

LIMB AMPUTATIONS IN WESTERN SAUDI ARABIA

Hasan A. Al Zahrani, Nashat M. Ghandourah and Hani T. Merdad

Department of Surgery,
King Fahd Hospital,
Jeddah, Saudi Arabia

Over a period of five years, 123 patients who had 124 limb amputations in King Fahd Hospital, Jeddah, Western Saudi Arabia were reviewed to find out the pattern of amputations, aetiological factors and difficulties in management. The male: female ratio was 2.8 : 1. The mean age was 52.5 years (range, 2-100 yrs). The lower limb was involved in 108 cases (87.8%) compared to only 16 upper limb amputations. The commonest cause of upper limb amputations was trauma while diabetic foot ulcer headed the list of indications in lower limb amputations. Peripheral vascular disease was the indication in 14.6% and neglected acutely ischaemic limbs in 4.1%. Seven limbs were lost due to malignant tumours, mainly squamous cell carcinoma (n=6). Most of the amputations were carried out by a qualified surgeon (91.0%). Reamputation was necessary in the same stump in 13 patients 10.5%. The mortality rate (within 30 days) after surgery was 5.7% (n=7). Only 20 patients were rehabilitated and fitted with artificial limbs. In developing countries every effort should be made to avoid amputation. Knowledge of the common causative factors will help in preventing them and subsequently reducing the incidence of this tragedy. (*Asian J. Surgery* 1992; 15(3): 119-122)

Key words: amputation — limb

Limb amputation is always a tragic event for the patient and surgeon. In a developing country the problem is more complicated as it may affect those family members who depend on the patient for their livelihood. The financial burden both to the patient and society is heavier and rehabilitation facilities are often limited. Many amputations can be avoided if the causative factor is prevented. In this study, we aimed to find out the most common indications for amputation in our fast developing country. The pattern of limb amputations and difficulties in their management are also discussed. Particular attention is paid to those amputations which can be prevented.

Patients and methods

King Fahd Hospital is a referral centre for most of Jeddah, Western Province of Saudi Arabia with a catchment area of approximately 750,000 inhabitants. It deals with both elective and emergency cases. The present study retrospectively analysed all limb amputations in a five-year period (January 1986 — December 1990).

The case records of these patients were reviewed to establish the pattern of amputations and aetiological factors. When more than one cause was found the primary one was considered as a leading cause. Amputations were classified according to site into major and minor limb amputations. The former included all amputations distal to the ankle and wrist joints. The way of closure i.e., closed or guillotine and the surgeon who carried out the procedure, including speciality and qualification, were noted. In cases of reamputation, the cause of failure and complications, if any, were reported. Mortality was defined as death within 30 days of amputation irrespective of cause. Progress with rehabilitation, if any, was recorded during the follow-up period.

Results

There were a total of 123 patients who had 124 limb amputations (one patient had a bilateral amputation). The mean age of the group was 52.5 years (range; 2-100 years) and there was a male: female ratio of 2.8:1. There were 24 patients below 35 years of

age and 18 of them (75%) were amputated after trauma. The mean duration of hospital stay was 36.7 days (range; 3-150 days). There were a total of 71 major limb amputations.

One hundred and eight (87.8%) of the amputations involved the lower extremities compared to only 16 upper limb amputations (Table 1). The left side was involved more often than right side (55.6%).

Table 1. Level of amputation in 124 amputated limbs

	Major number (%)	Minor number (%)
Above knee	39 (31.4%)	Toes 36 (29.1%)
Below knee	28 (22.6%)	TM* 5 (4.0%)
Above elbow	3 (2.4%)	Fingers 12 (9.7%)
Below elbow	1 (0.8%)	
Total	71 (57.2%)	53 (42.8%)

*TM = Transmetatarsal

Table 2. Indications for amputations in 123 patients

	Number	(%)
Diabetic foot ulcer	61	(49.6%)
Trauma: (n=28)		
crush injury	23	(18.7%)
orthopaedic	5	(4.1%)
Chronic ischaemia	18	(14.6%)
Malignancy	8	(6.5%)
Acute thromboembolism	5	(4.1%)
Others	3	(2.4%)
Total	123	(100.0%)

The indications for limb amputations are shown in Table 2. The diabetic foot ulcer headed the list of indications followed by trauma. The former was limited to the lower limb while the traumatic amputations occurred more in the upper limb. Indeed, 14 upper limb amputations were due to crush injury and/or orthopaedic trauma while in the other two patients the indications were ischaemia and congenital anomaly. Trauma was the result of domestic trauma in 10 patients, road traffic accidents in 7 and work injuries in five patients. The other causes of trauma were sport, iatrogenic and even traditional healer induced injuries.

A high incidence of limb amputations due to an ischaemic problem was seen (18.7%)

(Table 2). This reflects the referral pattern of the hospital as it contains a fairly active referral vascular unit.

Squamous cell carcinoma was responsible for 6 out of the 7 limbs amputated to cure a malignant ulcer. Leiomyosarcoma was encountered in one patient.

Most of the amputations were undertaken by a specialised surgeon. The general surgeons carried out the majority of amputations, 83 (67.5%), followed by vascular surgeons, 19 (15.5%); orthopaedic surgeons, 15 (12.2%) and plastic surgeons, 6 (9.8%). Generally, the amputation stump was closed primarily unless it was infected. Delayed closure was needed in 27 infected cases (21.9%).

Reamputation was necessary in the same stump of 13 patients (10.5%). This was related to infected diabetic foot ulcer in all the 13 patients particularly when peripheral vascular disease was a contributing factor. Of all the diabetic foot patients, five (8.2%) needed another amputation during the study period. Delayed wound healing (>3 weeks) was noticed in 20 patients (16.3%) while infection of the stump was noticed in 8 patients (6.5%). Seven patients (5.7%) died within 30 days of surgery due to cardiovascular causes. Only 20 patients (17.2%) of the 116 who had major limb amputation and survived were fitted with an artificial limb.

Discussion

To our knowledge this is the first report on limb amputations in Saudi Arabia. In our study, the annual amputation rate of 24.6 amputations, is much lower than that in United Kingdom or Australia^{1,2}. Coincident with other studies in the literature where males usually predominate, our male: female ratio was 2.8 : 1^{1,3}. However, the mean age of our patients (52.5 years) is older than reported from other developing countries e.g., Nigeria³. Indeed, with improvements in health services it is expected that Saudi Arabia will have an aging population similar to those in developed countries¹.

Most of our patients had lower limb amputation. However, 16 patients had upper

limb amputation. The latter group was characterised by a younger age and the majority of these amputations were caused by trauma. These findings compare favourably with similar studies in the literature^{4,5}. The typical upper limb amputee is a man of active age group and that was the case in most of our patients. In addition to the 14 upper limb amputations caused by trauma, there were another 14 involving the lower limbs. Road traffic accidents continue to be a major cause of trauma in Saudi Arabia and, indeed, it is the leading cause of death in young people⁶. Although a certain percentage of domestic trauma is acceptable and perhaps difficult to avoid, there is much to do to prevent motor vehicle, industrial and traditional healer induced trauma. Public health education, early diagnosis and referral are essential to save more of these injured limbs.

Unlike other studies, our commonest indication for lower limb amputation was the diabetic foot ulcer. Our recent experience in the management of this problem in Saudi Arabia has already been published⁷. The importance of basic foot-care education programmes in the prevention of initial trauma, ulcer formation and subsequent limb amputation in diabetic patients was emphasised in several recent studies^{8,9}. Furthermore, if an ulcer is already present, extensive investigations including a detailed vascular assessment is needed followed by the liberal use of various reconstructive vascular procedures where applicable⁷.

Peripheral vascular disease is the commonest indication for amputation in western studies¹². In contrast, not a single case was found in a Nigerian study³. We believe that although we had 18 patients with evidence of atherosclerosis, this may be an overestimate as it reflects the referral pattern of the hospital. Certainly, with changes in living patterns and eating habits towards a western style, the next decade may witness a change to a more westernised pattern of vascular disease.

Neglected acutely ischaemic limbs were encountered in five patients and were

amputated because of the delay in presentation. Ischaemic amputation may be avoided in many cases if an early diagnosis is made. This is mandatory in the acutely aschaemic case¹⁰.

Tumour related limb amputations occurred in only 7 cases and were due to squamous cell carcinoma which is a slowly growing tumour cured by local excision if diagnosed early¹¹.

Our reamputation rate in the same stump was 10.5% and was associated with diabetic foot ulcer. This is a fairly good percentage and may be attributed to the expertise of surgeons. It would be better if the newly advocated tests to predict stump healing were to be used¹². It is evident in our series that more above knee amputations were carried out to save the patient another operation if a lower level had been chosen in the absence of these new investigations. This may be the best approach in elderly high risk patients particularly those with peripheral vascular disease^{11,13}.

The mortality rate was 5.7% which compares well with other studies^{1,14}. Deaths occurred in elderly unfit patients with preoperative ischaemic heart disease. This low mortality rate was related to the good postoperative care as most of those high-risk patients were managed in the intensive care unit after surgery.

Unfortunately, only 17.2% were fitted with an artificial limb in the whole group which represented 31.3% of the 64 major limb amputees who survived. Rehabilitation of these patients in a developing country is still lagging behind other developed countries mainly due to financial problems¹⁵.

In conclusion, every effort should be made to avoid amputation particularly with the limited financial resources for rehabilitation in developing countries. This goal can be achieved to a great extent by knowledge of the common aetiological factors and their prevention. Public health education programmes, early detection of causative clinical conditions and referral to specialised centres are recommended.

Acknowledgment

We would like to thank all of our colleagues for allowing us to study their cases, Dr. Nasir Shukri for his help and Miss Joy Almeda for her secretarial assistance in typing this manuscript.

REFERENCES

1. Kald A, Carlsson R, Nilsson E. Major amputation in a defined population: incidence, mortality and results of treatment. *Br J Surg* 1989; 76:308-310.
2. Jones LE. Lower limb amputation in three Australian states. *Int Disabil Stud* 1990; 12:37-40.
3. Holcombe C, Hassan S. Major limb amputation in northern Nigeria. *Br J Surg* 1991; 78:885-886.
4. Pohjolainen T, Alaranta H. Upper limb amputation in southern Finland 1984-85, *Ann Chir Gynaecol* 1988; 77:32-36.
5. Andersen-Ranberg F, Ebskov B. Major upper extremity amputation in Denmark. *Acta Orthop Scand* 1988; 59:321-322.
6. Al Qassabi QO, Al Mofarreh MA, Al Bunyan A, et al. Road traffic accident fatalities in Riyadh Central Hospital. *Annals of Saudi Medicine* 1989; 9:237-240.
7. Al Zahrani HA, Saban SA, Merdad HT. Management of diabetic foot ulcer. *Asian J Surg* 1991; 14:24-27.
8. Malone JM, Synden M, Anderson G, Bernhard VM, Holloway GA, Bunt TJ. Prevention of amputation by diabetic education. *Am J Surg* 1989; 518-524.
9. Knighton DR, Fylling CP, Fiegel VD, Cerra F. Amputation prevention in an independently reviewed at-risk diabetic population using a comprehensive wound care protocol. *Am J Surg* 1990; 160:466-472.
10. Al Zahrani HA. Arterial embolism of limbs: Recent experience in a Saudi referral vascular unit. *Vasc Surg* 1991; 25:100-104.
11. Stehia KK, Berry AR, Morrison JD, Collin J, Murie JA, Morris P. Changing pattern of lower limb amputation for vascular disease. *Br J Surg* 1986; 73: 701-703.
12. Mc Collum PT, Spence VA, Walker WF, Turner MS, Murdoch G. Experience in the healing rate of lower limb amputations. *J Royal College Surg Edinburgh* 1984; 29:385-362.
13. Greant P, van den Brande P. Amputation in elderly and high risk vascular patients. *Ann Vasc Surg* 1990; 4:288-290.
14. Gutman M, Kaplan O, Skornick Y, Klausner JM, Lelcuk S, Rozin RR. Gangrene of the lower limbs in diabetic patients: a malignant complication. *Am J Surg* 1987; 154:305-308.
15. Malone JM, Moore WS, Leah JM, Childers SJ. Rehabilitation for lower extremity amputation. *Arch Surg* 1981; 116:93-98.