7%, previous amputation for 2.8%, incision and drainage of an abscess for 1.9% and fistulased chronic osteomyelitis for 0.9% of cases.

The lower limb was the most common amputated limb with 76.63% and only 23.37% of upper limb in our series. This compares with the general literature. Morrison reported that there are approximately 1,908 upper-limb amputations a year versus 56,912 lower-limb amputations, there is a much smaller group of upper-limb amputees.⁵

The most frequently performed procedure was BKA which was done in 37.38% of patients followed by AKA done in 35.51%. Of the upper limb amputations, above elbow amputation (AEA) was performed in 5.61% and below elbow amputation (BEA) performed in 8.41%. Disarticulation

accounted for 12.15% of the procedures performed. Akiode et al. reported similar findings in Nigeria.²

In the study done by Ofiaeli⁴ at Azikiwe University Teaching Hospital Nnewi and Holy Cross Hospital Nnewi in Nigeria, it shows that in 50 amputations of the study, the commonest level was BKA which accounted for 24 amputations (48.0%), there were 4 AKA (8.0%), giving a BKA-AKA amputation ratio of 6:1, three of above knee amputations were done for failed below knee amputations while one Gritti-Stokes amputation was done for failed BKA. The re-amputation rate for BKA in this study was 16.7%.

In our study, gangrene was the most common indication accounting for 43.95% especially dry gangrene with 22.43% as the most common gangrene, wet gangrene was found in 14.95%, gas gangrene accounted for 1.87% and unspecified gangrene accounted for 4.7%. The second most common indication was malignancy which accounted for 28.9%, malignant melanoma was the most found among malignancies with 7.5% followed by osteosarcoma with 6.5%. Trauma is the third leading indication with 13.08%. Biopsy was performed in only 14 (45.16%) out of 31 patients amputated for malignancy. This is very different from a study done by Akiode et al², who found trauma as the most common indication (76%) for limb amputation followed by Diabetes mellitus (14%) which was the most common cause of non traumatic amputation; malignancy accounted for 8.5%. Doumi et al³ found sepsis to be the most common indication accounting for 40%, and was followed by trauma (32%), vascular (16%), mycetoma (8%) and cancer (4%).

Kidmas et al⁶. in his study at Jos University Teaching Hospital, found that Trauma and diabetic foot sepsis topped the list of indications for lower limb amputations accounting for 29.9% and 26.4% respectively. Malignant lesions of the lower limb accounted for 23.0%. Peripheral vascular gangrene ranked fourth in their study, accounting for 9.2%. Other causes included chronic osteomyelitis (3.4%), chronic leg ulcer (3.4%) and snake bite with gangrene (1.1%).

In terms of patient rehabilitation, only 6.5% of the patients were fitted with lower limb prosthesis and none got upper limb prosthesis. This is because the prosthesis is expensive and is not covered by the medical insurance and is therefore unaffordable by the majority of the patients. During a Regional Workshop on Ageing and Poverty held in Dar es Salaam Tanzania in 2003, it was observed that 60% of the adult equivalent population in Rwanda lived below the poverty line and 42% in extreme poverty. Using households as the unit, 57% live below the poverty line. The incidence of poverty is much higher in the rural areas (66%) than in urban areas. The Household Living Conditions Survey shows that the provinces with the highest poverty rates are Gikongoro (77%), Butare (74%), Kibuye (72%), Kigali Rural (71%), and Ruhengeri (70%)⁷. A similar situation was found by Ofiaeli et al⁴ in his study where none of the patients is known to have acquired any prosthesis after surgery.

In this study, 7.5% of the patients were re-operated. The postoperative mortality rate was 4.7% with sepsis being the cause of death in all the cases. This lies within range as reported by several other series. Infected or necrotized amputation stump was the reason for re-amputation in our study. Jawaid et al¹ and Kidmas et al⁶ found a mortality rate of 12.6%. Ploeg et al⁸ in the Netherlands reported a hospital mortality for BKA as 9% and for AKA 18% from a contemporary series.

Conclusion

During the period under review, limb amputation accounted for 3.08% of operations done at UTH-B in Rwanda. Most of the indications were preventable. Lower limb amputations were commoner than upper limb amputations. BKA and AKA were the most commonly performed procedure. The rate of rehabilitation with prosthesis was very low which has a negative impact on the social reintegration of the amputees.



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