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CASE REPORTS

# *Ulcus Diabetica Hallucis Pedis. The Importance of Timely Treatment.*

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## *Abstract*

***Introduction.*** Diabetes mellitus represent a global problem in public health, and the incidence of diabetic foot is constantly increas-ingPatients with diabetes have a tendency to infections, due to previously present neuropathy, vascular insufficiency, as well as neutrophil dysfunction. The most important risk factor is the existence of peripheral neuropathy, and it is present in 30% to 50% of patients with diabetes. The foot becomes sensitive to trauma as a result of sensory, motor and autonomic dysfunction, and there is excessive pressure in the deformed foot, also the development of ischemia.

***Case report***. A 59-year-ol male patient sought medical help at the Clinic of Emergency Medicine of the Clinical Center in Sarajevo. He had edematous ulcers on the foot of his right leg.On the first day of therapy, the antibiotic amoxicillin + clavulanic acid, 875/125 mf film-coated tablets were included. Ulcerative formation on the injured finger healed relatively slowly in the first five days of therapy, so from the sixth day of therapy, another broad-spectrum antibiotic per os was included, for synergistic effects: metronidazole 500 mg tablets.On the tenth day of the therapy, visible progress was observed in the healing of the injured finger.Ultimately, the treatment of the injured finger was completed routinely and successfully.

***Conclusion***.Identification of risk factors as well as patients' education is an important prerequisite for the prevention of complications arising from the chronic course of diabetes.

Early initiation of treatment, with an adequate multidisciplinary approach, can cure ulcerative, inflammatory diabetic foot, which in our case corresponded to the Wagner-Meggitt classification, superficial ulcer, with a corresponding gradation 1.

***Keywords:*** Diabetic foot, diabetes mellitus, edematous ulcers, vascular insufficiency

## *Introduction*

Diabetes mellitus is a chronic metabolicdisease with systemic and chronic complications and an increasing frequency.It is estimated that 463 million people worldwide have diabetes in 2019, which represent9,3% of the world's population [1, 2].Thus, diabetes mellitus represents a global problem in public health, and the incidence of diabetic foot is constantly increasing. Foot ulcers are one of the most important complications of diabetes that occur in the chronic phase, as a consequence of neuropathy and angiopathy [3]. It has been found that patients diagnosed with diabetes mellitus, 5-10% of them have ulcerative diabetic foot.Foot problems are the most common cause of hospital admission, and the most common cause of hospital admission too, it is also often the cause of morbidity[4, 5].

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The tendency to infection turns this chronic condition into a progressive acute disease that often requires surgical intervention. Foot and limb infections are often life-threatening in diabetics, caused by necrotizing fasciitis, heterogeneous types of gangrene, and / or infections with systemic or metabolic toxicity, or an infection that can be simply defined as an infection that develops in the inframalleolarregion of diabetics [5, 6, 7].Patients with diabetes have a tendency to infections, due to previously present neuropathy, vascular insufficiency, as well as neutrophil dysfunction. The most important risk factor is the existence of peripheral neuropathy, and it is present in 30% to 50% of patients with diabetes. The foot becomes sensitive to trauma as a result of sensory, motor and autonomic dysfunction, and there is excessive pressure in the deformed foot, also the development of ischemia. Besides that, the additional risk factors such as atherosclerotic occlusion, smoking and obesity complicates the treatment [8].

However, diabetic foot is often neglected by patients and also by doctors, which leads to an increase of additional complications, which often results in amputation[9].

We present a case report with the aim of pointing out the exceptional importance of timely treatment of ulcerative diabetic foot, and the importance of permanent monitoring of all parameters of chronic diabetes mellitus, which was not the practice in the patient in this case.

### *Case Presentation*

A 59-year-ol male patient sought medical help at the Clinic of Emergency Medicine of the Clinical Center in Sarajevo. He had edematous ulcers on the foot of his right leg. In his history, he has been suffering from diabetes for fifteen years. He was a passionate smoker for many years, not long ago he


*Figure 1.Ulcusdiabetica hallucis pedis (A) –Evidently edematous ulceration of the right foot, before treatment: (B) On the fifth day after treatment, there is slight improvement in healing, with a rapid reduction in foot inflammation.: (C) Tenth day after treatment: (D) Fifteenth day after treatment (E) Twenty-eighth day after treatment, significant wound healing was observed.; (F) Thirty-fifth day after therapy, the injury healed completely.*

| Parameters | Value | Unit | Reference value |
|---|---|---|---|
| (S) Glucose | H **20,9** | mmol/L | 3,3 – 6,1 |
| Urea | 6,1 | mmol/L | 3,2 – 7,1 |
| Creatinine | 62 | umol/L | 58 – 110 |
| Bilirubin total | 11,8 | umol/L | 3,0 – 22,0 |
| AST | 24 | U/L | 17 – 59 |
| ALT | 20 | U/L | 0 – 50 |
| (S) Amylase | 60 | U/L | 30 – 110 |
| Calcium | 2,50 | mmol/L | 2,10 – 2,55 |
| Sodium | 132 | mmol/L | 130 – 145 |
| Potassium | H **5,8** | mmol/L | 3,6 – 5,2 |
| Chlorides | L **96** | mmol/L | 98 – 108 |
| LDH | 235 | U/L | 123 – 243 |
| CRP | H **16,7** | mg/L | 0 – 10 |
| CK | 98 | U/L | 55 – 170 |

H-high, L- low

*Table 1. Patients' clinical biochemistry parameters*

| Parameters | Value | Unit | Reference value |
|---|---|---|---|
| Leukocytes | 5,68 | $x10^9$/L | 4 – 10 |
| Erythrocytes | 4,94 | $x10^{12}$/L | 4,3 – 5,7 |
| Hemoglobin | 144 | g/L | 138 – 175 |
| Hematocrit | 42 | % | 41 – 53 |
| MCV | L **84** | fL | 86 – 100 |
| MCH | 29 | pg | 27 – 31 |
| MCHC | 348 | g/L | 310 – 350 |
| MPV | L **6,1** | fL | 7,4 – 10,4 |
| Platelets (PLT) | 290 | $x10^9$/L | 150 – 400 |
| RDW | H **31,3** | %CV | 11,5 – 15,5 |
| Platelet count (PCT) | 0,18 | % | 0,17 – 0,35 |

H-high, L- low

*Table 2. Patients' blood count parameters*

stopped consuming tobacco. From the anamnestic data, we learn that the patient suffered a harmless, mild trauma from uncomfortable shoes on the little toe of his right foot. After 24 hours, he noticed a large swelling and an obvious wound, in the area that had suffered trauma. (Figure1).

During the physical examination, he was conscious, oriented and cooperative. He also reported the existence of a tingling sensation in his foot.

The patient has been consuming diabetic *per os*therapy for many years: metformin film tablets 850 mg (Siofor® -auch von Berlin-Che mie) three times a day, after meal, and on an empty stomach glimepiride tablet, once a day (Melpamid® - Bosnalijek, Bosnia and Herzegovina).

Despite the therapy consumed, a high blood serum glucose concentration was found at the Clinic and was 20,9 mmol/L (Table 1). Also, an elevated value of C-reactive protein (CRP), 16,7 mg/L was found. The total number of leukocytes in the peripheral blood was in the physiological range of 5.68x109/L. Other parameters that deviate slightly from the reference intervals (MCV, MPV and RDW) are not significant for this case (Table 2).


*Figure 2. X-ray, white arrow indicates that bone structure is not affected by pathophysiological changes.*

On the X-ray (Figure 2), a white arrow indicates that the process on the little toe of the right foot did not affect the bone structures with the inflammatory process.

The wound was thoroughly washed with 0,9% NaCl solution, then with 3% hydrogen peroxide solution, and later treated with povidone iodine solution (Isobetadine®-Bosnalijek, Bosnia and Herzegovina) [10], and then a complete toilet was made in accordance with the protocol on the care of such wounds. The toilet is arranged every day, within the first week, and in the second or third week of treatment, every second or third day.

On the first day of therapy, the antibiotic amoxicillin + clavulanic acid, 875/125 mf film-coated tablets (Duoclav® - Bosnalijek, Bosnia and Herzegovina) were included. Ulcerative formation on the injured finger healed relatively slowly in the first five days of therapy (Figure 3), so from the sixth day of therapy, another broad-spectrum antibiotic *per os* was included, for synergistic effects: metronidazole 500 mg tablets (Metrozol® - Bosnalijek, Bosnia and Herzegovina). On the tenth day of the therapy (Figure 1. C), visible progress was observed in the healing of the injured finger.

An urgent correction of diabetological therapy has also been proposed, which includes the exclusion of the current glimepiride tablets and the inclusion of the novomix 30 f pen 26 j. s/C in the morning, novomix 30 f pen 16 j. s/c before lunch, novomix 30 f pen 12 j. s/c before dinner.

During antibiotic therapy, altered diabetic therapy, and continuous toilet of the injured foot, the patient reported an improvement in general health, without any clinically significant changes. Ultimately, the treatment of the injured finger was completed routinely and successfully.

## *Discussion*

The most significant outcome of the peripheral effects of diabetes is a reduction in blood flow to the foot, which causes a delay in recovery, a predisposition to infection, ulcers and wounds that may result in amputation. In most cases, patients do not notice the development of complications in the initial period of the disease. The combination of ischemia, neuropathy and sepsis causes osteomyelitis and gangrene which further results in amputation[11].

The treatment of such conditions is prolonged, especially in underdeveloped and developing countries due to sociocultural and economic problems. It has been established with certainty that amputation rates increase with delayed treatment. Some studies have shown that amputation rates increased in line with the Wagner phase[12].

In our case, the patient is insufficiently educated about the disease he is facing. In addition, he consumes non-selective food, which is not suitable for the usual menu for diabetics. Also, an aggravating circumstance for the patient is that the occupation he performs on a daily basis prevents him from going to regular check-ups and consultations with a diabetologist. All of the above, suggests that diabetes in this case is visibly advanced, because previous *per os* therapy was not sufficient to adequately maintain blood glucose levels at a satisfactory level.

The banal injury of the little toe, caused by the use of tight footwear, led to a worrying inflammatory ulceration (Figure 1, A). However, timely treatment prevented much more serious complications, but with an evidently prolonged healing period.

Antibiotic treatment plays a significant r ole i n the treatment of diabetic foot infections [13].

Our experience in this case confirms the previous statements. Practice in our case has shown that the use of two types of antibiotics gives much better results, especially in patients with chronic diabetes mellitus. In our case, we did not isolate the causative agent, which is a disadvantage, but with the synergistic effect of two antibiotics, we repaired the ulceration. Definitely, the antibiotic of choice in relation to the most commonly detected pathogenic microorganism must be given in a dose to reach a high concentration in the tissue [13].

## *Conclusion*

Identification of risk factors as well as patients' education is an important prerequisite for the prevention of complications arising from the chronic course of diabetes.

Early initiation of treatment, with an adequate multidisciplinary approach, can cure ulcerative, inflammatory diabetic foot, which in our case corresponded to the Wagner-Meggitt classification [9], superficial ulcer, with a corresponding gradation 1.

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