



Review

Diabetic foot syndrome: Our approach to the treatment of the patients

V.N. Obolenskiy^{a,b,*}, P.S. Leval^a, D.A. Ermolova^b, V.G. Protsko^c^a SBHI City Hospital № 13 of Moscow Healthcare Department, 115280 Moscow, Russian Federation^b Russian National Research Medical University named after N.I. Pirogov, 117997 Moscow, Russian Federation^c Russian University of Friendship of People, 117198 Moscow, Russian Federation

ARTICLE INFO

Article history:

Received 30 January 2014

Accepted 31 January 2014

Available online 7 February 2014

Keywords:

Diabetic foot syndrome

Methods of diagnostic and treatment

ABSTRACT

Readers are proffered by the authors to become acquainted with their diagnostic and treatment approach towards patients with diabetic foot syndrome. In addition, an overview of organizational solutions, medicinal products and dressing materials that are used, as well as treatment methods and surgical tactics is provided along with clinical examples. An algorithm of using topical treatment methods according to the phase of wound healing process is presented.

© 2014 Elsevier GmbH. All rights reserved.

Contents

Conclusion	35
References	35

Diabetes mellitus (DM) is the most widespread endocrine disease that has taken up a non-infectious epidemic character across the world. The number of patients with DM doubles every 10–15 years. In just two years (2005–2007), the number of patients with diabetes mellitus has increased by 8.5% in Russia, 13.5% in the U.S., 20% in the Middle East, and 30.7% in Oceania [1]. According to the State Register, as of January 1, 2013, there were 3,779,423 patients with diabetes mellitus, out of which 325,743 with type 1 and 3,453,680 with type 2 [2]. However, the incidence of diabetes is higher in reality. Thus in half of the patients being admitted to our hospital with purulent-inflammatory diseases, type 2 diabetes is revealed for the first time.

In more than 70% of patients with diabetes mellitus, various complications develop, which include diabetic foot syndrome (DFS) – a complex combination of anatomic and functional changes in tissue on the background of diabetic micro angiopathy and macro angiopathy, neuropathy, as well as osteoarthropathy. Almost in half of the patients, the diabetic foot syndrome is complicated with development of purulent necrotic processes on the foot, leading to amputation at various levels in 50–75% of cases. According to various sources, amputation frequency in patients

with diabetes mellitus is 17–45 times higher than among those who do not suffer from diabetes mellitus. After first amputation, up to 30% of patients undergo amputation of second limb within next 3 years, whereas up to 50% within 5 years. The average postoperative life span is 5 years after amputation of one limb and 1 year after amputation of two limbs.

In spite of the rapid development of diabetology since the beginning of the 21st century, appearance of a large number of international and national guidelines on the treatment of diabetic foot syndrome [2–5], and introduction of generally accepted standards into everyday practice, the treatment issue concerning this category of patients does not lose its relevance and constantly compels us to look for new ways of its solution.

Various classifications of diabetic foot syndrome and chronic wounds are used in practice across the world, e.g. classification of ulcerative defects in patients with diabetic foot syndrome (University of Texas), PEDIS classification (The Consensus of diabetic foot Supplement, Amsterdam, 2003), Knighton's classification of chronic non-healing wounds, MEASURE – a system for evaluation of chronic wounds, and other classifications [6–9]. However, the most widely accepted classification in Russia is the classification of Wagner (Wagner, 1979), which is used in our practice as well. In addition, the wound healing process is usually considered by its phases – inflammation, proliferation, and maturation – in Russia [10].

* Corresponding author at: SBHI City Hospital № 13 of Moscow Healthcare Department, 115280 Moscow, Russian Federation. Tel.: +7 9161724430.

We believe that it is necessary to have a multidisciplinary approach and consistency in organizing the treatment process in patients with diabetic foot syndrome. The “Team” consists of following specialists: Surgeon (specialist in treatment of wounds and wound infections), Endocrinologist (diabetologist), Physician (cardiologist), Anaesthetist, Vascular Surgeon, Traumatologist (orthopaedic surgeon), and Podiatrists, Neurologist, Ophthalmologist, Physiatriist, as well as qualified nursing staff. Nephrologist, Transfusiologist, and other specialists consult patients as per the indications.

From fourth quarter of year 2012, a district outpatient centre for treatment of wounds and wound infections, equipped with a room for dressing procedures and a dedicated medical staff, was organized in our hospital. The medical staff there works 6 days a week providing consultation and referrals to patients for receiving surgical treatment, pre-hospital and post-hospital monitoring of patients, as well as outpatient supervision of patients with chronic wounds. The average number of patients approaching the outpatient centre is about 400 per month.

We consider that general diagnostic principles for patients with diabetic foot syndrome should be the following:

- Diagnostic examination of the organ dysfunction.
- Level of glycaemia and presence of ketoacidosis.
- Determination of the degree of manifestation of systemic inflammatory response syndrome.
- Diagnostic microbiological examination of the lesion (tissue biopsy).
- Diagnostic examination of pathology in the extremity (X-ray, multi-detector CT scan (MSCT) or MRI).
- Diagnostic examination of the vascular pathology and determining the degree of ischaemia (IVUS – intravascular ultrasound, TCPO₂ – transcutaneous oximetry, and MSCT angiography).
- Determination of the degree of manifestation of neuropathy.
- Diagnosing the presence of nephropathy and retinopathy
- Diagnostics of the blood clotting system.
- Diagnostic examination and determination of the significance of background and concomitant pathology.

We consider that general treatment principles for patients with diabetic foot syndrome include the following:

- Correction of the organ dysfunction, detoxification.
- Compensation of the carbohydrate metabolism.
- Timely, necessary, and sufficient surgical intervention.
- Rational antibacterial therapy.
- Pharmacotherapy of angiopathy and neuropathy, drugs with metabolic action, and normalization of BP.
- Immobilization (relieving) of the limb.
- Reducing the swelling and ischaemia in the limb.
- Preventive measures against thromboembolic complications, bedsores, pneumonia, urinary tract infections.
- Topical treatment of wound (ulcer) according to the phase of wound healing process and the principles of Wound Bed Preparation [11,12].

The following appears to us as the rational surgical tactics:

- Timely as well as reconstructive endovascular and/or angiosurgical interventions.
- For destructive forms: staged necrectomy, additional methods of cleaning the wound, minor and “virtual” amputations, as well as reconstructive bone-plastic and plastic surgeries.
- Early closure of bone fragments using various methods.
- Under vital indications: higher level amputations (at amputation at the level of shin – removal of soleus muscle; at pronounced

edema of tissue – open management of the stump or vacuum-assisted dressings).

The time factor plays a vital role too. Therefore, if there is a purulent-necrotic process on the foot, necrectomy and lesion cleansing (or amputation under vital indications) should be performed as early as possible, revascularization immediately after cleansing the wound and relief of systemic inflammatory response syndrome, whereas reconstructive plastic surgeries not earlier than 1 month after revascularization. As rightly pointed Setacci et al. [13], “Time is Tissue!”

Organ dysfunction (decompensation of cardiac pathology and nephropathy, presences of ketoacidosis, or signs of sepsis) revealed at the admission of patient to the hospital serves an indication for hospitalization of patient to the specialized intensive care unit, primarily carrying out syndrome-related intensive therapy, and detoxification.

The tactics of adjusting carbohydrate metabolism is determined according to the clinical and laboratory data by the endocrinologist: while treating purulent-necrotic forms of diabetic foot syndrome, patients with diabetes mellitus of any type can be shifted to the short-acting insulin therapy with at least 4 (6) injections per day until stabilization of blood glucose level within 6–10 mmol/l (fasting blood glucose 6–7 mmol/l, 2-h postprandial 9–10 mmol/l), or to the administration of long-acting insulin in the morning and evening and short-acting insulin during the day. A proper diet is certainly an unconditional background to all this.

The choice of rational empirical antibacterial therapy is based on a rigorous substantiation of indications for antibacterial therapy, knowledge about microbial spectrum of the local hospital and the level of resistance, about the features of microflora in a particular pathology, consideration of the manifestation of nephropathy, the drug’s ability to penetrate into soft tissues and bones, and the principles of de-escalation and gradation.

Considering the polymicrobial associative nature of microflora in the infected lesions on the foot of a diabetic patient, involving several aerobic and anaerobic pathogens, the empirical antimicrobial therapy with broad-spectrum antibiotics is indicated in all the cases. The duration of antibiotic therapy in patients with extensive purulent-necrotic processes may make up to 10 weeks on the background of surgical treatment. Inadequacy of drug choice, dose, and duration of treatment may lead to relapse or superinfection.

As a rule in addition to microbial associations, the wounds are contaminated with fungi as well, more often yeast like fungi (different types of *Candida*), on the background of diabetes mellitus. Therefore, it is necessary to verify them and prescribe a corresponding antimycotic drug (fluconazole, voriconazole, caspofungin, etc.)

According to us, the pathogenesis-based pharmacotherapy for treating the main complications of diabetes mellitus (neuropathy and angiopathy, as well as tissue dystrophy) should include the following drugs [14–16] (unless contraindicated):

- Drugs containing α -lipoic acid or thioctic acid: improve blood circulation in neurons, regulate lipid and carbohydrate metabolism, exhibit antioxidant, hepatoprotective, and detoxification effect.
- Vitamin B complex: in which the leading role belongs to benfotiamine that suppresses the main biochemical mechanisms of pathogenesis induced by hyperglycemia of vascular lesions.
- Pentoxifylline: improves rheological properties of the blood, has mild fibrinolytic action, expressed venotonic effect, and high lymph drainage effect, as well as prevents migration, adhesion, and activation of leukocytes – an important link in pathogenesis of trophic disorders.

Download English Version:

<https://daneshyari.com/en/article/6078536>

Download Persian Version:

<https://daneshyari.com/article/6078536>

[Daneshyari.com](https://daneshyari.com)