

Lower limb amputees in Southern Finland

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Abstract

The purpose of this study was to look at the current epidemiological trends of lower limb amputees in 1992 in the area of Southern Finland with 1.2 million inhabitants.

Similar data was collected earlier in 1984-85 and 1989. The amputation incidence was found to be 27.4 per 100,000 inhabitants. The trans-tibial/trans-femoral ratio was 0.78. The percentage of prosthetic fitting among patients undergoing unilateral trans-tibial amputation was 68% and the corresponding figure among the trans-femoral patients was 35%. The epidemiological data showed an improvement on that found 8 years earlier although the overall age structure is shifting upwards.

Introduction

Amputations resulting from end-stage peripheral vascular diseases are a common health problem. Amputations of the lower limb are increasing in number not only because of the increasing number of elderly people in the population, but also because of factors such as diabetes, smoking, nutrition and lowered physical activity (Persson, 1980).

There is a specific requirement for lower-limb amputee statistics for the planning of preventive, operative and rehabilitative activities and the evaluation of future needs in personnel, facilities and funds. To assess the epidemiological situation concerning amputees in Southern Finland the data on all limb amputations made in all the operative units in the catchment area of the Helsinki University Central Hospital (HUCH) were collected for the

period 1984-1985 and 1989 (Pohjolainen and Alaranta, 1988; Pohjolainen *et al.*, 1989; Lääperi *et al.*, 1993). The amputation rate was 32.5 per 100,000 inhabitants in 1984, 28.1 in 1985 and 22.0 in 1989. The trans-tibial (TT)/trans-femoral (TF) ratio was 0.54 in 1984-1985 and 0.57 in 1989. The mortality rate during the first postoperative year was 39% in 1984-1985 and 36% in 1989. After the basic epidemiological survey in 1984-1985 there were various activities to inform medical and rehabilitation staff of results using local medical journals, seminars, multicentre video counselling of hospitals etc.

The purpose of the current study was to look at the epidemiological trends of lower limb amputees in the same catchment area as in 1984-1985 and 1989: incidence, diagnosis, levels of amputations, TT/TF ratio, postoperative mortality and survival. The aim was to establish whether there had been any improvement in the situation compared with the earlier studies.

Methods

In 1992 HUCH had a catchment population of 1,258,496 representing about 25% of the total Finnish population. In this area there were 15 surgical hospitals where amputations were performed. To study the situation with regard to lower limb amputations in this area during 1992, all data concerning amputees in these hospitals were collected. The patients' hospital records were examined and data concerning diagnosis and levels of amputation were recorded. Mortality during the one-year follow-up was investigated in collaboration with the national Social Insurance Institution. The data on prosthetic fitting were collected from both prosthetic workshops in the area for the one-year period following the amputation.

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Table 1. Distribution of amputees

Level	Number	Percentage
Unilateral amputees		
Hemipelvectomy or hip disarticulation	5	1.4%
Trans-femoral	113	32.8%
Trans-tibial	88	25.5%
Syme, Chopart, Pirogoff	13	3.8%
Transmetatarsal or toe	60	17.4%
Bilateral amputees	66	19.1%
Total	345	100.0%

Results

During 1992 lower limb amputations were performed on a total of 345 patients (mean age 70.5 yrs): 184 males (53%, mean age 65.3 yrs) and 161 females (47%, mean age 76.4 yrs). The amputation incidence was 27.4 per 100,000 inhabitants.

Unilateral amputation was performed in 279 cases and bilateral in 66 cases (Table 1). Unilateral TF amputation was performed on 113 patients and unilateral TT amputation on 88 cases. The TT/TF ratio was 0.78.

Vascular dysfunction was the cause of amputation in more than 90% of all patients (Table 2). The most frequent disease was diabetes.

Percentage of prosthetic fitting for those unilateral TF amputees who survived more than two months postoperatively was 35%. Corresponding percentage for unilateral amputees was 68%.

A total of 63% of all the amputees survived more than a year postoperatively.

Discussion

According to the predictions of the Central Statistical Office of Finland the overall age structure of the population will continue to shift upwards causing a twofold increase in the proportion of over 60 year olds in the next 30-40 years. Because the increase in amputation rate seems to increase in the older age groups (Liedberg and Persson, 1983; Coddington, 1988; Pohjolainen and Alaranta, 1988), there is a need for amputee statistics with a view to planning the rehabilitation of lower limb amputees in Finland.

Lower limb amputation has not increased in the catchment area of HUCH compared with 1984-1985 but it has increased compared with 1989 (Table 3). In 1984, the amputee rate per 100,000 inhabitants was 32.5, in 1985 28.1 (Pohjolainen and Alaranta, 1988), in 1989 22.0 (Lääperi *et al.*, 1993) whereas in 1992 it was 27.4. There are few epidemiological studies concerning the incidence of limb amputations. The incidences reported above are very close to the figures reported by Liedberg and Persson (1983) 32.0 per 100,000 inhabitants in Sweden and Sethia *et al.* (1986) 27.5 per 100,000 in 1976 and 31 in 1982 in United Kingdom. Jones (1989) found lower incidences in three Australian States, 22.6 in 1981, 22.5 in 1983 and 23.6 in 1984. In Finland, the age structure of the population has caused an increase in the amputee rates. Vascular surgery can delay amputation. However, in a large North American survey Tunis *et al.* (1991) found that the rate of lower limb amputation remained stable despite the increase in vascular and reconstructive surgery. The rehabilitation and

Table 2. Diagnosis and mean ages in three surveys of the same area

Diagnosis	1984-85		1989		1992	
	%	Age	%	Age	%	Age
Diabetes	40.7	75	42.5	71	47.7	72
Arteriosclerosis	43.1	72	36.2	77	30.6	78
Embolism	3.8	71	2.6	69	4.9	74
Frostbite	4.4	51	1.5	55	2.3	44
Tumour	2.4	39	2.2	53	1.2	46
Trauma	2.0	41	6.4	46	6.6	43
Others	3.5	52	8.6	63	6.6	63
Total	100	71	100	70	100	70

Table 3. The trends of the amputees in three surveys of the same area

	1984-85	1989	1992
Incidence per 100,000	32.5-28.1	22.0	27.4
TT/TF ratio	0.54	0.57	0.78
Mortality during two postoperative months among unilateral amputees			
TF	32%	28%	32%
TT	17%	16%	19%
Mortality of all the amputees during the first postoperative year	39%	36%	37%
Prosthetic fitting among unilateral amputees who survived more than two months			
TF	27%	26%	35%
TT	62%	63%	68%

prosthetic services of the lower limb amputees can be planned on the basis of the incidence of 30 per 100,000 inhabitants.

Theoretically, diabetes mellitus has become the most common cause of amputation. This may be partly due to the variations in reporting comorbidity diagnosis. The total percentage of diabetes and arteriosclerosis has not significantly changed. There is no clear difference between diabetic and so-called arteriosclerotic non-diabetic gangrene. In clinical surgical practice, it can be difficult to distinguish the diagnosis of "non-diabetic" gangrene in cases of diabetic patients. Patient education regarding foot care plays an important role in prevention and management of disease. Early recognition of foot lesions, local care of lesions and aggressive treatment of infection prevent extension of the disease to adjacent areas.

Survival figures showed that 61% of the patients in 1984-1985 and 64% of patients in 1989 were alive after one year (Pohjolainen and Alaranta, 1988). The mortality rate during the first postoperative year has not changed. The mortality rate among amputees with vascular diseases indicates the advanced state of the disease. It must be emphasized that early rehabilitation and ambulation of patients especially in the case of geriatric patients is of importance.

The low TT/TF ratio of 0.54 in 1984-1985 and 0.57 in 1989 has improved but is not yet satisfactory. Among surgical hospitals in Finland there are geriatric units where TT

amputations are impossible or useless because of the final stage of the patients. Despite this more emphasis must be put on the concept of preserving the knee joint and the importance of preoperative assessment of vascular patients. In 1984-85 among the patients undergoing unilateral amputation 27% of the TF amputees and 62% of the TT amputees received a prosthesis. The corresponding figures in 1989 were 26% and 63%. In this series the prosthetic fitting in both groups was better (35% and 68%). The efforts of the medical and rehabilitation team, the use of training prostheses and more effective rehabilitation has increased the proportion of patients discharged with a prosthesis and increased the effectiveness of long term rehabilitation.

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