

MAJOR LIMB AMPUTATIONS: A 5YEAR RETROSPECTIVE STUDY IN A REGIONAL TRAUMA CENTRE

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ABSTRACT

Objective: The aim of this study is to establish the pattern of amputation in our environment, analyze the procedures done and outcome, compare our findings with various reports coming out from developing countries namely, indication, level of amputation, rehabilitation and outcome and recommend ways of mitigation and improved outcome.

Methodology: This is a retrospective study in which case histories of patients that had undergone amputations at National Orthopaedic Hospital Enugu (NOHE), Nigeria over 5 year period (Jan 1 2011 – Dec 31 2015) were reviewed.

Results: Results showed: There were forty – six (46) patients with forty seven (47) amputations, thirty-eight (38) (82.61%) were males and eight (8) (17.39%) Females with M.F ratio of 4:75:1. The Mean Age (in years) was 36.6 ± 17.08 with a range of 1 – 90 (yrs) Eight (8) (17.39%) of the patients were diabetic and the remaining thirty eight (38) (82.6%) were non diabetic patients. Thirty three (33) (70.21%) of these amputations were in the lower limb while fourteen (14) (29.79%) were in the upper limb. There was a re-amputation in five (5) (10.87%) patients. Twenty four (24) (52.17%) patients had complications.

Discussion: Six of the patients died representing a mortality rate of 13.04%. Seventeen (17) (36.96%) patients were rehabilitated with prosthesis. The highest indication in our series is due to gangrene secondary to diabetic foot followed closely by mismanaged tibia fractures by the Traditional Bone Setters (TBS) and poor wound management by doctors.

Conclusion: Most of our amputations are above knee with phantom limb as the most noted complications. Our rate of rehabilitation is quite low. We therefore recommend the following: continued education for doctors on wound management and management of diabetic foot, regulation and education of practice of Traditional Bone Setters to enable them recognize and not exceed their limits, development, equipping and capacity building for prosthetic units to enable them meet with the challenges facing the amputee, further studies to establish the real cause of low rate of rehabilitation.

Keywords -Amputation, Complications, Developing Country, Indications, and Rehabilitation

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INTRODUCTION

Amputation is an age old procedure documented in the history of medicine.^{1,2,3} Indications for amputation are usually a variable mixture of trauma, tumor, infection, congenital deformities and peripheral vascular disease. Reports emanating from the developed countries show vascular pathology as the leading indication with a variable mixture of outcomes^{4,5,6,7}. Authors⁸⁻²² from developing countries have contrary views on the pattern and outcome, with trauma, infections and diabetic mellitus as the leading causes of amputations.

Apart from the dangers associated with the

procedure, loss of a limb by an individual is often associated with major psychosocial problems. Therefore, there is need to minimize the indications through proper training of doctors in trauma management as this also helps to improve the outcome where the procedure becomes inevitable.

The aim of this study is to establish the pattern of amputation in our environment, analyze the procedures done and outcome, and compare our findings with various reports coming out from developing countries and to recommend ways of mitigation and improved outcome.

METHODOLOGY

Study design

This was a cross-sectional descriptive study involving all patients who had undergone major limb amputations at National

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Orthopaedic Hospital Enugu (NOHE) between Jan 1 2011 and Dec 31 2015. Major Limb Amputation is defined as any amputation above the wrist or ankle.

Study setting

The study was conducted at National Orthopaedic Hospital Enugu (NOHE), which is a regional trauma centre situated in Enugu, South Eastern Nigeria. It is a tertiary care hospital with a bed capacity of 500. It is also a postgraduate centre for the training of postgraduate doctors in the specialty of orthopedics, traumatology, burns and plastic surgery .It is also a centre for the training of post basic nurses other paramedics. NOHE provides services to patients from neighboring towns in Enugu city and those referred from peripheral hospitals.

Study population

The study population included all patients of all age group and gender who had major limb amputations at NOHE within the period of study. Major limb amputation is any amputation proximal to the wrist or ankle.²⁶

Selection criteria

All patients of all age group and gender who had major limb amputation whose records had demographic data (e.g. age, gender, educational level and occupational status) and clinical data (e.g. indications, level of amputation, postoperative complications, Length of hospital stay, mortality were included in the study. Patients who had incomplete records and those who had surgery in other institutions, but required stump revision were excluded from the study.

Statistical analysis

We used the IBM SPSS Version 25 package to analyze our data. Descriptive statistics were calculated for all variables of interest. Categorical measures were summarized as counts and percentages, and continuous measures were summarized as means and standard deviations.

RESULTS

General Information

As shown in Table 1, there were forty – six (46) patients with forty seven (47) amputations, thirty-eight (38) (82.61%) were males and eight (8) (17.39%) Females with M.F ratio of 4:75:1. The Mean Age (in years) was 36.6 ± 17.08 with a of Range 1 – 90 (yrs)

Eight (8) (17.39%) of the patients were diabetic and the remaining thirty eight (38) (82.6%) were non diabetic patients. Thirty three (33) (71.74%) patients had Pre Hospital Treatment and Thirteen (13) (28.26%) had no pre hospital Treatment. Twenty two (22) (47.83%) patients had their left side affected while twenty three (23) (50%) had right side afflictions. Only one (1) (2.17%) patient had a bilateral amputation. Thirty eight (38) (82.61%) patients amputation were trauma associated while eight (8) (17.39%) patients had no trauma associated with it. Thirty three (33) (70.21%) of these amputations were in the lower limb while fourteen (14) (29.79%) were in the upper Limb. There was a re-amputation in five (5) (10.87%) patients. Thirty two (32) (69.57%) patients had provisional amputation while fourteen (14) (30.43%) had definitive amputations. Twenty four (24) (52.17%) patients had complications. Six (6) patients died representing a mortality of 13.04%. Seventeen (17) (36.96%) patients were rehabilitated with prosthesis.

Occupation

As shown in Table 2, the distribution of occupation was as follows: Trader, twelve (12) (26.09%). Driver/Bus Conductor, eight (8) (17.39%), students, seven (7) (15.22%), Pensioner four (4) (8.696%), Civil Servant three (3) (6.522%), Electrician, three (3) (6.522%), Farmer, three (3) (6.522%), Cattle Rarer, two (2) (4.35%), Housewife, one (1), (2.174%) Unemployed one (1) (2.174%), Palm wine Taper, one (1) (2.174%), Artisan, one (1) (2.174%).

Indications for Amputation

As shown in Table 3 the indications for amputations were as follows: Gangrene, twenty two (22) (47.83%), Crush Injury, seven

(7) (15.22%), Traumatic Amputation, five (5) (10.87%), Malignancies of the Bone, four (4) (8.696%), Electrical Burns, three (3) (6.522%)

Causative Factors to Gangrene:

As shown in Table 4 the causative factors were as follows: Diabetic Foot, seven (7), (31.82%) Fracture of the tibia, six (6), (27.27%) Crush Injury, four (4), (18.18%) Vasculopathy, two (2), (9.091%) Gunshot wound of the thigh, one (1), (4.545%) Forearm Burns, one (1), (4.545%) Machete cut, one (1), (4.545%).

Pre hospital Treatment for patients with Gangrene:

As shown in Table 5 the pre hospital treatments were as follows: TBS, thirteen (13), (59.09%) Private Practice (PP), nine (9), (40.91%)

No of days in pre Hospital before Presentation:

As shown in Table 6 the average numbers of days spent at the peripheral hospital treatment were as follows: Traditional Bone Setters (TBS), 130, with a Range of 1-1095, Private Practitioners (PP), 751.68 with a range of 1.6205,

Level of Amputation:

As shown in Table 7 the level of amputations were as follows: above Knee, fourteen (14), (30.43%), Below Knee, eighteen (18), 39.13%, Knee Disarticulation, one (1), 2.174%, Above Elbow, eight (8), 17.39%, Below Elbow, five (5), 10.87%.

Complications:

As shown in Table 8 the complication arising were as follows: phantom limb, six (6), 25%, Wound Infection, Four (4), 16.67%, Septicemia, Four (4), 16.67%, Flap Necrosis, Two (2), 8.333%, Neuroma, One (1), 4.167%, Stump Ulcer, One (1), 4.167%, Erythema, One (1), 4.167% Anemia, One (1), 4.167%, Depression, One (1) 4.167%, Sinus Formation, One (1), 4.167%, Haematoma, One (1), 4.167%.

DISCUSSION

The patterns of amputation in the literature vary in various series. Our study showed that more males have amputations than females. This is in consonant with the findings of some series^{9,11,14,16}. Paudel¹⁰ in his series have adduced reasons, being that males are still more out of doors and exposed to more hazards. Umaru⁹ in discussing his series postulated that males are more adventurous in their active years more than females. Our mean age was 36.6 ± 17.08 which is in consonant with other reports^{9,14,15} from the region. This is the age of high level of activity. These support the finding that trauma is the leading cause of amputations in this series. Diabetic patients constituted seventeen percent of our patients (17.39%). This is in consonant with the work of Akiode¹² who reported an incidence of twenty two percent of amputation in diabetics (17.7% for 30-69 years), and who had observed that patients who had limited education had limited knowledge of their disease and actually did not practice any prevention for podologic traumatism. The author recommended programmes for the prevention of podologic complications taking into account local specifics. We cannot but agree with these assertions as we all know that pathogenesis of diabetic foot shows ulcers and peripheral neuropathy as the most important risk factors. Abbas et al²¹ in their study demonstrated the importance of seeking medical attention promptly at the earliest onset of symptoms, preventive efforts for both hand and foot sepsis which includes aggressive blood sugar control and education on hand foot care.

Our study showed that the lower limb was mostly affected (70.21%). This is similar to the findings of Onuminya.^{9,14,16} There was a re-amputation rate of 10.87% similar to the findings of Onuminya¹⁴ et al. There were provisional amputations in majority (69.57%) of our patients similar to the findings of Onuminya et al¹⁴ who recorded a 60% rate. This is attributed to the high number of patients with traumatic gangrene with many

presenting late at our hospital.

Majority of the cases that presented with gangrene were due to trauma (58.99%) as shown in figure 4 below. An analysis of the cases with gangrene showed mismanaged trauma to be the commonest causative factor. Out of the group 59.09% were managed by the Traditional Bone setters and 40.91% by the private practitioners.

Many authors^{9,14,17,18,19,22} have in several series highlighted the role of Traditional Bonesetters (TBS). Recommendations ranged from unacceptability of complications arising from their roles with calls for outright ban and legislation^{14,22} to training of practitioners.^{9,13,18} For the later, the question posed by Osime and Elusoji²⁴ on how safe this practice will be needs to be answered before we can embark on it. For the former, we need to examine the issue of market forces^{26,27} in Nigeria which favors the use of TBS. Indeed current market factors in United States are skewed in favour of TBS²³.

While contending with the issue of TBS, there is also an urgent need to focus our attention on the mismanaged cases that came from orthodox practitioners. There were issues like, poor wound management with suturing of gun shot wounds, machete cuts and crushed injuries, poor treatment of compound fractures, failure to recognize complications like compartment syndrome arising from fractures and circumferential burns of the limb, and failure to recognize vascular injuries early. These anomalies could be address by the continued professional development and review of the medical school curriculum.

Our series had a complication rate of 52.17% with a wound infection rate of 16.67% which is at variance with that of Olasinde¹⁵ who had a rate of 68.3%. We had a mortality rate of 13.04% which shows a rise compared to 8.3% rate documented in a previous work done by Katchy et al in this centre. Onuminya¹⁴, Olasinde¹⁵ had all reported a rate of 8.5% which is in keeping with our previous study. Our current mortality rate is same as reported by Kidmas¹³ and Nwankwo¹⁸ who reported a

rate of 12.6% and 15% respectively. Seventeen percent (17%) of our patients were rehabilitated with prosthesis.

This is significant improvement on what we found in our previous study⁸ in this centre when we had only 7.5% of patients fitted with prosthesis. Rehabilitation has always been a major problem in developing countries. Olasinde¹⁵ in a large number of eighty patients noted that none of the patients could be fitted prosthesis on admission. Onuminya's¹⁴ 25% fitting of prosthesis is indeed a far cry from what we have in developing countries where other authors^{9,10,19} in their series have highlighted this problem of inability to fit prosthesis. A lot of factors ranging from financial inability to unavailability contribute to this. Paudel¹⁰, Umaru⁹ have all recommended establishment of prosthetic fitting centres as a panacea to this problem. Pezzin²⁵ in a study to examine the long-term outcomes of persons with trauma related amputations fitted with prosthesis confirmed that a substantial effect of inpatient rehabilitation in improving long term outcomes of persons with trauma related amputations.

CONCLUSION

This study has examined the pattern of amputation in our environment and establishment that more males have amputations more than females with most of them occurring at the third decade of age which is in keeping with the period of high activities. The commonest indication for amputation in our series is Trauma (37.78%) and gangrene secondary to traumatic causes(28.26%) giving a total of 66.04%

Most of our amputations are above knee with phantom limb as the most noted complications. Our complication rate is comparable with that reported in other studies. Out rate of rehabilitation is quite low.

We therefore recommend the following: continued education for doctors on wound management and management of diabetic

foot, regulation and education of practice of traditional bone setters(TBS) to enable them recognize and not exceed their limits, development, equipping and capacity building for prosthetic units to enable them meet the challenges facing the amputee and further studies to establish the real cause of low rate of rehabilitation.

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