

An Overlooked Complication of Diabetes: Diabetic Hand Wounds

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Abstract: Diabetes Mellitus is the most common endocrinological condition. We can see complications as a result of the changes in microcirculation and tissue collagen structure. In our study; we aimed to discuss the clinical features and wound evaluations of the patients who applied to our clinic with diabetic hand wound, as well as their treatments and results. Patients with diabetic hand wounds who applied to our clinic between 2013-2015 were included. Demographic data, type of diabetes, characteristics of hand wounds, laboratory values, culture results, abscess involvement, treatment methods, and treatment results of the patients were obtained. Nine of the 29 patients were female and 20 were male. The mean age was 63.62 ± 14.12 . 22 patients had the wound in their right hand while 7 patients had it in the left hand. While 25 patients had finger involvement, 2 had volar part involvement and 2 had wounds in the dorsal part of the hand. 19 patients were treated with debridement and 10 patients were amputated. Flaps / grafts were applied to 5 of the patients. 8 patients had high sedimentation rates. The mean C-reactive protein value was calculated as 43.94. The mean HbA1c of the patients was 8.70 ± 1.74 . The wounds of all 29 patients were treated successfully. Patients should be careful while they are using hand tools, cutting nails, and should wear protective equipment. Strict blood glucose control, aggressive debridement, and antibiotics in the treatment of these wounds can reduce the risk of amputation.

Keywords: Diabetic hand syndrome, diabetes mellitus, diabetic complications, wounds and injuries.

INTRODUCTION

In almost every diabetic patient complications as a result of the changes in microcirculation and tissue collagen structure due to the long-term effects of diabetes mellitus (DM) which is the most common endocrinological condition [1].

"Diabetic Hand Syndrome" which is also one of these complications, is used to describe the complications of diabetes at hand [2]. Diabetic Hand Syndrome which is the clinical scenario where hands and fingers of upper limbs are affected has the same risk factors as diabetic foot of diabetic patients.

DM causes some changes in the vascular structures, joint capsule, subcutaneous fat tissue and skin, and disruption of the movement and anatomical structures of hands as a result. Vascular ischemic interactions, the changes in collagen structures and composition play role as the main mechanism of these changes [3-5]. Infection risk of organism increases in cases of uncontrolled or poorly controlled DM [6].

In our study; we aimed to discuss the clinical features and wound evaluations of the patients who applied to our chronic wound treatment clinics with diabetic hand wound, the treatments we applied to them and their results in comparison to literature.

MATERIALS AND METHODS

Patients with diabetic hand wounds who applied to Ankara Numune Training and Research Hospital Chronic Wound Care Center between September 2013 and September 2015 were included in the study. Demographic data (age, sex, country), type of diabetes, characteristics of hand wounds (right / left, location of involvement), laboratory values (hemogram parameters, biochemical tests, sedimentation, C reactive protein, HbA1c), culture results, abscess involvement, treatment methods (debridement, flap / graft, antibiotic, amputation), treatment results of the patients were obtained from hospital's automation system and recorded via SPSS 18 statistics programme. The descriptive statistics of the data were expressed as the mean \pm standard deviation and frequency (percentage) for continuous and categorical variables, respectively.

RESULTS AND DISCUSSION

Nine of the 29 patients included in the study were female (31%) and 20 (69%) were male. The mean age of the patients was 63.62 ± 14.12 (mean \pm SD). Seven of the patients were using insulin, while the others were using oral antidiabetic drugs. 22 patients (75.9%) had the wound in their right hand while 7 patients (24.1%) had it in the left hand. While 25 (86.2%) patients had finger involvement (Figure-1), 2 (6.9%) had volar part involvement (Figure-2) and 2

(6.9%) had wounds in the dorsal part of the hand (Figure-3). There were abscesses in 2 patients with diabetic wounds on their finger. 19 (65.5%) patients were treated with debridement and 10 (34.5%) patients were amputated. Flaps / grafts were applied to 5 of the patients (17.2%). 6 (20.7%) patients had growth in culture. Four (13.7%) patients had white blood cells (WBC) above normal values. 8 (27.5%) patients had

high sedimentation rates. When C-reactive protein (CRP) values were evaluated, 16 (55.1%) patients were found to have high CRP levels. The mean CRP value was calculated as 43.94. The mean glycated haemoglobin (HbA1c) of the patients was 8.70 ± 1.74 (mean \pm SD). The wounds of all 29 patients were successfully treated.



Fig-1: Diabetic wound on finger



Fig-2: Diabetic wound on volar side of the hand



Fig-3: Diabetic wound on dorsal side of the hand

Despite the progress and innovations in treatment and follow-up of diabetes, its microvascular and macrovascular complications can lead to complications which cause loss of function in the musculoskeletal system. The usual physical examination of these patients is mostly focused on the foot while the hand examination is ignored. Hand examination of a patient with diabetes is very important. The presence of neuropathies in the patient along with the involvement of hand tendons and muscles will

disrupt the functional use of the hand. The resulting complications may be painless, but will lead to loss of function in later stages [7, 8]. In addition, as a result of poorly controlled diabetes, the susceptibility of the body to infection will increase and catastrophic complications will be inevitable.

Diabetic hand is not mentioned amongst the diabetes-specific complications and it does not have a precise definition in the literature as well [9-12]. In

literature diabetic hand is described as the clinical condition including limited joint mobility, Dupuytren's contracture and trigger finger [13-16]. However, an infected ulcer can cause a gangrene which may result in amputation or even death [17, 18]. In our study, all patients had hand-wounds.

Most of the patients with diabetic hand wound have female sex, insect bites, hand trauma, low socioeconomic status and late hospital admission as risk factors [12, 19, 20].

In addition, in some other studies, risk factors for diabetic hand syndrome were reported as poorly controlled blood glucose level, peripheral neuropathy, peripheral vascular disorders, change in hand biomechanics, insect bites, poor primitive therapies (herbal approaches), and moist environment. In diabetic hand wounds *Staphylococcus aureus* is the most common microorganism. But the mixed bacterial colonization is also frequently reported in wound culture results [5, 21].

Single bacterial type is seen in 75% percent of tissue biopsy cultures, while mixed polymicrobial flora is found in wound smear cultures quite often. Contamination in cultures taken from open wound through swab is a possible cause of this condition [22].

The participants in our study mostly had a trauma history of ingrown nail, foreign body injuries of hand, and traumas during work. In our study, these injuries were more common in males. It might be due to the fact that men play a more active role in active work life wounds of the right hand were observed more often. This is caused by the fact that the number of right-handed people is high in society. In addition, mixed polymicrobial flora is frequently reported in cultures of our patients. This situation may be because of the contamination of the culture obtained via swabs.

It is a known fact that diabetic hand infections are more common in tropical regions [12, 19, 20]. Diabetic hand infections are more common, especially in coastal regions. But in our study, patients were mostly from continental climate zone. The reasons for this might be that women play a more active role in agriculture in tropical regions and that our hospital is located in Central Anatolia.

Uncontrolled blood glucose level causes infections and poor wound healing in patients. This is due to the suppression of cellular immunity, microangiopathy, and the reduction of chemotaxis and phagocytosis [21, 23].

Ozturk and colleagues found that high blood glucose level resulted in infection, and the mean HbA1c

in patients with diabetic hand syndrome was 10.58 [24]. In our study, mean HbA1c was found at 8.70.

Higher age also predisposes to infection [24]. The average age of the patients in the study of Öztürk was 61, and similar results have been obtained in our study as well.

Late admission to the hospital reduces treatment success [19, 25-27]. In our study, patients who went to amputation consisted mostly of patients who were referred to the hospital late.

A quick and aggressive treatment should be applied in the treatment of diabetic hands. Hand elevation, antibiotic use, strict blood glucose control, abscess drainage and necrotic debridement and, if necessary, amputation should be applied [28]. The rate of amputation in our study was found to be 34.5% and is similar to the literature.

Multiple debridement reduces the rate of amputation in patients [11]. In our study, 65.5% of the patients were treated with single or recurrent debridement.

Abscesses are frequently found in the diabetic hand patients during admission. Cellulite and ulcer are also frequently observed [29]. In our study, there were abscesses in 2 patients, and almost all of them had cellulitis and ulcers.

The most effective way to overcome diabetic hand is educating the staff and patients about hand care, nutrition, and early application. The complications which range from finger/hand loss to death will be lesser and the best results that are aimed will be obtained with the proper approach of well-trained staff to the patients applying to the hospital with this condition [29, 30].

CONCLUSION

Diabetic hand injuries are a forgotten or ignored complication of diabetes which may have catastrophic consequences. Patients should be careful while they are using hand tools such as hammer, needle, saw, knife and nail, arranging thorny plants, cutting nails, and should wear protective equipment. The fact that minor hand traumas can lead to amputations in this patient group should be remembered. Strict blood glucose control, aggressive debridement, and antibiotics in the treatment of these wounds can reduce the risk of amputation. Physicians and patients should be informed about these.

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