


<p>Diabetic Foot: Treating and Preventing the Possibility of Major Amputation</p>		<p>Healthcare</p> <p>Keywords: diabetic foot, surgical treatment.</p>
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Abstract

Diabetic foot is functionality and integrity damage of the foot due to infection, tissue damage and destruction, damage to nerves and blood vessels in the peripheral parts of the lower extremities. Given that the relatively large number of patients to whom complications are developed to toe due to diabetes, it can be concluded that a diabetic foot represents health, as well as social and economic problem. Increasing numbers of patients is becoming even more alarming. According to WHO it is expected that the number of new cases will double and that from 135 million to approximately 300 million. This as a whole depends on unhealthy food, obesity and disordered way of food. This as a whole makes the treatment reach the account for millions of dollars. The purpose of this paper is to analyze how to deal with diabetic foot in the clinical vascular surgery at the University Clinical Center (UCC) in Prishtina and the importance of minor amputation as the primary surgical treatment of choice in order to maintain the function of the plantar. The present paper analyzed 94 patients, 72 males and 22 females, aged 30-80 years, with diabetic foot, hospitalized in the Vascular Surgery Clinic in Prishtina (UCC) during 2012-2013. It is analyzed: surgical treatment, the wound gauze, days of hospitalization, vascular status, type of diabetes. Treatment of hospitalized patients is done with daily toilets of the wound or surgical intervention with aggressive surgical debridman to amputation, with local or general anesthesia. Daily toilets is made of 18 cases (19.1%) while with the incision and necrectomy were treated 22 patients (23.4%). Finger amputation of the leg is made in 37 cases (39.36%), while in the more advanced cases, 11 patients (11.70%) amputation was carried out in the crural region and with 6 patients (6.38%) amputation was carried out in the femoral region. Early identification of risk factors, and careful evaluation of regular and aggressive treatment of the wound in multidisciplinary team offer prevention of amputation in most cases of diabetic foot ulcera.

Introduction

Given the relatively large number of patients to whom are developed complications due to diabetes foot, this represents a health problem as well as socio-economic problem. **(1)**. In the U.S. within a year from diabetic foot 8 million patients are hospitalized, for which costs are calculated in millions of dollars. More than 14% of patients undergo adequate evaluation of lower extremities, and when diabetic ulcers develops, a part of these patients end with extremities amputation **(2)**. The disease is manifested by infection, ulcer or gangrene. Three primary factors that are affecting the appearance of diabetic foot and its complications are: neuropathy, decreased blood perfusion and reduced resistance to infection **(1, 2)**. Also case combustions like: trauma, plantar deformations help infection and ulcera to appear **(3)**. Of particular interest is the early detection of these risk factors. Changes that occur on the foot are sometimes so characteristic that according to them can also be ascertained diabetes. **(8)** Neuropathy allows constant stress to the toe which occurs without being investigated by the patient resulting in advanced stages with foot ulcer. Identification of vascular ischemia in diabetic patients is quite difficult since diabetes masks the ischemia **(4)**. Combined ischemia with diabetic neuropathy is considered a risk for loss of extremity. So, the complete evaluation of the patient including aggressive local treatments of the wound are the most effective measures in prevention of diabetic foot complications. There have been numerous classifications of diabetic foot lesions but today it is used mostly the classification by Brodsky compiled in 1999 **(5)**.

Classification of diabetic foot lesions by depth and the treatment approach by Brodsky (St. Louis 1999) (5).

0	Non-risked foot and without ulcers	Health education of the patient, comfortable footwear, dietetic hygiene regime
1	Superficial Ulceras	Regular medical examination, special wear, regular monitoring of the situation and smear with antibiogram
2	Deep ulceras with exposed tendons	Surgical Debridman, regular wound care and specific antibiotics (antibiogram)
3	Extensive Ulceras or Abscesses	Debridman or partial amputation, specific antibiotics (antibiogram)

Classification of diabetic foot lesions according to blood supply and the treatment approach by Brodsky (St. Louis 1999) (5).

A	without ischemia	
B	ischemia without gangrene	non-invasive vascular testing, monitorin of the vascular condition
C	partial gangrene	vascular intervention plan
D	complete plantar gangrene	upper extremity amputation

This system of classification devides diabetic foot lesions based on the depth of ulcera and blood supply. Preferred treatment reflects the degree of risk for each category (5).

The Aim of the Study

Given that diabetic foot is a big surgery problem therefore the purpose of the paper is to analyze: its mode of treatment and complications, early identification of risk factors, the effect of prophylactic measures in definitive repair of complications, length of hospitalization.

Materials and Methods

94 patients were analyzed, of which 72 (76.59%) were males and 22 (23.40%) were females. The average age was 30-80, with diabetic foot in different stages of development, hospitalized in vascular surgery clinic UCC in Prishtina during 2012-2014. It is analyzed: surgical treatment, laboratory tests, bacteriological analysis, hospitalization days, vascular status, type of diabetes. As a source of data served histories of disease where to every patient is taken the history including temperature, respiration, pulse, beginning the first signs of the disease, non-invasive examination of the peripheral pulses in arteries, nerve sensacion in foot, locating the wound, type of the wound (dry or moist gangrene), edges of the wound (regular or irregular). Routine laboratory tests are done (hemogram, urine, urea, creatinine, SE, glycemia), is making the RTG plantar possible to see changes in bone. From the first day the standard antibiotic therapy is started with the vasodilators and antiagregator. Extensive debridmenti of the wound is made with local or general anesthesia. In all patients wound swab is taken basen on the antibiogram are ordinated local or parenteral antibiotics in wound. Most patients have undergone frequent necrectomia in the operating room. The results obtained are presented in tabular form. It is used epidemiologico-clinical methodology.

Results

Table 1 shows the structure of patients by gender where it is seen that a total of 94 patients, 72 (76.59%) were males and 22 (23:40%) were female.

Table 1. Structure of patients by gender (n = 94)

Gender	Number of patients	Percentage
Males	72	76.59
Females	22	23.40

Table 2 shows that most of the patients have been with insulin-dependent diabetes, a total of 63 patients (67.02%).

Table 2. Structure of patients on the basis of the type of diabetes (n = 81)

Type of diabetes	Number of patients	Percentage
Insulin dependent	63	67.02 %
Non-insulin-dependent	31	32.97 %

In only 18 patients (19.1%) is made daily toaleta wound without surgery, incision with necrektomy in 22 patients (23.4%) and amputation of the finger in 37 patients (39.36%). (Table 3).

Table 3. Treatment conducted (n = 94)

Treatment	Number of patients	Percentage
Only toaleta wound	18	19.1
Incision and necroctomy	22	23.4
Amputation of the fingers	37	39.36
Amputacion at surgical level	11	11.70
Amputacion at femoral level	6	5.64

Table 4 shows that out of 94 patients, 40 or (42.55%) had no amputation, whereas with 54 or (57.44%) is made finger amputation, whether in crural or femoral level.

In all patients, to whom are made the above-amputations was initially made aggressive debridman of the wound with drainage of pus, followed by minor amputation, so of the fingers, in order to maintain the function, while despite all efforts with many reinterventions we finished amputation in the crural region to 11 patients (11.7%) and amputation in femoral region to 6 patients (5.64%). (Table 3).

Table 4. Structure of patients under local status (n = 94)

Local status	Number of patients	Percentage
Without amputation	40	42.55
With amputation	54	57.44

In the wound swab is confirmed the presence of infection in all analyzed patients. In Table 5 are shown types of microorganisms isolated from wound swab and one of the most commonly Staphylococcus aureus was isolated in 17 patients (18.85%), Enterococcus in 21 patients (22.34%).

Table 5. Microorganisms isolated from wound swab (n = 94)

Type of microorganisms	Number of patients	Percentage
Staphylococcus Aureus	17	18.85
Proteus mirabilis	7	7.44
MRSA	4	4.25
Enterococcus	21	22.34
Aerobic / anaerobic mixed flora	10	10.63
There are no result of Bacteriology	21	22.34

All treated wounds have had primary localization in the fingers of the plantar with irregular edge and prostration tissue structures. All patients had peripheral neuropathy.

Table 6 shows that 61 out of 94 patients (64.89%) have been with ischemia and 33 (35.10%) without ischemia.

Table 6. Structure of patients according to the blood supply (n = 94)

Vascular status	Number of patients	Percentage
With ischemia	61	64.89
Without ischemia	33	35.10

Discussions

Diabetic foot despite adequate treatment whether with medications or surgery still represents a significant problem. These patients are referred for care by the vascular surgeon because of their experience with the complications of atherosclerotic disease. More than 20% of hospitalized persons with diabetes in surgical clinics in the U.S. during the year are for the treatment of foot problems. These data, we can not count in our country because we do not have adequate administrative service yet which would have given data for health service throughout Kosovo. In our analysis 72 (76.59%) were males and 22 (23.40%) females which this does not mean that gender plays a role in the outbreak, but it accidentally appeared like this. In European countries and in the U.S. the frequency of diabetic foot complications is greater in patients with type 1 diabetes (5,6). This is in accordance with the frequency of the disease in the material presented where 63 patients or (67%) with the type of diabetes are not dependent on insulin. Rationality of early detection of the disease lies in the fact that the treatment in the initial phase reduces the financial and clinical burden of the disease (6). Costs of treatment were 4 times higher in diabetic patients with infection than those without infection (7). Duration of treatment also varies from case to case and depends on the severity of infection (9). However, our patients require surgical treatment relatively late as long treated on an outpatient basis, which means that we treat them in the advanced stage of the disease. Also the fact that the average duration of hospitalization of these patients in our clinic is 22.1 when daily debridman is assessed, in some cases twice a day is about spending large enough to significantly reduce the health budget. Costs for patients in the U.S. accounted for about \$ 10,000. Data on the cost of treatment in our study can not be taken of the fact that the treatment is free of cost. In materials presented total number of amputations is 56 patients (59.57%), with minor amputation 37 patients (39.36%), approximately the same results with those of other authors. Polymicrobial infections with aerobic and anaerobic species have destructive potential in the diabetic foot. Microbiological laboratory in Wisconsin is most commonly isolated the staphylococcus aureus, which corresponds to the results obtained in our paper, where in 17 patients (18%) from wound swab is isolated this bacterium (6). Atherosclerotic changes in small blood vessels are with high frequency in patients with diabetes. According to the American Diabetes Association 57% of these patients have these problems. Even the departing ischemia in 61 patients (64.6%) matched with other authors' data. Prophylactic measures proposed to all patients, who after discharge from the hospital were followed in the outpatient clinic, had a satisfactory effect which is consistent with data from numerous authors.

Conclusion

- Techniques for the prevention and treatment of lower extremity amputation in patients with diabetes vary from simple inspection of the plantar to complicated vascular and plastic surgery.
- Early identification of risk factors, regular and cautious evaluation as well as aggressive treatment in a multidisciplinary team prevents amputation in most cases with complicated diabetic foot.

- Appropriate treatment of these complications consists in minimizing the local pressure, curing infection, ischemic correction.
- Success in this regard not only improves the quality of life in these patients but also saves the health care budget.

Proposal of measures

Amputation in diabetic patients is a complication which results in long hospitalization and rehabilitation of the patient. It simultaneously implies a significant change in the lives of these patients and therefore can be prevented significantly with particular attention to preventive measures.

These measures include:

- patient's health education,
- foot should be examined every day and especially after any trauma,
- wear cotton socks and adequate and long shoes,
- cracks in skin should be creamed with moisturisers,
- each case of kallos manifestation should be treated by a relevant specialist **(10)**
- regular control of glycemia,
- receiving regular therapy,
- smoking cessation,
- consult the concerned doctor in case of any change in foot **(6)**.

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