CLINICO SURGICAL PROFILE OF MAJOR LIMB AMPUTATIONS AT TERTIARY CARE CENTRE, DHARAN, NEPAL

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ABSTRACT

Background: This is a four year retrospective study of major limb amputations performed at BPKIHS, Dharan, Nepal, a premier medical centre of Eastern Nepal. Analysis of indications and complications of the surgical amputations are presented. **Results**: This patients were mostly males below the age of 40 years. Lower limb amputations constituted 75% while the rest were upper limb amputation. The commonest indication was trauma (42%) followed by traditional bone setter (TBS) gangrene (32%) and malignant tumours (14%). Wound infection, the commonest complication occurred in patients who had identifiable predisposing factors. The two deaths that occurred were in the patients who had traditional bone setter intervention and all died due to septicaemia. **Conclusion**: Trauma and traditional bone setter gangrene were the commonest indications. Most of the amputations were avoidable. Institution of preventable measures is imperative. Paying attention to predisposing factors can reduce complications.

Key Words: Major amputation, traditional bone setter, developing countries.

INTRODUCTION

A major amputation is one that is performed proximal to the ankle or wrist. The physical disability that is associated with the procedure employs modern prosthetic technology, often non-affordable in developing countries. Judicious indications and mindfulness of complications of amputation is helpful in instituting preventive strategies. In the western world, peripheral vascular disease is the commonest indication of amputation[1]. In Indian subcontinent, trauma is the most important cause with lower limb amputation being commonest[2]. Complications of amputation may involve the skin, muscle, artery, nerve, joint or bone. They may interfere with proper use of prosthesis.

The B. P. Koirala Institute of Health Sciences (BPKIHS) is the premier medical centre serving the entire population of eastern Nepal. There was no previous published data on amputation from the centre. We conducted a four year retrospective descriptive study to assess the indications and complications of major limb amputation in the hospital.

SUBJECT & METHODS

A retrospective study of major limb amputation was carried out from July 2009 to August 2013. Data were collected on age, gender, indication, duration of injury before presentation, level of amputation, number of stages in which amputation was performed, complications and duration of follow-up.

RESULTS

Major limb amputation were performed in 104 patients comprising 90(87%) males and 14 (13%) females (M:F = 6:1) with mean age of (±SD) 30 (±16) years. 73 patients were below the age of 40 and peak age was 30-39 years.

The distribution of amputation is shown in table-1. There were 78(75%) lower limb amputations and 26(25%) upper limb amputations. All amputations were unilateral. Sixty three (60%) amputations were done in one stage while 41(40%) were done in two stages. The former included below knee amputations done for mangled foot or diabetic foot gangrene, above knee amputations for gangrene or sepsis localized to the leg and amputations for malignant tumours. In one patient a below knee amputation was converted to above knee amputation

because of ascending sepsis. Only one of the amputees had prosthetic fitting.

The commonest indication was trauma (42%) followed by TBS gangrene (32%) and malignant tumours (14%) as shown in Table-2. Diabetic foot gangrene accounted for only 5% of the ampu-tations. Patients who had amputations because of trauma, TBS gangrene and burn constituted 76% of the total amputations.

Thirty one (30%) amputations had complications (Table-3). The indications for amputation in the patients who had wound infections, wound dehiscence and stump osteomyelitis are presented in Table-4. The data demonstrates the presence of the predisposing factors to infection in these patients. 8(62%) of 13 patients that developed wound infection and 2(67%) of 3 patients who had wound dehiscence had one stage surgery.

There were 2 deaths giving a morality rate of 2%. Death were due to septi-caemia and these patients presented with TBS gangrene. Excluding the patients that died, 38(37%) of the 102 patients were lost in follow-up. The median follow-up period was 1.5 months with a range of 0-42 months.

DISCUSSION

The patients in this study were predominantly males below the age of 40 years. Corroborating finding have been reported by others[3,4,5] but male to female ratio was much higher in the present study. This may be because a great number of patients were trauma patients. Young males are more involved in trauma because they travel more frequently and are more likely to engage in risky behaviour. The peak age of 30 -39 years in this study is the productive age group whose contri-bution to the economy would be optimum without the physical and psychological disability that accompanies amputation particularly in poor developing countries like Nepal.

The commonest indication for amputation in this study was trauma leading to mangled limb or gangrene due to vascular injury. Similar finding have been documented by others.[3,5,6,7] Presentation was delayed in most of the patients. The age and sex distribution might explain the leading position of trauma.

Table-1: Level of amputation

Level	No.	%
Below knee	38	36
Keen disarticulation	04	04
Above knee	33	32
Hip disarticulation	03	03
Below elbow	06	06
Elbow disarticulation	02	02
Above elbow	15	14
Shoulder disarticulation	03	03
Total	**104**	**100**

Table-2: Indications for amputation

Indication	No. of amputation	%
• Severe trauma	44	42
• TBS Gangrene	33	32
Malignant tumour		
• Squamous cell carcinoma	06	06
• Osteosarcoma	05	05
• Unrecorded histology	04	03
Diabetic foot gangrene	05	05
Infections		
• Chronic Osteomyelitis	02	02
• Severe Surgical site infection	01	01
Others		
• Madura foot	01	01
• Lymphoedema	01	01
• Severe burn	02	02
Total	**104**	**100**

Table-3: Complications of amputation

Complication	No. of amputation	%
Wound infection	13	42
Phantom limb pain	05	16
Stump pain	03	10
Wound dehiscence	03	10
Stump Osteomyelitis	02	07
Stump Overgrowth	01	03
Phantom limb sensation	01	03
Painful bone spur	01	03
Hypertrophic scar	01	03
Severe depression	01	03
Total	**31**	**100**

Table-4: Indications for amputation in amputees who had complications

Complication	Indication of amputation	No.
Wound Infection	Severe crush injury	09
	TBS gangrene	02
	Diabetic foot gangrene	01
	Malignant tumor	01
	Sub-total	**13**
Wound dehiscence	Severe crush injury	01
	Diabetic foot gangrene	01
	Surgical site infection	01
	Sub-total	**03**
Stump Osteomyelitis	Severe crush injury	01
	Lymphaedema	01
	Sub-total	**02**

Our finding from a premiere orthopaedic centre of Nepal revealed the pattern identified in the review. This is likely due to the high volume of orthopaedic trauma patients seen in the study centre, rather than a great use of motor ventricles adduced by the reviewrs[8]. It should be noted, however, that the proportion of trauma patients and those with TBS gangrene were close to our study.

TBS gangrene is well recognized as an indication for ampuation[6]. This indication may be under-documented because some workers include it under trauma stating only proportion of trauma patients that had TBS intervention[3,6,7]. It may also be over documented when considered as a separate indication as in this study. This is because some of the patients, due to severity of their injury, would have ended up having amputations whether they sought TBS care or not.

Diabetic foot did not feature prominently in this study, being an indication in only 5% of amputations. This is in contrast to reports from higher multi-speciality teaching hospital in major cities where diabetic foot accounted for substantial chunk of amputations.[3,5] The higher pool of diabetic patient sin these hospitals would be the probable cause.

It was found that lower limb were more commonly amputated, a result that in similar to that of most series.[1,6,7]. Reports are variable and values sometimes close on the relative distribution of above knee and below knee amputations. In this study there were more below knee amputations similar as reported by others.[6,7] Below knee prosthetic walking is known to be associated with less energy expenditure.[9]

A recent study found that below knee amputations performed better on the timed test for walking speed, even though functional outcome as determined by the sickness impact profile (a self reported measure of functional status) scores did not differ significantly between below knee and above knee amputations.[10] In resource poor setting, above knee amputation is often done in diabetic patients when the popliteal pulse is absent so as to avoid re-amputation at a higher level for ascending gangrene.

However, it is known that healing of a below knee stump depends on adequacy of collateral circulation (largely flowing below the knee, through the muscle of proximal portion of the calf) and absent popliteal pulse or arteographic demonstration of arterial block does not necessarily imply comprise of collateral circulation.[11] In the absence of sophisticated investigations we believe that a below knee amputation should be done in diabetic patients especially if the calf muscle bleeds freely[11], because only a small proportions of them is likely to require revision to a higher level.

The complication rate was 30%. The commonest complication was wound infection in this study as observed in other studies.[3,5] We observed that infection and wound healing disturbance occurred in patients who had some predisposing factors like crush injury. One stage amputation also appeared to be associated with increased risk of

wound infection and wound dehiscence. Phantom limb pain accounted for 16% of the complications in contrast to about 80% reported in the literature[12]. This may be due to under documentation which is inevitable because of the retrospective nature of this study. It may also be that only early onset phantom limb pain was documented as there was a high rate of loss to follow-up and short period of follow-up. There are early and late peaks of onset of phantom limb pain at one month and one year after amputation, respectively[13] but the maximum follow-up period in this study were about 7 months.

There were 2 deaths (mortality rate of 2%). This is lower than studies from other developing countries[3,5] in which mortality was due to sepsis with specific diabetes related mortality rate of 34-50%. The small proportion of diabetes related amputation in this study may explain the lower mortality rate. However, we also found that sepsis accounted for 100% of the death.

Considering the physical and psychological disability that is associated with amputation, prevention is paramount. Trauma prevention, training of traditional bone setter and advocacy for early hospital presentation are useful preventive measures. To reduce the complications of wound infection and or dehiscence, consideration should be given to performing below knee amputation in two stages in the presence of infection or gangrene of the foot and above knee amputation in two stages in the presence of similar condition affecting the legs.

CONCLUSION

Trauma and traditional bone setter gangrene were the commonest indications. Most of the amputations were avoidable. The pattern of indications may be affected by the nature of specialization and location of a study centre. The commonest complication was wound infection with identifiable predisposing factors. Paying attentions to predisposing factors can reduce complications. Mortality was low because of the low contribution of diabetic foot to the spectrum of indication.

REFERENCES

1. Moxey PW, Hofman D, Hinchliffe RJ, Jones K, Thompson MM, Holf PJ. Epidemiological study of lower limb amputation in England between 2003 and 2008. Br. J Surg 2010; 97: 1348-53.
2. Agrawal AK, Goel MK, Srivastava RK and Rastogi S. A clinical study of amputations of the lower limb. Prosthet. Orthot. Int. 1980; 4: 162-164.
3. Pen-Barwell G. Outcome in lower limb amputation following trauma; a systematic review and metaanalysis. Injury. 2011; 42: 1474-79.
4. Hazmy W, Mahamud M, Asikin N, Jamilahsis, Yee LE, Shong HK. Major limb amputations in Serembon Hospital: a review of 204 cases from 1997-1997. Med. J. Malayasia, 2001; 56: 3-7.
5. Settakorn J, Randaeng S, Arpornchyayanon O, Lekawan- Vijit S, Bhoopat L, Attia J. Why were limb amputated? An evaluation of 216 surgical specimen from chiang Mai Hospital, Thiland. Arch Orthop Trauma Surg 2005; 125: 701-05.
6. Garba ES, Desi PJ. Traditional bone setting – A risk factor in limb amputation. East Afr. Med. J. 1998; 75: 553-55.
7. Sabzi Sarvestani A Tenriazam A. Amputation: A ten year Survey. Trauma Mon. 2013; 18: 126-129.
8. Ephraim PL, Dillinghram TR, Sector M, Pezzin LE, Meckenzil EJ. Epidemiology of limb loss and congenital limb deficiency. A review of literature. Arch. Phys. Med. Rehabil. 2003; 84: 747-61.
9. Traugh GH, Corcoran PJ, Reyes RL. Energy expenditure of amputation in the patients with above knee amputations. Arch Phys. Med. Rehabil 1975; 56: 67-71.
10. Mackenzie EJ, Bosse MJ, Pollak AN, webb LX, Swiontkowski MF, Kellam JF, Smith DG *et al*. Long term prediction of disability following severe lower limb trauma. Results of a seven year follow-up. J. Bone Joint Surg. Am 2005; 87: 1801-09.
11. Wray CH, Still JM, Moretz WH. Present management of amputation for peripheral vascular disease. 1972; 38: 87-92.
12. Bosmans JC. Geertzen JH, Post WJ, Vander Schans CP, Dijkstra PU. Factors associated with phantom limb pain: a 3½ year prospective study. Clin. Rahabil. 2010; 24: 443-53.
13. Hunter JP, Katz J, Devis KD. Stability of phantom limb phenomenon after upper limb amputation: a longitudinal study. Neuroscience. 2008; 156: 939-49.