

W. Yinusa · M.E. Ugbeye

Problems of amputation surgery in a developing country

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Abstract We studied prospectively 87 patients who underwent extremity amputation in the National Orthopaedic Hospital in Lagos in 1995–1996. Trauma from road traffic accident was the most common indication (34/87) with peripheral vascular disease being the least encountered (2/87). Traditional bonesetters' gangrene accounted for 9/87 cases in circumstances that were largely avoidable. Our study revealed that amputation is still being performed as a life-saving procedure, as 44/87 patients presented with gangrene of a limb. The non-availability of special investigations such as Doppler ultrasound, arteriography, and CT scan was responsible for a delay in definitive treatment in 28 cases. Poor prosthetic services and the absence of a well-coordinated amputee clinic were responsible for some of the unsatisfactory results. We believe that the availability of specialized diagnostic tools and facilities for microvascular surgery, together with a multidisciplinary approach to the management of the amputee, would considerably change the current gloomy picture of amputation in developing countries such as Nigeria.

Résumé Nous avons étudié prospectivement 87 malades qui ont subi une amputation de l'extrémité d'un membre dans l'Hôpital Orthopédique National de Lagos en 1995/96. Les traumatismes résultant d'accident de la route, était l'indication la plus commune (34/87) tandis que les maladies vasculaires périphériques étaient la plus rare (2/87). La gangrène causée par la fixation traditionnelle des fractures a expliqué 9/87 cas dans circonstances qui étaient en grande partie évitables. Notre étude a révélé que l'amputation était encore exécutée comme une procédure de sauvetage chez 44 /87 malades présentant une extrémité gangréneuse. La non – disponibilité d'outils d'investigation spécialisés comme le doppler,

l'artériographie et le scanner était responsable d'un retard dans le traitement définitif dans 28 cas. L'insuffisance des possibilités d'appareillage et l'absence d'une clinique de l'amputé bien coordonnée sont des éléments nuisibles mis en évidence par cette étude. Nous croyons que la possession d'outils diagnostiques spécialisés et des installations. Pour chirurgie microvasculaire, dans le cadre d'une approche multidisciplinaire de la gestion de l'amputé changerait considérablement l'image sombre de l'amputation dans un pays en voie de développement comme le Nigeria.

Introduction

Amputation is a mutilating surgical procedure, both altering the body image and producing severe functional deficit; yet it is one of the common surgical procedures undertaken in developing countries [7, 9].

While the indications for amputation in Europe and America are dwindling day by day, resulting both from the development of modern technology in the areas of reconstructive vascular and musculoskeletal surgery and the introduction of adjuvant cancer therapy, the situation in Nigeria is worsening as many treatable diseases continue to end in amputation. This country also suffers from the lack of rehabilitation available for these unfortunate patients who, as a result, many end up on the streets as glorified beggars.

It is for this reason that we conducted a 2-year prospective study of extremity amputation at the National Orthopaedic Hospital, Igbobi, Lagos (NOHL) in order to determine the appropriateness of the decision to amputate, the contributory role of traditional bonesetters to amputation surgery, and the scope of rehabilitation services available to amputees. The NOHL is the largest orthopedic and trauma center in Nigeria and serves a population of about ten million people.

W. Yinusa (✉) · M.E. Ugbeye
Department of Orthopaedics and Trauma Surgery,
National Orthopaedic Hospital,
Igbabi, PMB 2009, Yaba Lagos, Nigeria
e-mail: boboyinus@hotmail.com
Tel.: +234-08033195540

Patients and methods

A prospective study of 87 patients who underwent amputation between January 1995 and December 1996 was undertaken at NOHL. At presentation, a detailed history of the presenting complaints was obtained. Also, an observer-administered questionnaire was used to obtain all other relevant information, including the age, gender, and occupation of the patient, initial treatment given and by whom, and the time interval between the appearance of the first symptom and presentation at NOHL.

A general physical examination was performed in order to rule out any other medical or surgical disease. The affected limb was examined to determine the nature of the pathology and to assess the integrity of the neurovascular system. Based on these findings, the limbs were placed into one of three categories: a normal limb with a normal neurovascular system; a gangrenous limb where there was obvious change of skin color, no pulsation and no cutaneous sensation; and a pregangrenous limb in which skin color and temperature are retained, the distal pulses are absent or feeble, and cutaneous sensation may or may not be present.

Nearly all patients received a preoperative blood transfusion and parenteral antibiotic therapy. Their packed-cell volume was estimated, and a plain radiograph of the affected part was taken in every case. Initial debridement and wound dressing was carried out on 28 patients before a final decision was taken to amputate. The care given by the physiotherapist and prosthetist while the patient was admitted was recorded, as well as duration of hospital stay and follow-up in outpatient clinics. Early complications occurring in the first 3 months after operation or before discharge from hospital (whichever period was the shorter) were noted in all patients [4]. Patients with complete traumatic amputation were excluded from the study.

Results

The peak incidence of amputation was in the third and fourth decades of life with 65 patients being less than 50 years of age (Fig. 1). Males outnumbered females by 2.5:1. Trauma was the most common indication for amputation (Fig. 2) and, of those, 34 resulted from road traffic accidents and 17 from industrial accidents. In the nontraumatic group, seven amputations were performed because of a malignant bone tumour and another seven for diabetic gangrene of a foot. Peripheral vascular disease was responsible for only two amputations. Sixty-five percent of patients were low-skilled workers, while 20% of the males and 5% of the females were high-skilled workers. Of the students, one third were males.

Table 1 shows the state of the limb at the time of presentation at the Accident and Emergency Department as a result of any treatment received before arrival. The five "normal" limbs had developed an osteosarcoma of the

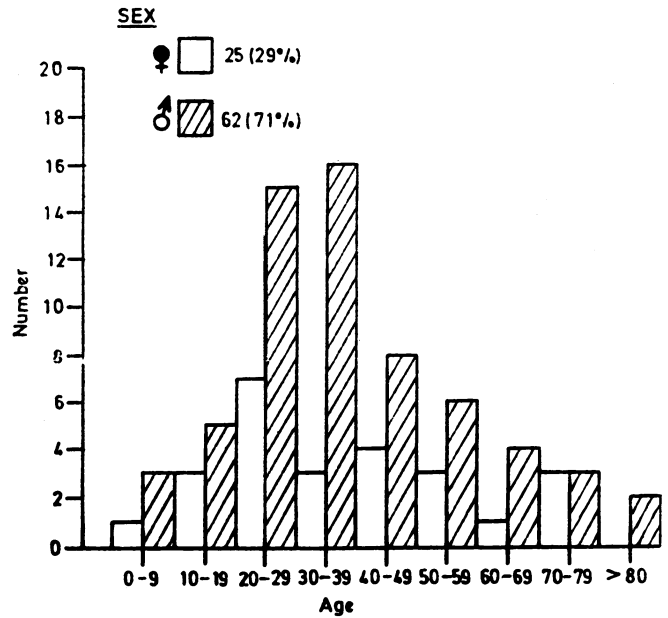


Fig. 1 Gender and age of patients undergoing amputation

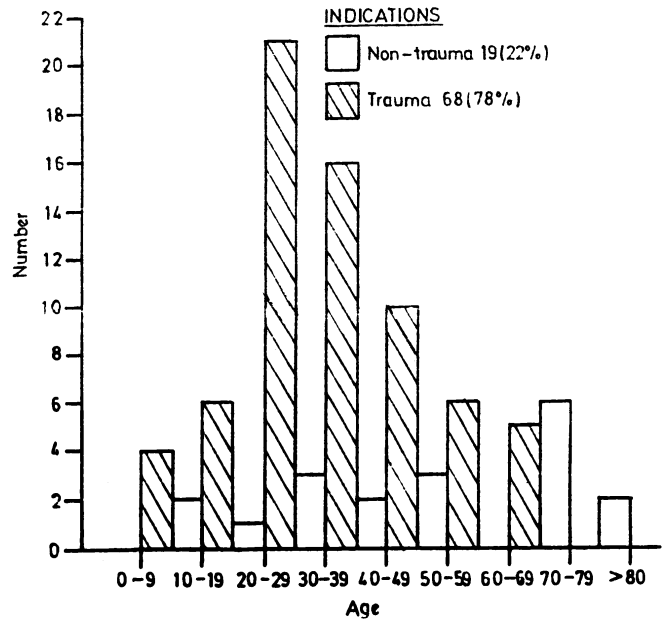


Fig. 2 Traumatic and nontraumatic amputations by age

Table 1 Place from where the patient was admitted and state of limb at admittance

	Normal	Pregangrenous	Gangrenous	Total
Site/home	1	18	9	28
Private hospital	4	11	20	35
Govt. hospital	—	8	7	15
Traditional bonesetters	—	1	8	9
Total	5	38	44	87

tibia. Thirty of the pregangrenous limbs were complicated open fractures, seven of which were type IIIC and 23 type IIIB. The seven type IIIC injuries presented within 6 h and were operated on the same day, while the 23 who presented after a mean time of 7.6 h were operated on after waiting an average of 10.4 days (SD 13.2). The remaining eight pregangrenous limbs comprised five gunshot injuries, presenting after an average of 25 h and operated on after a delay of 11.8 days (SD 7.55); one case of chronic suppurative osteomyelitis; and two cases of osteosarcoma.

Seven of the nine patients who had visited a traditional bonesetter had sustained uncomplicated fractures that could have been managed successfully, thus avoiding amputation. There were 55 amputations of a lower limb and 32 of an upper limb. The most common level of amputation was below the knee, of which there were 27. There were 21 above-knee amputations and 22 "digital." The most common complication was wound infection, affecting 31 patients, of whom five died (6%). Secondary procedures such as split-skin grafting, secondary wound closure, and reamputation at a higher level, were necessary in 21 patients (25%).

Length of hospital stay was 1.4 months (SD 0.97), while the mean follow-up after discharge was 2.6 months (SD 2.35). Forty patients (49%) had adequate physiotherapy while in hospital; 17 (21%) were assessed by the prosthetist on the ward, but only 13 (16%) had prosthetic fitting. Average time for provision of prosthesis in these 13 patients was 4.7 months.

Discussion

The image of amputation surgery in Nigeria has such a bad reputation among our people that by some, it is considered a taboo. The amputee is often viewed contemptuously as it is believed that after death he or she has come back to life with an incomplete limb. In addition to this cultural stigma, amputation is widely known to produce an alteration in body image and personality changes as well as severe functional deficits and significant social problems. In spite of these problems, it was surprising to find that amputation is the second-most common surgical emergency procedure undertaken at the NOHL.

While our study confirms the findings of Katchy, Onabowale, and Onuba [5, 8, 9] that Nigerians believe in treatment at home by traditional bonesetters, a sizable proportion of our patients had attended a private health institution where facilities and expertise were suboptimal. This resulted in late presentation to a specialist surgical center like the NOHL. In our series, the interval from injury to presentation ranged from 30 min to as long as 8 months while for nontrauma conditions it ranged from 1 month to 3 years. As a result, 50% presented with a gangrenous limb that demanded amputation, and it was especially sad that nine of these cases resulted from an injury that was uncomplicated but had been mismanaged by a traditional bonesetter. A painstaking

course of action was undertaken before deciding on amputation for the other 43 patients, especially those with a pregangrenous extremity.

The indication for immediate amputation was obvious for the seven type IIIC crush injuries. The extent of the damage could not be determined immediately for the remaining 23 open injuries, however, and these could have benefited from specialized investigations such as arteriography, CT scan, and MRI – the likelihood being that these limbs could probably have been salvaged. As these investigative tools are not available in most major hospitals in Nigeria, we had no alternative but to take care of the wound by debridement and then wait until the picture became clearer. This waiting period before amputation averaged 11.8 days (SD 7.6) for gunshot injuries and 10.4 days (SD 13/2) for the nonmissile injuries. Similarly, the five patients with an osteosarcoma could have been treated by a limb-sparing procedure if appropriate facilities had been available.

In Nigeria, common indications for amputation are road traffic accidents, industrial accidents, gunshot injuries, "diabetic" foot, and malignant musculoskeletal tumours [1, 5, 8, 9, 10]. In our study, trauma was responsible for 78%. While this is similar to Onuba's findings in Calabar (Nigeria), it is the opposite of what is reported from the USA and Britain where 75% of amputations are for nontraumatic conditions [11].

A plausible explanation for this difference is the short life span of Nigerians, which makes us less predisposed to peripheral vascular diseases. Another possible reason is that there are more adequate facilities and expertise to investigate and treat patients with traumatic vascular injuries of the limbs in the USA and Britain.

Trauma commonly occurs in young active individuals who are the breadwinners of the family. Our peak age incidence of 20–40 years is similar to that reported by Onuba. It is, however, pertinent to mention that of the trauma group 50% (i.e., 34/68) were due to road-traffic accidents while in the nontrauma group, "diabetic" foot and malignant neoplasm tops the list, each with a prevalence rate of 37% (7/19).

Our findings on age, indications, and mortality are at variance with those of Anyanwu and Naaeder [1, 7], who also studied the pattern of amputation in West Africa. While our study was carried out in a trauma center, their studies were in general surgical units with a resulting difference in the etiology. This difference merits further study to determine the contributory role of peripheral vascular disease in amputation surgery.

The inadequacies of traditional bonesetters in the management of musculoskeletal conditions in the West African subregion has been reported previously [5, 6, 7]. Though various governments in our region are promoting the practice of these practitioners, their activities have yet to be regulated and currently they do not realize their limitations. This can result in mismanagement.

Five of our patients (6%) died during the early post-operative period [4], and this was related to a mangled limb, multisystem trauma, and septicemia. This low mor-

tality rate, which also features in other Nigerian series [5, 9], is due to the young age of our patients who are less likely to develop associated medical conditions that are responsible for the high mortality found in Caucasians [4, 11].

The very essential rehabilitation should begin from the moment the decision to amputate is taken, and requires a multidisciplinary approach involving the surgeon, the prosthetist, the physiotherapist, the occupational therapist, and the social health worker. In the outpatient department, these services should be coordinated in a well-organized amputee clinic. At the present time, however, we do not know of any such coordinated services in Nigeria.

Apart from this lack of specialized care, our study, like others [6, 9], revealed that there was insufficient inpatient attention from physiotherapists and prosthetists. In addition, many of our patients who were unskilled workers (65%) were unable to afford the relatively expensive prosthesis. As a result, most of our amputees hop about with the aid of sticks or crutches and join the colony of beggars and destitution in our streets.

In summary, this study has revealed that late presentation, inappropriate management by traditional bonesetters, and the lack of microvascular facilities, will continue to mitigate against limb salvage in Nigeria. In addition, the successful rehabilitation of our patients will continue to present a formidable task as long as prosthetic and limb service centers are few and far between.

There is no doubt that health education for the public and government regulation of the practice of traditional bonesetters would substantially reduce the incidence of

amputation in our community. The provision of microvascular facilities and a special clinic for amputees should be the ultimate goal of all major hospitals in our country.

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