RESEARCH ARTICLE

An Epidemiological and Etiological Report on Lower Extremity Amputation in Northwest of Iran

Alireza Rouhani, MD; Saeid Mohajerzadeh, MD

Research performed at Tabriz University of Medical Sciences, Tabriz, Iran

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Abstract

Background: Lower extremity amputation has different etiologies and the purpose of the study was to describe the demographics and etiologies of amputations.
This study was designed to evaluate amputations performed in the province of Eastern Azerbaijan (north-west of Iran) and to determine specific causes of amputations associated with geographical and cultural characteristics of the region.

Methods: We have done this retrospective and descriptive study from June 1st, 2005 to June 1st, 2010 in Tabriz Shohada Hospital (Tabriz, Iran). The patients were evaluated with respect to age, sex, etiology, side and level of amputations, prevalence of amputations among the sexes at different ages and surgical interventions performed.

Results: One-hundred-sixty files were identified with a diagnosis of lower limb amputation. Trauma was the most frequent cause in 67 patients (46%), followed by vascular disease in 61 patients (42%), and then infection in 18 c patients (12%). Eighty percent of patients were male and 20% were female.

Conclusion: This investigation shows that trauma (especially due to car accidents) is the most common cause of amputations in our region, followed by vascular problems.

Keywords: Amputation, Extremity, Iran

Introduction

Lower limb amputation is accompanied by significant mortality and morbidity and a high risk of secondary amputations and enormous costs (1). Moreover, amputation is one of the most feared and costly complication related to diabetes mellitus (DM) (2).

In the USA more than 60,000 diabetes-related amputations are performed annually.

Approximately 40 to 60% of all lower extremity amputations are related to DM and in some areas it is as high as 70 to 90% (3). On the other hand, major limb amputation has other causes other than diabetes, which has been mentioned in different studies. For example, one study in Seremban Hospital in Malaysia has reported that traumatic amputations constitute 14.2% of the cases and non-traumatic amputations represent 85.8% of the cases. These cases are mainly due to diabetic ulcers or gangrene (91%), followed by peripheral vascular disease (7%) and malignancy (2%) (4).

Limb amputation is not only a loss of physical integrity, but it also deeply affects individuals' mental and social well-being and is a significant problem, especially for the youth and working population (5).

In spite of the latest improvements in adapting to the amputation and invention of improved prosthesis, surgeons consider it as the last treatment effort (6).

The aim of this study was to analyze the causes of lower extremity amputations in people who have had surgery in an orthopedic center in Eastern Azerbaijan (Iran) and, to offer solutions for reducing these causes.

Materials and Methods

We have done a descriptive, retrospective study in the University Shohada Hospital, Tabriz (Iran), wherein we

Corresponding Author: Saeid Mohajerzadeh, Department of Orthopedic Surgery, School Of Medicine, Tabriz University of Medical Sciences, Tabriz, Iran.
Email: saeid_mohajerzadeh@yahoo.com

evaluated the files of patients who underwent lower limb amputations to determine their etiology and their level and the type of amputation. The period studied was from June 1st, 2005 to June 1st, 2010.

Also, the prevalence of amputations has been evaluated according to the sex and average age of the patients. The results were analyzed by SPSS software (version 14).

Results

During these five years, 146 patients had lower limb amputations. One-hundred-seventeen (80%) of the amputated patients were male and 29 (20%) were female. The most common reason for amputation was trauma as was observed in 67 cases (46%). Sixty-one cases had damage to tissue and vascular complications in the second stage (42%) that required amputations.

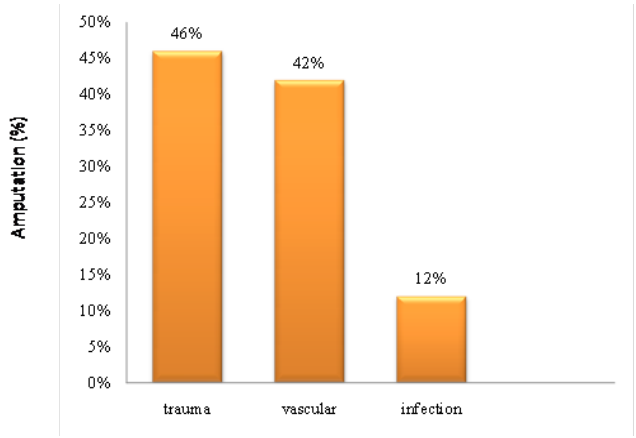

Figure 1. Etiology of amputation.

Chronic infections accounted for 18 patients (12%) (Figure 1).

In regards to the limb requiring amputation, 76 patients (52%) the right lower limb was involved and in 70 patients (48%) the left lower limb was involved. In addition, 31 (21%) amputations were done through the open method and 115 (79%) were done through the closed method. According to patient files, we realized that 115 cases (79%) of amputations were performed at transtibial, 25 cases (17%) were performed at trans femoral level and 6 cases (4%) were done by the Syme technique (Table1).

Table1. Comparison of amputation according to sex, limb and level

Category	n(%)
Male	117(80%)
Female	29(20%)
Right leg	76(52%)
Left leg	70(48%)
Transtibial	115(79%)
Transfemoral	25(17%)
Syme	6(4%)

The average age of the people who had an amputation because of different reasons is explained as follows (Figure 2):

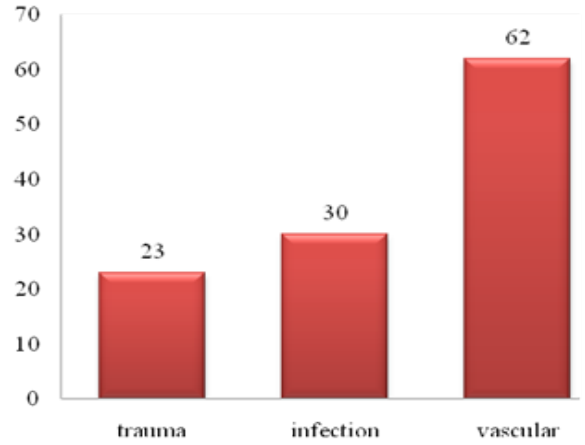

Figure 2. Etiology of amputation according to age.

1. Trauma Group: 23 ± 11.
2. Vascular Group: 62 ± 8
3. Infection Group:30 ± 6

In addition, the average age of males requiring amputation surgery was 35 ± 10 and for females it was 62±10.

The most common reasons for amputation in males was trauma through road accidents (50%), vascular disorders (30%) and infection (20%) . For females the most common reasons for amputations were vascular reasons (80%) , trauma in 17% and infection only in 3%.

Discussion

The results show that the rate of amputation in men (80%) is relatively higher than women (20%) . Similarly, in other studies, the rate of lower extremity amputations is apparent in men more than women, but this rate in our study was higher than the mentioned studies (1, 4, 5, 7, 8).

There are multiple causes to the loss of a limb, including DM, peripheral vascular disease, trauma and malignancy, and these amputation etiologies may vary in different countries or regions (9, 10).

In our study trauma comprises the majority of the amputation cases (46%), but in other studies most of the amputations were performed because of vascular and diabetic reasons (1, 5, 8).

In developed countries, many studies have shown diabetic amputations to be the most common etiology of amputation (11,12).

In contrast, in Tabriz (Iran) region, there are distinct etiologies of amputation due to socioeconomic and cultural characteristics. Tabriz is located in the north-west of Iran. Moreover, Iran is a developing country and Tabriz is one of its important industrial cities, where the largest industries are located. Moreover, there is a high prevalence of road

accidents in Iran and because of that road trauma is most common etiology of lower limb amputation.

Moreover, the etiology of amputation in developed countries is different from developing countries.

A study that was carried out in Seremban Hospital in Malaysia reported that 34.3% of patients who had amputation were female and 65.7% were male. The average age of the patients was 39.7. The most common cause of amputations was not traumatic, but mainly due to diabetes or gangrene. In contrast to our study that 14.2% of our study patients were caused by trauma and of those 82.8%, amputations were because of road accidents (4).

As stated previously in our study 88%, of traumatic amputations happened because of road accidents. The most common reason of amputation in males was car accidents (50%), followed by vascular disorders (30%) and then infections (20%). Furthermore, the most common cause of amputation in females was due to vascular reasons, followed by trauma.

A different study carried out in Turkey in the province of Van, by Dogan *et al.* They found that trauma was the most common indication for amputation of the lower extremity at either above or below the knee (excluding amputations on patients' toes, ankles or feet.) This study showed that the three most common indications for lower limb amputation were trauma [including gunshots, occupational accidents, traffic accident], diabetes mellitus, and peripheral vascular disease (4) .

In a retrospective study of 100 clinical files from a rehabilitation hospital in Chile by Rotter *et al*, causes of traumatic injury necessitating amputation were due to work-related injuries in 89%, and 50% of those were crushing injuries. Traffic accidents accounted for 19% and being run over by a car in 14% (8). In comparison to our study, the average age of the people with traumatic amputation was 23 ± 11. In this study we showed that a high percentage of lower extremity amputations in Tabriz, Iran occur due to trauma, especially due to road vehicle accidents.

A very high percentage of patients in this study were young people,who were actively involved in the economic and production sectors of society.

Since young people constitute a very high percentage of patients in our community, the disabilities of young people are a serious economic loss to families and their society.

Also, family and medical organizations in the country are suffering great losses due to the cost of treatment. Therefore, it is proposed that three solutions may offer some relief for this distressing situation: special attention to training the youth about driving with particular attention to young male drivers; producing safer vehicles and ensuring that roads and streets that are prone to accidents are modified. These three actions may help to prevent traumatic accidents necessitating amputation of the lower limbs of the youth.

Alireza Rouhani MD
Saeid Mohajerzadeh MD

Department of Orthopedic Surgery
School of Medicine, Tabriz University of Medical Sciences
Tabriz, Iran

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