



# BRITISH MEDICAL JOURNAL



# British Medical Journal

Volume 3, No.2, March 2023

Internet address: <http://ejournals.id/index.php/bmj>

E-mail: [info@ejournals.id](mailto:info@ejournals.id)

Published by British Medical Journal

Issued Bimonthly

3 knoll drive. London. N14 5LU United Kingdom

+44 7542 987055

Chief editor

**Dr. Fiona Egea**

*Requirements for the authors.*

*The manuscript authors must provide reliable results of the work done, as well as an objective judgment on the significance of the study. The data underlying the work should be presented accurately, without errors. The work should contain enough details and bibliographic references for possible reproduction. False or knowingly erroneous statements are perceived as unethical behavior and unacceptable.*

*Authors should make sure that the original work is submitted and, if other authors' works or claims are used, provide appropriate bibliographic references or citations. Plagiarism can exist in many forms - from representing someone else's work as copyright to copying or paraphrasing significant parts of another's work without attribution, as well as claiming one's rights to the results of another's research. Plagiarism in all forms constitutes unethical acts and is unacceptable. Responsibility for plagiarism is entirely on the shoulders of the authors.*

*Significant errors in published works. If the author detects significant errors or inaccuracies in the publication, the author must inform the editor of the journal or the publisher about this and interact with them in order to remove the publication as soon as possible or correct errors. If the editor or publisher has received information from a third party that the publication contains significant errors, the author must withdraw the work or correct the errors as soon as possible.*

**OPEN ACCESS**

Copyright © 2023 by British Medical Journal

# CHIEF EDITOR

**Dr. Fiona Egea**

## EDITORIAL BOARD

**J. Shapiro, MD**

**M.D. Siegel, MD, MPH, FCCP**

**S. Shea, MD**

**S.Sipila, PhD**

**M. Sherman, MB BCh PhD,  
FRCP(C)**

**P.Slocum, DO**

**H. Shortliffe, MD, PhD, FACMI**

**A. Soll, MD**

**D.S. Siegel, MD, MPH**

ELSEVIER



SSRN

Universal  
Impact Factor

**CURRENT STATE OF THE PROBLEM OF TREATMENT OF PATIENTS WITH CRITICAL LIMB ISCHEMIA ON THE BACKGROUND OF DIABETES MELLITUS (Literature review)**

**Xomidov Feruz Kosimovich**

*Abstract. Ischemia of the lower extremities -is a chronic pathological condition characterized by a lack of oxygen in the tissues of the legs. Critical ischemia of the lower extremities is a set of manifestations of diseases accompanied by damage to the peripheral arteries and associated with chronic insufficiency of blood supply to the soft tissues of the legs. Critical ischemia of the lower extremities (pre-gangrene, threatening limb ischemia) is a special form of circulatory condition in which there is a high risk of irreversible changes in the leg and the threat of amputation.*

*Keywords:diabetes mellitus, ischemia, lower extremities, treatment.*

Diabetes mellitus is the leader among all diseases in Russia, it affects about 8 million people, and is often one of the main causes of early disability and mortality in patients of working age. It is patients with a diagnosis of diabetes that are characterized by the development of diabetic foot syndrome. The incidence of DFS is 20-80% of the total number of patients with DM. Over the past decades, the frequency of DM detection has increased significantly. Every year, the number of detected patients with DM increases by 5-7%. According to experts of the World Health Organization (WHO), the occurrence of DM doubles every 10-15 years, and by 2025 there will be 250 million people diagnosed with type 2 diabetes [13].

Patients diagnosed with DM are 10-15 times more likely to have complications compared to the general population . In patients with diabetes mellitus, mortality from diseases of the heart and brain is several times more common, approximately 2-3 times. The susceptibility to visual impairment with subsequent blindness in patients with diabetes is ten times higher than in the general population. "Approximately \$ 3,500 per year is needed for medicines for one DM patient" [7].

The incidence of diabetes complications is much lower in patients undergoing intensive glycemic control and achieving stable compensation of carbohydrate metabolism. DM has early and late complications. "In general, the most dangerous complications leading to deaths are late ones. These include such complications as macroangiopathy (obliterating atherosclerosis of the aorta, coronary, peripheral arteries and brain vessels); diabetic retinopathy (pathology of small vessels of the fundus), diabetic nephropathy, diabetic neuropathy and diabetic foot syndrome. The main factor in the development of vascular problems is chronic hyperglycemia " [16].

DM affects almost all body systems, and over time leads to the development of various complications of the disease, one of which is purulent-necrotic damage to the lower extremities. In patients with DM with late-stage neuropathy complications, the risk of developing trophic ulcers of the lower extremities is significantly higher than the development of retinopathy and nephropathy [2].

According to the WHO definition (2000), diabetic foot syndrome is "an infection, ulcer and/or destruction of deep tissues associated with neurological disorders and a decrease in the main blood flow in the arteries of the lower extremities of varying severity."

In order to improve blood flow to the limb, generally accepted reconstructive vascular operations are performed. In 12-21% of cases, such operations end in various

complications due to pre-existing disorders of various types of metabolism in the body and the infection that has joined. To maintain the support function of the limb, it is necessary to restore blood flow to the foot tissues. The complexity of recovery depends on the volume of lesions in the arterial anatomical segments of the limb and the length of the occlusal-stenotic process [3,8].

It is expected that technical progress will contribute to improving the results of endovascular intervention in the distal arteries of the lower extremities.

The proportion of patients with gangrene of the toes with lesions of the tibial arteries with DM is 66%, and only 17% without DM. In this category of patients with the development of a purulent-necrotic process for decades, the operation of choice was high amputations of the lower extremities. In DM, this type of surgery is performed 15-20 times more often than in the general population. The large number of high amputations in this category of patients with the development of purulent-necrotic process is based on late diagnosis, inadequate treatment, and the lack of an established system of interdisciplinary care [1,5,8].

Currently, problems associated with diabetic foot remain the most common cause of non-traumatic limb amputations, disability, causing the highest damage to health, reducing the quality of life of patients and requiring large material costs for the treatment and rehabilitation of patients [4,9].

The first measurement of glucose in the urine was made in 1841.

The German anatomist-histologist Paul Langerhans in 1869 discovered in the pancreas islet tissue, which in the modern world are called "islets of Langerhans". In 1880. The French scientist Laciero Etienne tried to classify diabetes by distinguishing 2 types: the easily amenable diet therapy "diabete gras", and the non-amenable diet therapy, but rapidly progressing "Diabete maigre" [7].

In 1910, the English physiologist Sir Edward Albert Sharpay-Schaefer suggested that diabetes causes a missing chemical produced in the "islets of Langerhans" and named it insulin.

Классификация по Wagner classification shows the degree of foot damage, taking into account three main factors: the depth of damage to the skin, muscle tissues, and bone structures; the presence of an infectious process; and the presence and prevalence of necrotic changes - gangrene. The classification is conditional, but due to its simplicity, it is used most widely, although it does not fully reflect the diversity of the lesion. It also often makes it difficult to grade a purulent-ulcerative defect [2].

There is a classification associated with the pathogenesis of DFS development, which is associated with neuropathic changes and blood supply disorders of the limb. The classification is based on the severity of the combination of neuropathic and perfusion disorders, the degree of infection [5].

The majority of patients with SDS are neuropathic and are detected in 70% of cases, neuroischemic form occurs in 20%, and only 3-7% are ischemic.

Diabetic neuropathy (DN) is one of the most common complications of diabetes. This complication is nothing more than a disorder of the nervous system. This is a symptom complex characterized by a violation of the functioning of sensory, motor and autonomic nerve fibers. The development of DN is based on damage to small-caliber vessels with a subsequent violation of the metabolic process, and occurs in all patients with DM.

Diabetic autonomic neuropathy (autonomic imbalance, autotomy) is a violation of the full functioning of the autonomic nervous system, due to the negative effects of diabetes mellitus, leading to improper functioning of organs and systems [1,5,15,16]. Autonomic neuropathy manifests itself in violation of the pupillary

reflex, sweating, cardiac conduction system in the form of arrhythmia, dysfunction of the bladder and penis, etc. Disruption of proper functioning on the part of some organs and systems leads to destabilization on the part of others. Thus, autonomic neuropathy disrupts the regulation of smooth muscle relaxation of microvessels, provoking an increase in blood flow to the skin and bone tissue. Stagnation of blood leads to increased bone destruction. Due to a violation of sweating, dry skin appears, exfoliation processes are disrupted, followed by hyperkeratosis and the formation of cracks and calluses. Vascular changes occur in the form of calcification of small and medium-sized arteries (Menckenberg sclerosisМенкенберга) [5,14].

One of the systems more susceptible to the negative impact of diabetes mellitus is the vascular system, which is called diabetic angiopathy. Separate diabetic macro- and microangiopathies. Macroangiopathy is characterized by damage to the arteries and is caused by the manifestation of atherosclerosis, calcification of the wall. Microangiopathy is characterized by damage to arterioles and capillaries. In both cases of diabetic angiopathy, a partial or complete violation of vascular patency is possible, which worsens the microcirculation and reduces the blood supply to organs and tissues, leading to pathological changes with subsequent necrosis [17].

According to literature sources, there are several reasons that prevent the normal process of skin regeneration. One of the reasons is a violation of the distribution of blood flow in tissues due to the effect of autonomic neuropathy on microcirculatory function. This disorder consists in capillary stasis of the nutritional link and the occurrence of pathological arteriovenous discharge. The resulting tissue edema causes tissue hypoxia. The presence of sensory neuropathy disrupts the body's protective function and makes it difficult to determine the damaged area of the patient's skin [11,18].

In view of the tactically different approach to treating forms of DFS, it is necessary to be able to distinguish between neuropathic and neuroischemic ulcers in patients. Neuropathic ulcers have a characteristic location - the back of the foot, painless, pulsation on the anterior and posterior tibial arteries is not changed. First of all, patients with this form of SDS suffer from superficial sensitivity, and then only deep. Treatment of such ulcers is mostly conservative and is achieved in 90% of cases [9,19].

Limb ischemia is based on the development of obliterating atherosclerosis. When chronic limb ischemia reaches the Sb stage according to the Fontaine-Pokrovsky classification, there is a greater threat of trophic disorders at any time, followed by gangrene. In addition to obliterating atherosclerosisмакроангиопатиям относят , mediasclerosis of the arteries is also referred to as macroangiopathies .There is still no consensus on the pathogenesis of Menckeberg's sclerosis. One common theory is the deposition of calcium salts in the middle lining of the artery. In some literature sources, Menkeberg's mediocalcinosis is referred to as a separate independent nosology as "Menkeberg's atherosclerosis" [12,20].

**Used literature.**

1. Akchurin R. S., Vlasova E. E., Mershin K. V. Diabetes mellitus and surgical treatment of coronary heart disease // Bulletin of the Russian Academy of Medical Sciences. 2012. No. 1. -pp.14-19.

2. Asamov R. E., Khamidov B. P., Abdullaev B. P. Endovascular treatment of critical lower limb ischemia in patients with diabetes mellitus // Bulletin of Emergency Medicine. 2012. №3.

3. Bababekov Azam Rakhmatovich Improvement of methods of treatment of diabetic gangrene of the lower extremities (according to long-term results) : Autof.dis... candidate of medical sciences.-Tashkent, 2002.- 26 p.

4. Barbarash L. S., Zhuravleva I. Yu. A new generation of bioprostheses for cardiovascular surgery: 10-year experience and prospects // MvK. 2003. No. 2.

5. Barbarash L.S. Dynamics of indicators of the number of large amputations and mortality in diseases of the arteries of the extremities in the period from 1993-2007. Results of a population study // Angiology and vascular surgery. 2010. No. 3. pp. 20-25.

6. Boikov A.A., Kretov E.I., Baystrukov V.I., Prokhorikhin A.A., Malaev D.U. Transradial Ultra support technique: a new method of supporting a guide catheter in interventional treatment of chronic coronary artery occlusions // Complex problems of cardiovascular diseases. 2018. №3.

7. Bondarenko O. N., Ayubova N. L., Galstyan G. R., Dedov I.I. Transcutaneous oximetry in dynamic observation of patients with diabetes mellitus and critical ischemia of the lower extremities // Diabetes mellitus. 2013. No. 1 (58). -pp.33-39.

8. Bondarenko O. N., Galstyan G. R., Dedov I.I. Features of the clinical course of critical lower limb ischemia and the role of endovascular revascularization in patients with diabetes mellitus // Diabetes mellitus. 2015. No.3.-pp.57-62.

9. Bontsevich D.N. Experience of surgical treatment of critical ischemia of the legs / Bontsevich D.N. - Bulletin of emergency and reconstructive surgery.-2010.-Vol. 11.-No. 3. p. 357

10. Burleva E.P., Babushkina Yu.V. et al. Results of differentiated treatment of patients with diabetic foot syndrome at the stage of specialized surgical care//Surgery.-2019.-No.5.-p.42-51

11. Burov Yu.A., Konnov N.A., Mikulskaya E.G., Burov A.Yu. Effectiveness of loop thrombendarterectomy in patients with critical lower limb ischemia // Proceedings of the XXXI International Conference of the Russian Society of Angiologists and Vascular Surgeons.-2015.-p

12. Vakkosov K.M., Naumov D.Yu., Vodopyanova N.I. Mechanical thrombectomy in acute ischemic stroke: the experience of one center//Complex problems of cardiovascular diseases.-2020.-No.8.-p.95-103

13. Gavrilenko A.V., Kotov A.E., Shatalova D.V. Results of open reconstructive interventions on a previously stented section of arteries in patients with critical lower limb ischemia. //Diagnostic and interventional radiology. 2015; 9 (1): 34-8.

14. Gavrilenko Alexander Vasilyevich, Kotov A. E., Loikov D. A. Surgical treatment of critical ischemia of the lower extremities in patients with diabetes mellitus // Annals of surgery. 2012. No. 2. -p.10-17.

15. Galstyan G.R. Diseases of the arteries of the lower extremities in patients with diabetes mellitus: the state of the problem and prospects of treatment /Tokmakov A.Yu., Bondarenko O.N., Sitkin I.I., Pryakhina K.Yu., Mitish V.A., Doronina L.P. / Diabetes mellitus - 2011, No. 1. pp.74-79.

16. Holbreich V.A., Mozgovoy P.V., Skobeldina T.A. Revascularization operations in

patients with diabetic foot syndrome // Bulletin of VolGMU. 2015. No. 2 (54).

17. Dedov I.I., Shestakova M.V., Mayorov A.Yu., et al. Algorithms of specialized medical care for patients with diabetes mellitus / Ed. Dedova I.I., Shestakova M.V., Mayorova A.Yu. - 8th issue // Diabetes mellitus. - 2017. - Vol. 20. - No. 1S. - C. 1-121

18. Didenko S.M., Sviridov N.V. Efficiency of hybrid reconstructions in patients with diabetes mellitus with critical ischemia of the lower limb // Clinical endocrinology ta endocrine surgery. 2018. №3 (63).

19. Dzhemilova Z.N., Sitkin I.I., Sergeeva S.V., etc. Application of the method of fluorescence angiography in the near infrared range in a patient with diabetes mellitus and critical ischemia of the lower limb // Diabetes mellitus. -2018.- Vol. 21. -No. 4. - pp. 319-324.

20. Egorov A.A. Clinical and pathogenetic aspects of revascularization osteotrepation surgery in patients with obliterating atherosclerosis of the arteries of the lower extremities: Abstract. dis. ... Candidate of Medical Sciences A.A. Egorov. - Ryazan. - 2007. - 21c.