

AMPUTATIONS FOLLOWING TRAUMATIC LIMB INJURIES IN JOS, NIGERIA.

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ABSTRACT

AIM: To describe the pattern of amputation following trauma in our institution with the view to identify preventable causes and suggest ways of reducing post-traumatic limb loss.

PATIENTS AND METHODS: A retrospective study of all cases of limb amputations following traumatic injuries seen in Jos University Teaching hospital over a 5-year period (March 1992 February 1997).

RESULTS: A total of 65 amputations were performed in 55 patients with traumatic limb injuries over the study period. There were 45 males and 10 females (M:F = 4.5:1). There ages ranged from 3 years to 70 years (mean \pm SD = 21.6 \pm 12.5). The peak age incidence of 49.1% occurred in the first decade of life.

Vehicular injuries and falls were the leading causes of trauma accounting for 32.7% and 27.3% respectively. Late presentation was common. Initial treatment by traditional bone setters was noted in 21 of the 27 children aged 16 years and below compared to seven of the 28 adults above 16 years ($\chi^2 = 15.33$; $p < 0.01$). Seventeen patients had various complications, the commonest being wound infection. A mortality rate of 5.5% was observed.

CONCLUSION: Initial presentation of patients with limb injuries to traditional bone setters is associated with high morbidity and mortality. Appropriate legislation to check the excesses of traditional bone setters should reduce the number of amputations following limb trauma.

KEY WORDS: Amputation, Trauma, Traditional bone setters, Younger age.

INTRODUCTION

High rate of vehicular injuries^{1,2} and industrial accidents continue to swell the number of trauma patients in our accident and emergency units. In Nigeria, limb injuries and fractures contribute significantly to morbidity and mortality arising from moderate to severe traumatic injuries^{3,4}. The favorable disposition of our people to patronage of traditional bonesetters often results in late presentation with consequent cellulitis and gangrene. This had led to loss of otherwise salvageable limbs.

We retrospectively reviewed cases of amputations following traumatic limb injuries in Jos University Teaching Hospital over a five-year period from March, 1992 to February, 1997. This paper aims at establishing the pattern of traumatic limb loss with special emphasis on avoidable factors that contribute to amputation and ways of reducing its incidence.

PATIENTS AND METHOD

Jos University Teaching Hospital is a 520 bedded hospital that provides tertiary care to Plateau state and the neighbouring Nassarawa, Bauchi and Southern part of Kaduna states. All patients who had amputations following limb injuries, between March 1992 and February 1997, were identified from the operating registers and the nurses' admissions and discharges records. Their hospital records were retrieved from the medical records department. Information extracted from their folders included age, sex, mechanism of injury, mode of presentation, level and laterality of amputations, outcome of management and rehabilitation. Any prior treatment before presentations was documented. Analysis were done using frequency tables and χ^2 test with $p=0.05$ considered as significant. Primary healing was considered to have occurred if the wound remained closed and dry after removal of stitches.

RESULT

Over the study period, a total of 16,213 patients had operations in surgery department. One hundred and twenty five (0.8%) patients had amputations for various causes, giving an average of 25 amputations per year. Of these, 58 patients (46.4%) had amputation following traumatic injuries. Three patients had insufficient data and were therefore excluded.

Age and Sex Distribution

A total of 65 amputations were performed in 55 patients following traumatic limb injuries. Figure 1 shows the age and sex distribution of amputees. There were 45 males and 10 females (M:F = 4.5:1). Their ages ranged from 3 years to 70 years with a mean of 21.6 ± 12.5 years and a median age of 17 years. The peak age incidence of 49.1% occurred in the first decade of life and 76.4% of the patients were aged 30 years and below.

Time Interval and Mode of Presentation in Hospital

Sixteen patients (29.1%) presented within 24 hours of injury. Of these, 14 had traumatic amputations requiring refashioning of stump and one had severe neurovascular injury complicating compound comminuted fracture of the wrist sustained as a result of a fall unto a grinding mill belt during acute cerebro-vascular accident (CVA). The other had electrical burns of the right hand with subsequent gangrene requiring below elbow amputation. The remaining 39 patients (70.9%) presented at time intervals ranging from two days to three months. Twenty-eight patients (50.9%) had received initial care from traditional bone setters and presented with gangrene. Of these, 26 (92.9%) had wet gangrene. Treatment modalities received by this group prior to presentation included local splintage and topical application of traditional concoctions after scarifications. Of the 27 children aged 16 years and below, 21 (77.8%) had received initial native treatment while only 7 (25%) of the 28 adults aged above 16 years had such treatment prior to presentation. Initial native treatment occurred significantly more in children than adults ($\chi^2 = 15.33; P < 0.01$).

Mechanism of Traumatic Limb Injuries

Table 1 summarizes the mechanism of injuries. Vehicular injury was the commonest cause accounting for 18 patients (32.7%). Of these, 8 (44.4%) were pedestrians. Lower limb

amputations occurred more (13 patients) than upper limb amputations (5 patients) in this group. Fall from heights and while walking or playing was the next common cause accounting for 15 cases (27.3%). Of these, 13 patients had upper limb amputations. Of the 11 patients (20%) who had industrial accidents, 7 followed grinding mill injuries involving the upper limbs. Six of these patients were children sent by parents to grind foodstuff.

Levels and Laterality of Amputations

The levels and laterality of amputations are shown in table 2. Of the 65 amputations performed, major amputations (proximal to the ankle and wrist) accounted for 43 cases (66.2%). Eleven of these were guillotine amputations performed because of indeterminate levels of sepsis or gangrene and required subsequent refashioning (10) or skin grafting (1). All digital amputations involved the fingers except one case of left hallux amputation following a traumatic partial amputation with sepsis. The right hand was more affected in 65% of cases involving the upper limb digits. All cases of finger injuries occurred as a result of industrial accidents except three cases of knife cuts that occurred at home.

Morbidity and Mortality

Duration of hospitalization ranged from 1 day to 3 months with a mean (+SD) of $28.1 + 16.4$ days. Late presentation, initial native treatment from bone setters with complications of cellulitis and gangrene were major causes of increased morbidity and mortality. There were 3 postoperative deaths giving a mortality rate of 5.5%. The causes of deaths are summarized in Table 3. Primary healing occurred in 48 amputation wounds (73.8%). 19 complications occurred in 17 patients (30.9%). These included wound infection (16 cases), two cases of chronic osteomyelitis of the stump and a case of complete wound dehiscence. The organisms isolated included staphylococcus aureus 3, pseudomonas spp 2, E. Coli, 1, proteus species 1 and klebsiella spp. 1. There were no records of cultures in others. Anaerobic cultures were not done because of unavailability of facilities during the study period.

Follow up and Rehabilitation

Follow up was generally very poor. Majority (59.6%) of the 52 survivors were lost to follow up. The rest were followed up for periods ranging from two weeks to two years with a mean

of 2 months. Initial mobilization of those who had lower extremity amputations was by crutches. Three patients were referred out for prosthesis and

never returned for further follow-up. Most of the patients indicated unwillingness to go for rehabilitation mainly due to lack of funds.

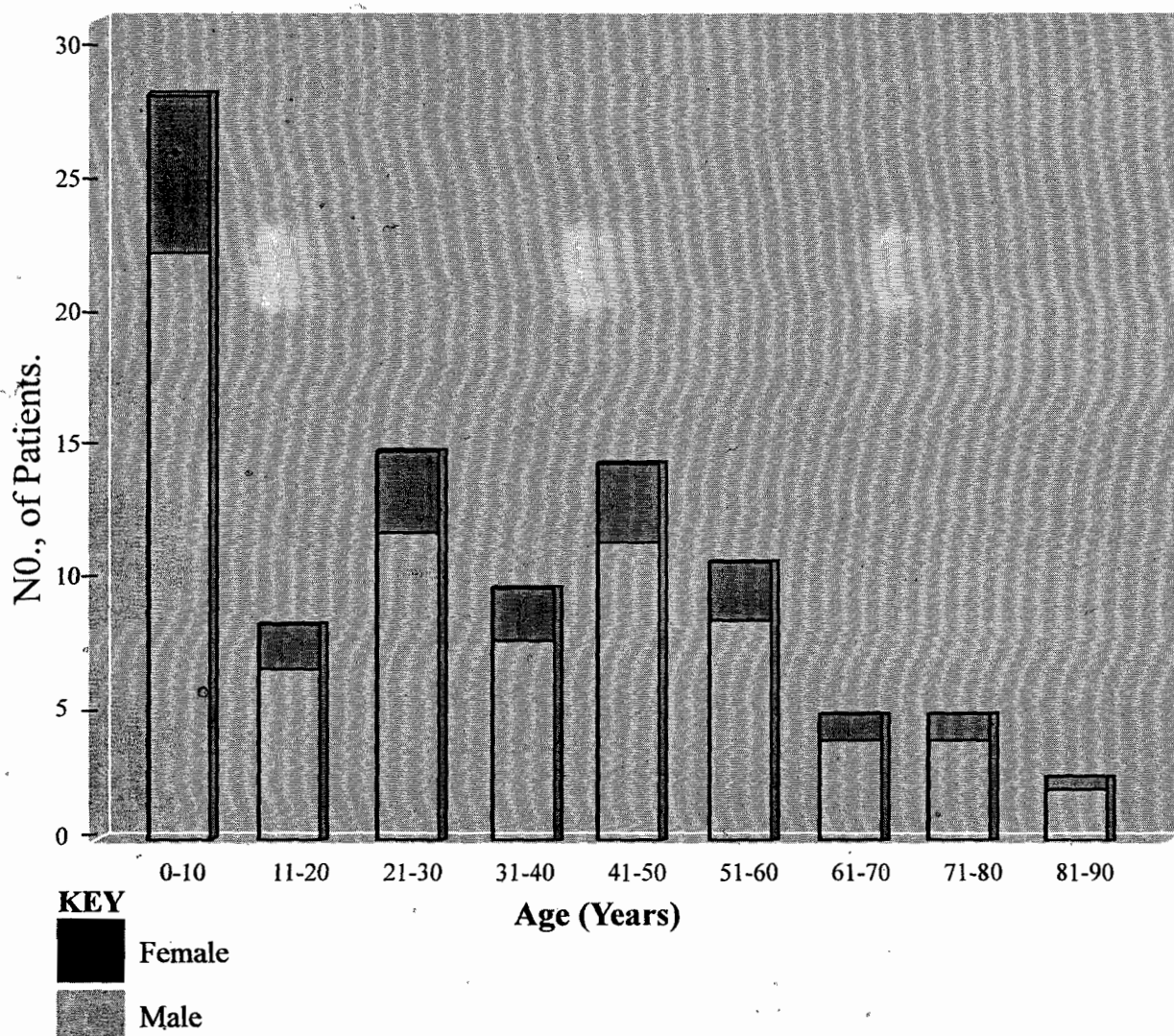


TABLE I: MECHANISM OF INJURY AMONG AMPUTEES FOR TRAUMA: JUTH 1992 - 1997

	Number	Percentage (%)
Vehicular Injuries	18	32.7
Fall	15	27.3
Grinding Machines	7	12.7
Other Industrial Machines	4	7.3
Knife Cut	3	5.5
Burns	2	3.6
Blast/Gunshot	2	3.6
Assault/Fight	2	3.6
Cow Accident	1	1.8
Barb Wire	1	1.8
TOTAL	55	100

TABLE II: LEVELS OF AND LATERALITY OF 65 AMPUTATIONS FOR LIMB TRAUMA: JUTH 1992 - 1997

	Right	Left	Total (%)
Above-knee Amputation	3	9	12 (18.5)
Below-knee Amputation	6	6	12 (18.5)
Above-elbow Amputation	8	5	13 (20.0)
Below-elbow Amputation	3	2	5 (7.7)
Shoulder Disarticulation	-	1	1 (1.5)
Transmetatarsal	-	1	1 (1.5)
Digital: Fingers	13	7	20 (30.8)
Toes	-	1	1 (1.5)
TOTAL			65 (100%)

TABLE III: SUMMARY OF MORTALITY AMONG AMPUTEES FOR TRAUMA: JUTH 1992 - 1997

S/NO	Name/Hospital Number	Sex	Age	Cause of Death
1	A. J. 986719	M	27	Gangrene of 4 fingers of left hand and tetanus complicating traditional treatment of compound fractures of the fingers in a RTA two weeks prior to admission. Died second day of admission from full blown tetanus.
2	T. D. 031311	M	38	Multiple injury following assault. Developed compartment syndrome of left leg for which he had fasciotomy initially and later BKA. Died 16th day of multiple organ failure.
3	B. Y. 061789	M	70	Known diabetic. Sustained fracture of right leg in a RTA four weeks prior to admission. Went for traditional treatment and presented with gas gangrene, sepsis and diabetic ketoacidotic coma. Died 8 days after AKA of multiple organ failure.

- KEY:** 1. RTA = Road Traffic Accident
 2. BKA = Below Knee Amputation
 3. AKA = Above Knee Amputation

DISCUSSION

In this study we recorded a male preponderance of amputees. This agrees with other reports on amputations^{1,5}. It is known that men have greater mobility in this region and culturally are expected to provide for their families. This makes them more susceptible to vehicular injury and industrial accidents. In addition, male children are given greater responsibilities probably in anticipation of their adult roles. The observed peak age incidence for amputation (first decade) in this series, contrasts

with the third decade reported from eastern Nigeria¹, fourth decade in northern Nigeria⁵ and seventh decade in Ghana⁶. However, the study population in this report has a preponderance of the younger age groups since it focuses on amputation arising from traumatic injuries. It has been found that injuries are common in Nigerian children following falls and pedestrian-vehicular injury resulting in greenstick and supracondylar fractures⁷. The practice of traditional bonesetters of unscientific tight splintage, scarification of simple fracture swelling with topical application

of unsterile concoctions leads to complication of cellulitis and gangrene. This practice resulted in staged amputation and was noted more in patients below the age of sixteen years (77.8% vs 25%).

The primary healing rate of 73.8% compares with 75.5% recorded by Naeeder⁶. Our postoperative mortality rate of 5.5% is lower than 8.3% reported from eastern Nigeria¹ and 20.0% from Ghana⁶. This is probably because the study population in the later series included older patients with diabetes mellitus and other peripheral vascular diseases.

We found that rehabilitation of patients was very unsatisfactory in this region. Poverty, ignorance and the distance of 420km from the nearest rehabilitation center are contributory factors. The paucity of rehabilitation facilities in this center is not a peculiarity^{1,5,6}. As a result, major amputations often result in destitution.

We believe that prevention of trauma and its complication by public enlightenment, strict enforcement of traffic regulations, and government legislation against parental child abuse will decrease the number of avoidable amputations. There should be a change in the attitude of government, which appears to encourage traditional healers without adequate regulation of their practice. We suggest that central regulatory bodies from the Ministries of Health be set up to oversee the activities. This is being practiced in some parts of Africa. Government and Non-governmental Organisation (NGO) involved in health care

provision should also provide facilities for rehabilitation such as prosthesis and orthosis units and occupational therapy. Deliberate attempt should be made to re-absorb amputees into gainful employment.

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