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Patients Characteristics, Pattern and Outcome of Major Limb Amputations from a Tertiary Hospital in Tanzania: A Retrospective Chart Review

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Abstract

Background

Amputation of major extremities is a preventable problem of public health concern. Limb loss in resource-limited countries is associated with significant physical disadvantages to the patient and aggravates the social burden. This study aimed to characterize amputees and their immediate post-operative complications from a single center.

Methods

A 19-months (January 2014 to August 2015) retrospective hospital-based chart review was conducted at Muhimbili Orthopedic Institute on all amputees. A predesigned and pretested checklist was used to extract details on demography, reason for amputation, type of amputation, 30-day post-operative complication and mortality. Data was entered into SPSS version 20 for analysis where descriptive statistics were computed. Ethical clearance and permission to conduct the study was obtained from Muhimbili University of Health and Allied sciences Institutional Review Board Ref.No.2015-08-24/AEC/Vol. IX/352.

Results

A total of 77 patients who had amputation and whose files could be retrieved were involved in this study. The age range of the participants was 5 - 75 years (mean age of 32.2, SD 13.7). Majority, 87.1% were in the age group between 16 to 45 years. Male predominance was noted with male to female ratio of 3.5: 1. Trauma was the commonest all cause by 79.2%, and lower limbs led the log with lower to upper limb ratio of 2.9:1. Complications were reported in 25(32.5%) with stump infection being the leading by 22 (28.5%). Two deaths were reported of which all were from advance metastatic disease.

Conclusions

Trauma was the leading cause of major extremity amputation in this study center. Majority of the amputees were male at their younger age. A quarter of the amputees developed complications with surgical site infection being the commonest.

Keywords: *Amputation, Trauma.*

Introduction

Globally, it is estimated that 57.7 million people were leaving with an amputation due to traumatic causes in 2017 (1). Indications and patient's demography for these amputations vary between High Income Countries (HICs) and Low **and** Middle Income Countries (LMICs), with vascular diseases being predominant in HICs, whereas trauma, infection and uncontrolled diabetes were leading causes in LMICs (2–6).

Major limb amputations are expected to cause major consequences in the society with a need for extensive rehabilitation services which are still limited in developing countries as compared to developing countries (7,8). In Tanzania for instance, these amputees immediately become dependants.

Despite severe impacts of limb loss in all domains of life especially in LMICs, data to inform interventions is lacking. MOI is centered to provide state-of-the art orthopedic services in the region, of which rehabilitation is integral. This study therefore aimed at describing patients' characteristics, indications, types and complications of amputation from this setting. These findings will inform plans for improvement of rehabilitation and preventive measures.

Methods

This was a retrospective hospital-based chart review, which was conducted in 2015. The review covered all patients who were operated in the department of Orthopedics and Traumatology at MOI between January 2014 and August 2015. MOI is the only tertiary level for trauma center in the country serving a population of over 60million people. It offers both emergency and elective orthopedic and neurosurgery services and training. It is located within the Muhimbili National Hospital, which offers more amputations from non-orthopedic cases, with limited rehabilitation services. On the other hand, MOI has both trauma and orthopedic surgeons, well-established rehabilitation services to help ambulates the patients post amputation and prosthetic unit to offer prosthesis.

Operation logs and in-patient records were searched for all patients who have had major limbs amputations primarily conducted at the institute. Major limb amputation was defined as any amputation at or proximal to the wrist and ankle. All patients who came for stump revision following amputation from other facilities were excluded. Case note numbers were identified separately from the two records above and checked for similarity. Next step was pulling together of case notes from the records section. Only amputees with retrievable case notes were subsequently included in the final analysis even those, which were missing some demographic variables. A predefined spreadsheet was used to collect information on

patient's demography, indications for amputation, type and level of amputation, and 30 days post-surgery complications. Data was transferred from the excel spreadsheet to SPSS Version 20 computer software. Ethical clearance to conduct the study was obtained from the ethical committee at MUHAS and MOI.

Results

A total of 89 case records of patients who underwent major amputations at MOI were identified from the operation logs, however only 77 case files were retrieved and hence included in the final analysis. The mean age was 32.21years (5-75) with 87.1% of the amputees being under the age of 45. Male to female ration was about 3:1. Of the 73 who had employment status available, 89% were either engaged in private sector, self-employed or were unemployed. Marital status was available for 63 patients of which the majorities, 55.6%, were married followed by those who were single by 42.9%. (Table 1)

Table 1: Social Demographic Characteristics of the amputees

Characteristics	Frequency	Percentage (%)
Age group		
0-15	6	7.8
16-30	30	39
31-45	31	40.3
46-60	6	7.8
Above 60	4	5.2
Sex distribution		
Male	60	77.9
Female	17	22.1
Occupation*		
Public employee	8	11
Private employee	23	31.5
Self employed	26	35.6
Unemployed	16	21.6
Marital status **		
Married	35	55.6
Single	27	42.9
Divorced	1	1.6

**n=73 **n=63*

From table 2, it can be seen that trauma was the leading indication for amputation where it accounts for 79.2% of the 77 amputees followed by tumors that accounted for 13%. By limb

category, lower limbs were the most involved by 74% of which above knee amputation was the leading involving 52.6% followed by below knee type. Among the 26 upper limb amputees, above elbow amputation was the most common where 60% of the amputees belong. Hospital stay was within seven days for the majority of the amputees (53.2%) with only 10.4% staying beyond a month. Closer to one third of all amputees had documentation of having had a complication of which stump infection was the leading involving more than one quarter of all amputees (28.5%). Severe bleeding necessitating re-admission had occurred in 1 patient. Mortality was reported in two amputees giving an all-cause mortality rate within 30 days of 2.6% and all the two patients were reported to have died of metastatic disease. (Table 20)

Table 2: Amputees characteristics

Variable	Frequency	Proportion
Indications for amputation		
Trauma	61	79.2
Infection	6	7.8
*Others**	2	3.6
Limb amputated		
Lower	57	74.0
Below knee	22	38.6
Above knee	30	52.6
Through knee	3	5.3
Upper	20	26
Above elbow	12	60
Below elbow	4	20
Through elbow	1	5
Wrist Disarticulation	3	15
Complication (32.5%)		
Stump infection	22	28.5
Bleeding	1	1.3
Death	2	2.6
Duration of hospital stay (days)		
≤ 7	41	53.2
8 – 14	20	26.0
15 – 21	6	7.8
22 – 28	2	2.6
≥ 28	8	10.4

***Gun shoot wounds*

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Discussion

In an attempt to understand the nature of major limb amputations at a tertiary hospital, we conducted a retrospective chart review. This review completely relied on physicians documenting all events, especially complications on patient's case notes.

This study has reported young age among the amputees with male predominance similar to other studies (3,8). Conducted in a trauma hospital, this is reflective of male and youth predominance among trauma victims as in other centers (6,9) Any country with high incidence of road traffic injuries can expect similar findings among its amputees. High youth involvement is usually due to high-risk engagement and mobility in their economic zones. With limb loss, this would mean that their mobility is affected hence their productivity. Only 1 in every three patients was employed in the public sector hence would maintain their source of income but the rest would find it rough to maintain their source of income.

Four in five of all amputations were due to trauma related causes, unlike various reports showing diabetes related vascular complications and resultant infection being the leading cause. Similarly, lower limbs were the leading just like in other studies with predominance of above knee amputation especially from centers where trauma was the leading cause of amputations (9,10). The differences in our findings as compared to other centers could be attributed to the all-trauma nature of this cohort of patients who are primarily managed by trauma surgeons unlike in other studies where both trauma and none trauma patients were involved. To fully understand the characteristics of amputees, a similar analysis involving general surgery unit in this set up is needed.

Level of amputation is determined largely by pathology, but every effort should be made to go below knee or below elbow, as rehabilitation and prosthesis are readily available and less expensive. This study reported higher incidences of above knee amputations, with young age that still have the necessary energy to ambulate when given prosthetics predominating the cohort.

The high tend of above elbow amputation reported in this study, despite contradicting findings from many other studies is similar to what was found in Ethiopia (10). This could be due to differences in the primary cause of amputations and the set up in which these studies were conducted. Finding above elbow prosthesis is not easy in our settings and would naturally be expensive. But with small number of patients involved, it should be possible to return them to functions as near possible with appropriate prosthesis.

Amputations are safe and feasible surgical procedures in our settings. No mortality was directly related to amputations except for two that had metastatic disease of which, why these two patients were operated even in the presence of metastatic disease is not known and their functional status at the time of amputation couldn't be ascertained. Stump infection was the only serious complication reported affecting about 1 in 4 patients similar to what was observed from other centers (11) . This means that almost all stumps were primarily closed even when tissue viability was questionable. Open stumps with delayed closure would reduce infection rates and optimize outcomes. Similarly, hospital stay was shorter compared to another study which was done in Tanzania (9). This shorter stay would be best explained by trauma nature and the young age of this cohort and hence less comorbidity associated with it.

Since level of education was not uniformly available in the majority, cultural barriers on people with disability would be predicted to affect these people. Patients in this setting do not necessarily get prosthesis fitting unless one can afford to pay for it. This is in spite of the fact that most of the amputees were victims of road traffic carnage, and all motorized vehicles have at least a third-party insurance policy that could be used to care for these patients, including rehabilitation. How to activate utilization of this policy is necessary and needs engagement of stakeholders in that industry that include insurance regulators and providers, traffic police and civil societies.

Limitations

This study had some limitations. Firstly, we could neither ascertain in majority of cases existence of any scoring tool to decide the amputation as required in trauma situations (Mangled Extremity Severity Score) nor a senior surgeon consenting to the amputation to protect from unnecessary amputation. Furthermore, whether the patients would have benefited from vascular surgery review, limited in the institute could not be ascertained as vascular reconstruction is well known to be limb saving. Furthermore, we believe that a lot of diabetic and vascular indications for amputations take place at the national hospital hence our findings cannot be generalized for amputees. This study therefore only provides descriptive characteristics of the amputees at the institution.

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Conclusions

Majority of the victims of major extremity amputations are still economically active and hence efforts to provide prosthesis are needed. Amputation carried no mortality risk, but stump infection was a major problem in this study setting.

Authors' contributions

OHU - Proposal development, data collection, data analysis, prepared the original manuscript. AA - Critical review of the research questions and methods. LA - Data analysis, critical review of the finding and manuscript review.

Abbreviations

HIC	High Income Countries
LMIC	Low- and Middle-Income Countries
MOI	Muhimbili Orthopaedic Institute
MUHAS	Muhimbili University of Health and Allied Sciences
SPSS	Statistical Package for Social Sciences.

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References

1. McDonald CL, Westcott-McCoy S, Weaver MR, Haagsma J, Kartin D. **Global prevalence of traumatic non-fatal limb amputation.** Prosthet Orthot Int. 2020;
2. Imam B, Miller WC, Finlayson HC, Eng JJ, Jarus T. **Incidence of lower limb amputation in Canada.** Can J Public Heal. 2017;108(4).
3. Behrendt CA, Sigvant B, Szeberin Z, Beiles B, Eldrup N, Thomson IA, et al. **International Variations in Amputation Practice: A VASCUNET Report.** Eur J Vasc Endovasc Surg. 2018;56(3).
4. Pooja G Das, Sangeeta L. **Prevalence and aetiology of amputation in Kolkata, India: A retrospective analysis.** Hong Kong Physiother J. 2013;31(1).
5. Doumi E, Ali AJ. **Major limb amputations in El Obeid Hospital, Western Sudan.** Sudan J Med Sci. 2008;2(4).
6. Ogeng'O JA, Obimbo MM, King'Ori J, Njogu SW. P**attern of limb amputation among rural Kenyan children and adolescents.** J Prosthetics Orthot. 2010;22(3).
7. Yinusa W, Ugbeye ME. **Problems of amputation surgery in a developing country.** Int Orthop. 2003;27(2).
8. S. Y. **Complications following an amputation.** Phys Med Rehabil Clin N Am. 2014;25(1).
9. Chalya PL, Mabula JB, Dass RM, Ngayomela IH, Chandika AB, Mbelenge N, et al. **Major limb amputations: A tertiary hospital experience in northwestern Tanzania.** J Orthop Surg Res. 2012;7(1).
10. Gebreslassie B, Gebreselassie K, Esayas R. P**atterns and Causes of Amputation in Ayder Referral Hospital, Mekelle, Ethiopia: A Three-Year Experience.** Ethiop J Health Sci. 2018;28(1).
11. Cornelius EI, David SZ, Williams TY, Joseph NK, Daniel DM. **Causal conditions for major limb amputation at a specialist hospital in north central Nigeria.** Jos J Med. 2013;7(2).