ACTA SCIENTIFIC CLINICAL CASE REPORTS

Volume 5 Issue 11 November 2024

Short Communication

Risks and Challenges in Treating Purulent-Necrotic Forms of Diabetic Foot

Bohdan Krysa[1], Valentin Smorzhevskyi[2], Rasheed Manasrah[2]* and Vasyl Krysa[1]

[1]*Ivano-Frankivsk National Medical University, Ukraine*

[2]*Shupyk National Healthcare University of Ukraine, Kyiv, Ukraine*

***Corresponding Author:** Rasheed Manasrah, Shupyk National Healthcare University of Ukraine, Kyiv, Ukraine.

Received: September 20, 2024

Published: October 18, 2024

© All rights are reserved by **Surabhi Agrawal., *et al.***

The purulent-necrotic form of diabetic foot syndrome (DFS) represents one of the most severe complications of diabetes mellitus (DM), affecting 30-80% of patients who have lived with the disease for 15-20 years. When this condition is coupled with critical limb ischemia, it often leads to inevitable limb loss and poses a significant risk to the patient's life [1,2]. The study of this pathology is increasingly relevant given the global rise in diabetes prevalence, the extended duration of treatment required, and the significant financial burden associated with managing such complications. Globally, between 60,000 and 125,000 amputations are performed annually due to purulent-necrotic complications of DFS, which is 17-45 times more frequent than in the general diabetic population [3].

Arterial damage and critical limb ischemia

A distinctive characteristic of arterial damage in patients with DFS is the presence of multi-level stenosis and occlusion, which tend to progress rapidly and aggressively, leading to critical ischemia. This condition, when accompanied by purulent-necrotic lesions in the foot, virtually eliminates the possibility of limb preservation [4]. Consequently, there is a cautious approach to organ-preserving foot surgeries due to the high risk of exacerbating the purulent necrotic process. Similarly, reconstructive surgery on peripheral arteries, although theoretically beneficial, is only feasible in 41.8% of patients with critical limb ischemia. The prognosis remains guarded as early occlusion of the reconstructed area occurs in 16% of cases, rising to 41% within a few months and 25% within a year [5].

Introduction of indirect revascularization: Lumbar sympathectomy

Since 2015, our treatment approach for purulent-necrotic complications of DM has included an indirect revascularization method, specifically a computer tomography (CT)-guided puncture lumbar sympathectomy performed on the affected side. This technique, known as paravertebral sympathectomy, aims to improve long-term blood flow by expanding the arterial bed in the sympathectomized area and promoting the development of collateral blood flow.

The intervention's primary effects become evident 2-3 days post-procedure, including significant pain reduction or complete relief, warming of the affected limb, reduction in swelling, and decreased wound discharge. The benefits of the sympathectomy continue to intensify over the next three months and can persist for 4-5 years.

Patient study and risk factors

This study involved 21 patients diagnosed with DM and presenting with purulent-necrotic complications of DFS, classified as stage III-IV according to the Meggit-Wagner scale. These patients were also assessed for amputation risk using the Wound, Ischemia, and foot Infection (WIfI) classification system. All patients presented with inoperable peripheral arterial circulation disorders, which were identified through repeated ultrasound examinations of the lower extremity arterial system. The ultrasound findings often re-

vealed a combination of unfavorable factors that made the medical challenge particularly complex. These factors included:

- **Multi-Level Arterial Stenosis and Occlusions:** Stenosis of the main arteries with multiple occlusions in the arteries of the leg and foot, which significantly complicates blood flow.
- **Purulent-Necrotic Lesions:** The presence of extensive purulent-necrotic lesions in the foot tissues, which are resistant to conservative treatment.
- **Assessment Challenges:** The inability to reliably assess the reversibility of tissue changes, which complicates decisions regarding foot preservation.
- **Severe Comorbidities:** Patients commonly had severe comorbid conditions, including uncontrolled diabetes and obesity, which further increased the complexity of their treatment.
- **High Amputation Risk:** According to the WIfI classification, these factors corresponded to a high risk of limb amputation (W 2-3, I 2-3, f 2).

Treatment strategy and outcomes

During the initial patient consultation, after a thorough examination of the affected limb and sonographic evaluation of the arterial system, we stressed the necessity of prolonged treatment (spanning 2-4 months or more) to maximize the likelihood of limb preservation. Patients were informed of the importance of strictly adhering to all medical recommendations to halt the progression of the purulent-necrotic process. This comprehensive treatment strategy included:

- **Glycemic Control:** Achieving strict glycemic control to prevent further metabolic derangements.
- **Correction of Comorbidities:** Addressing and managing other co-existing medical conditions, particularly obesity and cardiovascular disorders.
- **Surgical and Conservative Approaches:** A combination of surgical debridement to remove necrotic tissue and conservative measures to manage infections and promote wound healing.
- **Paravertebral Sympathectomy:** Lumbar sympathectomy was performed after initial management of purulent infections in the foot, facilitating improved blood flow and wound healing.

Positive local dynamics were observed 1.5-2 weeks post-sympathectomy, with notable reductions in swelling, formation of granulation tissue over the wound bed, and the emergence of marginal epithelialization. Patients were trained in self-care for wound management and dressing changes, allowing for a transition to outpatient care under the guidance of a family doctor. Wounds typically healed by secondary intention within 2-3 months.

In one particularly complex case involving a patient with a previous Chopart amputation, a split-thickness perforated skin graft was performed, resulting in full graft adherence and closure of the chronic ulcer. Subsequent sonographic evaluations 1.5-2 months post-intervention showed significant improvements in blood flow in the arteries of the foot and leg.

Limb preservation and quality of life

The comprehensive treatment approach yielded positive outcomes, with limb preservation achieved in 17 out of 21 cases (81%). However, thigh-level amputations were necessary in 4 patients (19%) due to the progression of critical ischemia and necrosis. The integration of modern treatment methods for purulent-necrotic forms of diabetic foot with paravertebral puncture CT-guided lumbar sympathectomy offers an expanded range of therapeutic options for high-risk patients, effectively reducing the rate of high-level amputations and enhancing the quality of life for these individuals.

Bibliography

1. Hoffmann M., *et al*. "Survival of diabetes patients with major amputation is comparable to malignant disease". *Diabetes and Vascular Disease Research* 9 (2015): 1-7.

2. Herasymchuk PO., *et al*. "Medical, social, and economic issues in the treatment of patients with diabetic foot syndrome". *Likarska Sprava* 3-4 (2020): 42-48.

3. Rubeaan K., *et al*. "Diabetic foot complications and their risk factors from a large retrospective cohort study". *PLoS One* 10.5 (2010): 1244-1246.

4. Bakker K., *et al*. "International Working Group on the Diabetic Foot. The 2015 WGDF guidance documents on prevention and management of foot problems in diabetes: development of an evidence-based global consensus". *Diabetes/Metabolism Research and Reviews* 32 (2016): 2-6.

5. Russell D. "Multiple Interventions of Diabetic Foot Ulcer Treatment Trial". *MIDFUT* (2017): 1.0 09.02.17, 45.