

OUR EXPERIENCES WITH THE BELOW KNEE AMPUTATION

I. Frangež, B. Smrke-Rejec, D. M. Smrke
University Medical Centre Ljubljana, Slovenia

Abstract

Objective: The aim of this analysis was to evaluate the characteristics and outcome in patients undergoing lower limb amputation in University Medical Centre Ljubljana between January 1st 1996 and December 31st 2002. Patients and methods: Among 771 patients with lower limb amputation we focused on 172 (22.3%) patients with below knee amputation. The most com-

mon underlying pathologies indicating amputation were diabetes mellitus complicated by vascular occlusive disease and infection. Results and discussion: Postoperative complications occurred in 24% of cases. The majority suffered from infections that required wound revision or reamputation. Among below knee amputees there were 102 (59.3%) of patients with indication for prosthesis and were sent to Institute for Rehabilitation, Republic of Slovenia.

INTRODUCTION

Major amputation is a commonly performed procedure that is indicated in patients with failed attempts at revascularization, comorbidity or anatomic factors precluding revascularization efforts, and extensive tissue loss or infection (1).

The transtibial level is the most proximal level at which near-normal function can be expected for most patients. Preserving the knee joint allows transtibial amputees to consume much less energy than transfemoral amputees and contributes to more efficient ambulation with prosthesis (2).

The below-the-knee amputation (BKA) is typically performed about 15 cm below the knee. A longer muscle flap made up of the thick muscles of the back of the calf is attached to the remaining part of the tibia or to a shorter muscle flap that makes up the front of the calf. This soft tissue is important because it provides padding for the remaining part of the limb at the site where it attaches to the prosthesis. The remaining part of the limb is known as the residual limb or stump. It can have different shapes, but it is somewhat bulbous initially due to postsurgery swelling. In time, it may resemble cylinder or a cone. The length of the residual limb is very important. If it is too short or too long, it may be difficult to fit it with prosthesis (3).

Because BKA is a common surgical procedure we attempted to gain a better understanding of the patient population that required BKA, including co-morbid diseases, revascularisation history, indications for amputation, and postoperative complications.

METHODS AND SUBJECTS

Retrospective analysis was conducted using data from medical records of patients who underwent BKA in University Medical Centre Ljubljana at the Department for surgical infections and Department for Traumatology, between January 1st 1996 and December 31st 2002. Medical records were reviewed for basic demographic data, underlying pathologies indicating amputation and postoperative complication. Descriptive statistics were obtained for basic demographic characteristics. The main outcome measure was early operative outcome (operative mortality, wound complications and need for revision amputation).

RESULTS

In our sample women were on average roughly 8 years older than man, and the difference was statistically robust. The distributions of patients by age group, indications and comorbid conditions are presented in Table 1.

Postoperative complications including wound infection, bleeding and dehiscence occurred in 23.1% of patients (Table 2). Secondary operative procedure was necessary in 24.4% of patients. There was cardiac arrest in 2 patients (1.2%), and no cerebrovascular insults, pulmonary embolism or deep vein thrombosis in our group of patients.

Among 172 amputees there were 102 of patients with indication for prosthesis and were sent to Institute for Rehabilitation, Republic of Slovenia. Among the remaining 70 patients, there were 40 (23.2%) using wheelchair, 14 (8.1%) were immobile and 16 (9.3%) were using crutches.

Table 1: Demographic data of patients undergoing lower extremity amputation

	Total, n=172	Male, n=108	Female, n=64
Mean age (SD) [years]	69.1 (13.0)	66.2 (13.9)	73.9 (9.5)
Age group [n (%)]:			
21 - 40	7 (4.0%)	6 (5.5%)	1 (1.6%)
41 - 60	26 (15.1%)	24 (22.2%)	2 (3.1%)
61 - 80	118 (68.6%)	68 (62.9%)	50 (78.1%)
> 80	30 (17.4%)	16 (14.8)	14 (21.8)
Indication for amputation [n (%)]:			
Vascular occlusive disease	161 (93.6%)	98 (90.7%)	63 (98.4%)
Infection	154 (89.5%)	94 (87.0%)	60 (93.7%)
Trauma	7 (4.0%)	7 (6.5%)	0
Tumour	1 (0.6%)	1 (0.9%)	0
Comorbid conditions [n (%)]:			
Diabetes mellitus	114 (66.2%)	67 (62.0%)	47 (73.4%)
Cardiovascular disease	117 (68.0%)	74 (68.5%)	43 (67.2%)
Lung diseases	5 (2.9%)	4 (3.7%)	1 (1.6%)
Neurologic diseases	27 (15.7%)	17 (15.7%)	10 (15.6%)
Malignancy	7 (4.0%)	5 (4.6%)	2 (3.1%)

Table 2: Postoperative complications and secondary operative procedures after BKA

	Total, n=172	Male, n=108	Female, n=64
Postoperative complications			
Infection	31 (18.0%)	17 (15.7%)	14 (21.9%)
Bleeding	2 (1.1%)	1 (0.9%)	1 (1.6%)
Dehiscence	7 (4.0%)	6 (5.5%)	1 (1.6%)
Operative mortality	0	0	0
Postoperative mortality	3 (1.7%)	1 (0.9%)	2 (3.1%)
Secondary operative procedure			
Reamputation	32 (18.6%)	20 (18.5%)	12 (18.7%)
Revision	10 (5.8%)	7 (6.5%)	3 (4.7%)

DISCUSSION

The majority (68.6%) of the patients were older than 60 years. Many patients had multiple medical co-morbidities. Vascular occlusive disease mostly caused by Diabetes mellitus was the most common underlying pathology. BKA is associated with higher wound complication and revision rate as above knee amputation (1, 4). In our group of patients, postoperative complications occurred in 23.1%, which was comparable to the findings of other authors. The latter was also true for the need for secondary operative procedure, which was 24.4% (1, 4).

Preserving the knee is also important for subsequent prosthesis use. In our group of patients, 59.3% of patients were candidates to use prosthesis.

CONCLUSION

In our institution, the majority of BKA are performed in geriatric patients with vascular occlusive disease. BKA is associated with high level of revision and reamputation rate, which is particularly distressing for both, patient and the surgeon.

We recommend this type of operation, since high quality of life can be achieved despite frequent correction rate of previous below knee amputation.

References:

1. Aulivola B, Hile CN, Hamdan AD, Sheahan MG, Veraldi JR, Skillman JJ, Campbell DR, Scovell SD, LoGerfo FW, Pomposelli FB Jr. Major lower extremity amputation: outcome of a modern series. Arch Surg 2004; 139(4):395-9.
2. Smith DG. Atlas of Amputations and Limb Deficiencies. Rosemont: American Academy of Orthopaedic Surgeons 2004: 481-99.
3. Cristian A. Lower Limb Amputation. New York: Demos Medical Publishing, 2006: 17-21.
4. Wong MW. Lower extremity amputation in Hong Kong. Hong Kong Med J 2005; 11(3):147-52.