



Major limb amputations at a teaching hospital in the sub-Saharan Africa: Any change in trend?

O.J. Ogundele, A.I. Ifesanya, O.A. Oyewole, O.O. Adegbehingbe

University College Hospital, PMB 5116, Ibadan, Oyo state, Nigeria

Correspondence to: Joshua Ogundele, Email: <ogunjosh@yahoo.com>

Background: Major limb amputation is a serious but usually preventable public health problem that is often associated with profound social, psychological and economic impacts on the patient and family. The objective of this study was to evaluate the trend, indications and short term complications of major limb amputations and to compare our experience with that of other published data.

Methods: A retrospective study of medical records of all patients who underwent major limb amputations at a Nigeria teaching hospital between 2006 and 2013. Information about age, sex, indications, level of amputation, facilities where patients had initial care before presenting in our centre, complications and outcomes of care were studied.

Results: One hundred and sixty-five major limb amputations were done in 158 patients with bilateral lower limb amputations in seven of them. 60.8% of these were due to severe extremity trauma with irreversible vascular damage while diabetic foot gangrene accounted for 30.4%. Complications included wound infections (24.2%), flap necrosis (3.6%), phantom limb pain (2.4%) and knee flexion deformity (0.6%). Mortality was 0.2%.

Conclusion: Trauma with irreversible vascular damage is still the leading indication for major limb amputation in our hospital.

Key words: Major, Limb, amputation, sub-Saharan, Africa, trend

Introduction

Major limb amputation is a serious but usually preventable public health problem that is often associated with profound social, psychological and economic impacts on the patient and family especially in developing countries where prosthetic services are poor. Major limb amputation is described as amputation proximal to the wrist or ankle¹. The indications for limb amputations are generally considered as the three "D"s: dead limb, deadly limb and a damn nuisance of a limb. The most common indications for limb amputation vary from study to study and includes trauma with irreversible ischemia to a limb, complications of diabetes mellitus and peripheral vascular disease.

There is a growing aggressive policy of limb revascularization in the developed world with various procedures being advocated to attempt to revascularize an ischemic limb even in poor candidates. Medicolegal issues also sometimes influence decision making as to whether to salvage or amputate a limb. Hence the decision for limb salvage or primary amputation is a crucial one for the surgeon to make, and it is imperative that the surgeon makes a good initial decision². In some instances amputation of the limb may be the only viable option to save the patient's life. The objectives of this study were to evaluate the trends, indications and short term complications of major limb amputations and to compare our experience with that of other published data.

Patients and Methods

A retrospective study of all patients who underwent major limb amputations at a Nigeria teaching hospital during the seven year period between 2006 and 2013 was carried out. The patients were identified from the operating theatre records and their case notes were retrieved from the Medical Records department. A questionnaire was designed to capture the relevant data from the patients' hospital records. Information about age, sex, indications for amputation, level of amputation, facilities where patients had initial care before presenting in our center, complications and outcomes of care were studied. The data was fed into a computer spreadsheet and analyzed using the Statistical Software for the Social Sciences (SPSS) version 17. Quantitative variables are described by mean and standard deviation while qualitative variables are described with percentages and proportions. The results are presented with the aid of tables and figures.

Results

A total of 165 major limb amputations were done in 158 patients. Bilateral lower limb amputations were carried out in seven of them. The patients were aged between 1 and 91 years with a mean age = 41.0 ± 21.4 years (Table 1). There were 107 males and 51 females with a M: F sex ratio of 2.1: 1.0. One hundred and twenty five (75.8%) lower extremity amputations were done while 40 (24.2%) amputations done in the upper limb (Figure 1). Forty eight (30.4%) patients who had lower extremity amputations were due to diabetic foot gangrene, 76 (48.1%) were due to severe extremity trauma with irreversible vascular damage, 6 (3.8%) were due to peripheral vascular disease while 4 (2.5%) were due to neoplasm.

Twenty (12.7%) patients had upper extremity amputations due to trauma such as gangrene from improperly managed fractures, gunshot injuries with irreversible vascular damage and electric burns. Two (1.3%) were due to neoplasm and 2 (1.3%) badly managed chronic osteomyelitis (Figure 2).

Table 1. Age Distribution of Patients Who Had Major Limb Amputations.

Age (years)	Frequency	(%)
0-9	11	7.0
10-19	15	9.5
20-29	25	15.8
30-39	31	19.6
40-49	19	12.0
50-59	18	11.3
60-69	25	15.8
≥70	14	9.0
Total	158	100.0

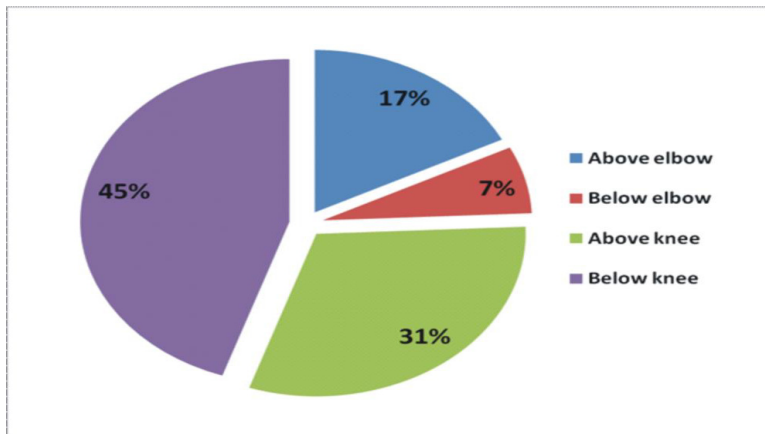


Figure 1 Types of major limb amputations

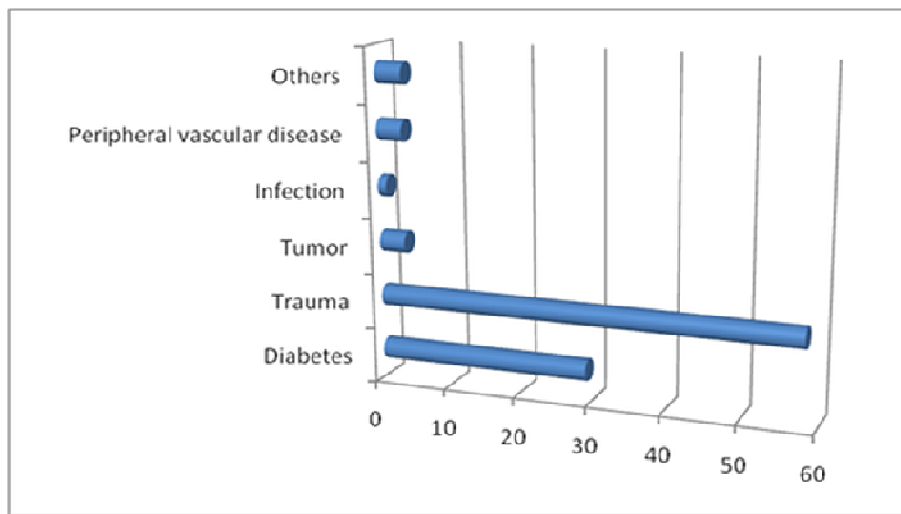


Figure 2. Indications for Major Limb Amputations

Twelve (7.6%) patients had re-amputation. Eighty-five (53.8%) of the patients who had lower limb amputations were able to procure and ambulate with prosthesis while 40 (25.3%) were not able to procure prosthesis due to financial constraints. Only two (1.3%) patients who had upper extremity amputations procured prosthesis. Sixty-three (40.0%) of the patients presented directly to our hospital while the rest presented initially to other health care facilities (Figure 3). Complications included wound infections (24.2%), flap necrosis (3.6%), phantom limb pain (2.4%) and knee flexion deformity (0.6%). 163 (99.8%) patients were discharged home while 2 (0.2%) died.

Mean age is 41.0±21.4years.

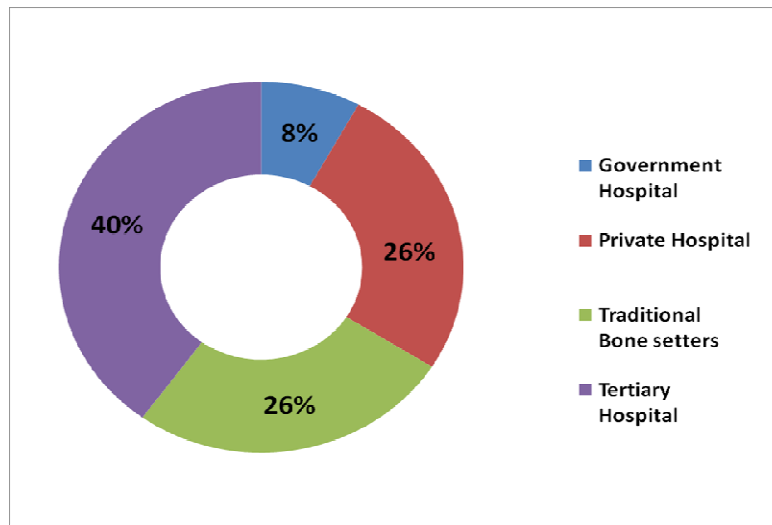


Figure 3. Health Facilities Where Amputation was Done

Discussion

Amputation is the removal of whole or parts of the body and can be as a result of unprecedented havoc or natural disasters; like accidents, earthquakes of major intensity, terrorism and war, or medical reasons with the aim of improving health outcomes and quality of life of patients. Despite advances in medicine and surgery, amputation continues to be a major problem in the world, predominantly for older adults. It has been estimated that there were 664,000 persons living with major limb loss in the United States in 2005 and more than 900,000 with minor limb loss. Lower limb amputations are much more frequent than upper limb and are most commonly the result of diseases such as diabetic foot gangrene, neoplasm, peripheral vascular diseases followed by trauma³. Although amputation is still often erroneously viewed as a failure of treatment, it can actually be the treatment of choice in severe trauma, vascular disease and tumours⁴. The decision to perform an amputation often comes after all other options have been exhausted and once it is initiated, it cannot be reversed. Unfortunately, most often, patients' present late when extensive gangrene had occurred such that revascularization and limb salvage is no longer a feasible option.

As amputation indications and patterns vary between hospitals and between countries, this study was undertaken to describe our experiences on major limb amputations in a large tertiary care teaching hospital and compare the findings with an earlier study conducted in our center and those in other parts of the world with a view to highlighting the variations in the pattern and indications for amputations. There was a male predominance in this study, which is consistent with findings in other reports in our country as well as in the western world^{5, 6, 7, 8}.

The mean age for amputations is consistent with findings in other studies^{8, 9} though a higher mean age was reported from Ghana¹⁰. This age differences can be explained by differences in the indications and patterns of amputation. The male to female ratio is comparable with findings in studies in Nigeria and Sub Saharan Africa^{4, 10}.

The indications for amputation are similar to an earlier study in this center a decade ago¹¹ and in other studies in sub-Saharan Africa^{4, 6, 11}. In the advanced countries, 80-90% of limb amputations are due to vascular problems^{7, 8, 12}. Trauma was the commonest indication for



amputation in young adults in the productive and reproductive age groups. Limb amputation in this group almost always results in a serious economic crisis for the family, especially due to the fact that prosthesis is either unavailable or unaffordable¹³. Amputations due to infections and malignancies appear to be declining. Other indications for amputations in this study included peripheral vascular diseases, post burns contractures, severe electric burns, neoplasm, and severe infections like gas gangrene.

As in other reports, most of our amputations were performed in the lower limbs and below knee amputation was the most common procedure performed^{4,6}. This is similar to findings in earlier studies where lower extremities were found to be injured more often than the upper extremities and diabetic gangrene is common on the lower extremities than elsewhere on the body^{11, 13}. However, other reports have indicated above knee amputation as the commoner procedure performed than below knee amputation^{6, 14}. Late presentation with spreading gangrene or advanced diabetic foot gangrene or malignant lesions that have involved the underlying bones may make the surgeon to opt for a higher level of amputation.

Wound infection, our commonest complication is in keeping with earlier reports^{4, 6, 14}. The overall surgical site infection rates in these studies reflect the severity of complications leading to amputation in the first instance coupled with the fact that majority of the patients presented late when severe sepsis had already set in. The rate of re-amputation is lower in this series compared to that reported by other studies^{2,4} but similar to that reported by Kidmas et al⁶ in Nigeria (7.4%). These differences may be due to the fact that traumatic limb injuries are the commonest indications for amputation in our study. Poor management of the amputation stump coupled with the fact that majority of the amputations were done by junior doctors may have been responsible for the re-amputation rate in this study.

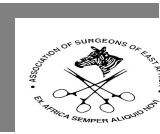
The mean duration of hospital stay in this series is shorter than that obtained by Esoh et al.⁴ The length of hospital stay is an important measure of morbidity and an important determinant of cost associated with amputation¹⁵.

Eighty-five (53.8%) of the patients who had lower extremity amputations were able to procure and ambulate with prosthesis while only 2 (1.3%) patients who had upper extremity amputations procured prosthesis. The cost of health care in this environment is entirely out of pocket by the patients and the relations. Few non- governmental organizations are involved in providing prostheses for amputees but this is largely inadequate compared to the teeming number of individuals who need these services.

The mortality rate in our study is lower compared with other reports^{4, 6, 15}. This may be due to the relatively younger patients who presented with severe extremity injuries. These are otherwise healthy individuals prior to their injuries and once life threatening events have been treated they usually make satisfactory recovery.

Conclusion

Road traffic limb injuries and diabetic foot gangrene are still the commonest indications for major limb amputation in our environment. These are potentially preventable through provision of health education, early presentation and adequate treatment of these conditions. Measures on prevention of road traffic crashes, community health education to encourage early presentation to hospital, good diabetic control and early recognition and management of risk factors for foot complications will reduce the number of patients undergoing major limb amputations in this environment and subsequently reduce the number of amputees.



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