

CAUSAL CONDITIONS FOR MAJOR LIMB AMPUTATION AT A SPECIALIST HOSPITAL IN NORTH CENTRAL NIGERIA

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ABSTRACT

Background:

Amputation is said to be a mutilating surgical procedure with causes varying within and between countries. Even though most causes of amputation result from potentially preventable conditions, it is one of the most commonly performed procedures. The aim of this study is to elucidate the of causes of major limb amputation at NKST Rehabilitation Hospital, Mkar , Benue State so as to proffer preventive measures .

Methodology: *Case records of patients who had major limb amputation between January 2007 and December 2011 at NKST Rehabilitation Hospital, Mkar, were retrieved from the Medical Records Department and analyzed for age at time of amputation, gender, indication for amputation, and early complications following surgery.*

Results: *A total of 198 major limb amputations in 198 patients were audited. There were 139(70.2%) males and 59(29.8%) females with an age range of 2-85 years. The causes of major limb amputation included trauma (n=122, 61.6%), diabetic foot disease (n=36, 18.2%), musculoskeletal tumours (n=26, 13.1%) and peripheral vascular disease (unrelated to diabetes) (n=10, 5.1%). Traditional bone setters' gangrene was the predominant cause (n=65, 53.3%) of traumatic amputation. Surgical site infection was the leading early complication(n=63, 31.8%).*

Conclusion: *Trauma and diabetic foot disease were the leading causes of major limb amputation from the study. Regulating traditional bone setters' practices, enforcing road safety regulations and adequate diabetic foot care practices are recommended.*

Keywords: *Major limb amputation, Indications, Trauma*

INTRODUCTION

Amputation is the most ancient of all surgical procedures with a history of over 2500 years going back to the time of Hippocrates.¹ It is a mutilating surgical procedure with profound economic, social and psychological effects on the patient and their family.^{2,3} Despite this, it is one of the

most commonly performed surgical procedures with 185,000 performed each year worldwide.⁴ Amputations are performed for varying reasons trauma, musculoskeletal malignancies, diabetes, peripheral vascular disease (non-diabetes), congenital malformations, sepsis, burns .^{5,6}

The indications vary within and between countries. While peripheral vascular disease, with or without diabetes, is the leading cause in the western world, tumours and trauma are the predominant causes in sub-Saharan Africa.^{1,5} In Nigeria, trauma and complications of traditional bone setters have being the leading causes of amputation but diabetes mellitus is being reported, of recent, to be the leading cause by some investigators.^{6,7}

Despite it's devastating impact on patients and the society, majority of amputations result from potentially preventable conditions, complications or circumstances.^{8,9} The aim of this study is to elucidate the causes of major limb amputation at NKST Rehabilitation Hospital, Mkar with a bid to proffering preventive measures. The facility is a church-based specialist orthopaedic hospital with referrals from North Central Nigeria and surrounding areas.

MATERIALS AND METHODS

Case records of all patients who underwent major limb amputations from January 2007 to December 2011 were retrieved from the Medical Records Department and examined for age at time of amputation, gender, cause of amputation and early complications.

Causes of amputations were categorized as trauma, diabetic foot disease, musculoskeletal tumours, peripheral vascular disease (unrelated to diabetes), congenital malformations, sepsis and burns. Only patients with complete medical records were included in the study. Major limb amputation was defined as amputation at or proximal to the wrist or ankle joint.⁹

Data collected were analysed using the software Statistical Package for Social Sciences for Windows version 15.0 (SPSS, Inc; Chicago, Illinois). Descriptive statistics were used to display single variable quantities using means and standard deviations (SD) for continuous variables or proportions for categorical variables unless otherwise stated.

RESULTS

198 cases of single major limb amputations were included in the study. There were 139(70.2%) males and 59(29.8%) females with an age range of 2-85 years (mean 36±21). The modal age range was 20-29 years. Fig. 1 shows the age distribution of amputees. The common causes of major limb amputation were trauma (n=122, 61.6%), diabetic foot disease (n=36, 18.2%), musculoskeletal tumours (n=26, 13.1%) and peripheral vascular disease (unrelated to diabetes) (n=10, 5.1%). Table 1 shows the numbers and proportions of causes of major limb amputation. Traumatic causes of major limb amputation include traditional bone setters' gangrene (n=65, 53.3%), road traffic accidents (n=42, 34.4%) and falls (n=11, 9.0%). Table 2 shows the numbers and proportions of traumatic causes of major limb amputation. Musculoskeletal tumours treated by major limb amputation include, advanced squamous cell carcinoma of the skin (n=12, 46.2%) and osteogenic sarcoma (n=5, 19.2%). Table 3 displays proportions of tumours treated by major limb amputation. Early complications were wound infection (n=63, 31.8%), wound dehiscence (n=8, 4.0%), haematoma formation (n=2, 1.0%) and flap necrosis (n=6, 3.0%).

Fig. 1: Age distribution of amputees

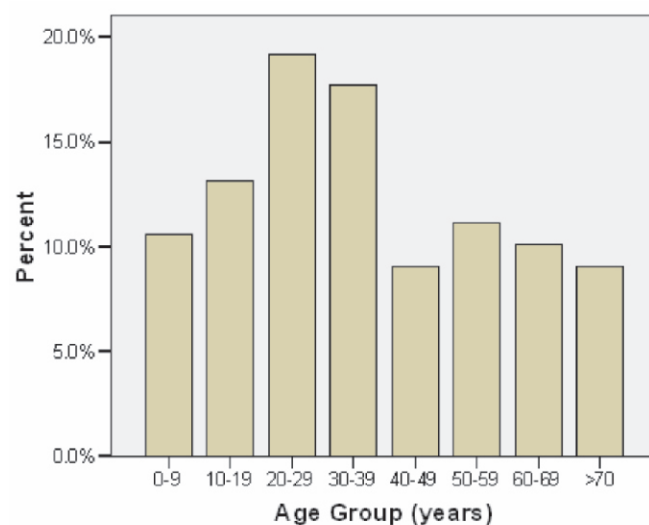


Table 1: Numbers, proportions (%), Mean age (SD), minimum and maximum ages of causes of major limb amputations.

	Number	%	Mean age	SD	Min	Max
Diabetic foot disease	36	18.2	52	15	5	75
Trauma	122	61.6	28	17	2	85
PVD*	10	5.1	68	12	50	85
Tumours	26	13.1	43	19	7	70
Cong. malformations [#]	1	0.5	16	-	16	16
Sepsis	2	1.0	28	6	23	32
Snake bites	1	0.5	7	-	7	7
Total	198	100.0	36	21	2	85

* – *Peripheral vascular disease (unrelated to diabetes)*

– *Congenital malformations*

Table 2: Traumatic causes of major limb amputations

Traumatic Causes	n	Percent
TBS' gangrene*	65	53.3
Road traffic accident	42	34.4
Falls	11	9.0
Missile injuries	4	3.3
Total	122	100.0

*- *Traditional bonesetters' gangrene*

Table 3: Tumours that resulted in major limb amputation

Tumour	n	Percentage
Squamous cell carcinoma	12	46.2
Osteogenic sarcoma	5	19.2
Fibrous histiocytoma	4	15.4
Malignant melanoma	3	11.5
Kaposi sarcoma	2	7.7
Total	26	100.0

DISCUSSION

In this study, trauma was the leading cause (61.6%) of major limb amputations, a finding similar to those of previous Nigerian studies.^{10,11,2}

This is at variance, however, with recent studies that showed a change in trend towards diabetic foot disease as the leading cause of amputations in Nigeria.^{6,12}

Traditional bone setters' gangrene was the most predominant cause (53.3%) of traumatic amputation. Gangrenous limbs result from post-fracture manipulation and tight splintage by traditional bone setters. Similar misfortunes have been reported by different authors^{13,9,14} with most quoting higher figures. Despite the well-documented deleterious consequences of traditional bone setters' activities, they still enjoy high patronage from trauma victims because of ignorance, poverty and cultural beliefs.^{13,15}

Traditional bone setting is so ingrained in the socio-cultural fabric of the society that eradicating the practice may be an impossible task. Traditional bone setters, however, could be made safer by training, certification and integration into the

National Health System. Onuminya showed that giving a one-day instructional course to a traditional bone setter significantly reduced the number of gangrenous limbs resulting from his practice compared to another who was untrained.¹⁶

Road traffic accidents were a significant cause of traumatic amputations (34.4%). Similar observations have been found in other series.^{10,17,1}

Most of those affected are young adults in the productive period of their lives. Late presentation and paucity of facilities and expertise for vascular surgery make limb salvage difficult. Nigeria has a high rate of road traffic accidents with poor road conditions and driving under the influence of alcohol being some of the reasons put forward.¹⁸ Training and retraining of drivers and improvement of road conditions may go a long way in addressing this.

Diabetic foot disease is the second most common indication (18.2%) for major limb amputation in this study, a finding similar to some Nigerian studies.^{11,19,20} However Dada et al.⁶ and Onyemaechi et al.¹² reported much higher figures. Diabetic neuropathy, angiopathy and susceptibility to infection predispose to foot conditions. Early detection of diabetes, patient education on blood sugar control and foot care practices may be key to preventing limb amputation.

Musculoskeletal tumours accounted for 13.1% of major limb amputations performed, a figure similar to that reported in a prior study⁵ but much lower than that by Loro et al.²¹ While osteogenic sarcoma accounted for majority of amputations due to musculoskeletal tumours in most reports,^{5,21} this study showed a preponderance of advanced squamous cell carcinoma of the skin. Squamous cell carcinoma occurs at sites of previous burn scars, sinuses, pressure ulcers, trauma or sites of osteomyelitis.²¹ Underlying bone involvement may occur if left unattended to for long. Early presentation to hospital and treatment of ulcers by cover with skin grafts or flaps will go a long way in preventing malignant transformation and possible amputation.

Peripheral vascular disease unrelated to diabetes mellitus ranks fourth as an indication for major limb amputation. It accounted for 5.1%, a figure lower than other studies.^{9,17} It is not common in Nigeria

possibly because of the short life-span.² Most patients are elderly presenting late with gangrene necessitating amputation. Early presentation and availability of investigative and therapeutic modalities will help prevent amputation.

Amputations due to congenital anomalies are rare and constitute a small proportion of amputations even in areas where congenital anomalies are common.^{5,22} They were responsible for only 0.5% of cases in this study. O'gengo et al.⁵ reported a much higher figure in their series. The finding in this study is consistent with the reported rarity of amputations due to congenital defects.²²

The male predominance in this study is similar to findings reported in prior studies.^{2,4,5} This may be because males are more susceptible to trauma than women. The peak age group was 20-29 years comprising of young adults who form the productive part of the population. Failure of complete rehabilitation and integration into the society adversely affects the economy of the country.

Surgical site infection was the most predominant complication accounting for 31.8%, a figure higher than that reported by Chalya et al.¹⁷ The relatively high rate found may be because of compromised tissue states seen in diabetes, peripheral vascular disease and complicated trauma patients.

Staphylococcus aureus was the most commonly isolated organism similar to findings by other investigators.^{6,12}

Trauma, diabetes, peripheral vascular disease, malignancy, sepsis and snake bites constituted 99.5% of causes of amputation in this study and these are potentially preventable conditions, complications and chronic diseases.²³ Public awareness programs on the causes of major limb amputation may go a long way in reducing the number of amputations performed and its burden on the society.

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