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Diabetic foot syndrome – severe complication of diabetes. Prophylaxis and care

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ABSTRACT
Diabetes is an incurable metabolic disease whose neglect can lead to serious health complications. It is caused by a malfunction or insulin secretion by the pancreas. Diabetes is more and more often diagnosed in society and has become a disease of civilization. An increase in the incidence of diabetes is expected in the coming years. Inadequate treatment and inadequate control may cause hyperglycaemia, causing a number of consequences associated with an increase in glycaemia levels. Diabetic foot syndrome causes damage to peripheral nerves or vessels of the foot. Early detection of abnormalities allows to take appropriate action, therefore an important element of prevention of a person suffering from diabetes is foot control. Ignoring the symptoms may lead to the development of ulceration and infection or even at a later stage to amputation of the limb.
The aim of the study is to present appropriate prophylaxis, care and treatment in the care of a patient with diabetic foot syndrome. The paper is based on a review of articles in reputable journals from the last few years.

Key words: diabetic foot syndrome, prophylaxes, therapy, diabetes complications

INTRODUCTION

Diabetes is an incurable disease, but proper treatment and compliance with the doctor's recommendations by the patient reduces the risk of complications. The consequences of ill-treated diabetes cause a decrease in patient's comfort and may cause numerous ailments, e.g. pain. Feet are at risk of many injuries and external factors, which in people with diabetes may cause many complications, including one of them is diabetic foot syndrome (DF). Wounds and injuries in patients are much more difficult to heal than in healthy people, so it is very important to observe the condition of the skin in order to detect skin lesions as soon as possible.[1]

Diabetic foot syndrome can be diagnosed in case of damage, ulceration or infection of the skin, muscles and/or bones resulting from damage to the vessels of the foot or peripheral nerves. The following division of DF can be observed: vascular, neuropathic and mixed. The most common is diabetic neuropathic foot (70%), less frequently mixed and vascular. In Poland, the foot is often amputated as a result of DF, so it is very important to treat diabetes properly and prevent injuries. In case of damage, immediate treatment is very important in order to prevent further development of DF. Daily observation and care is an important part of prevention.[2]

As a result of sensory damage to nerve fibres, diabetic neuropathy develops, i.e. pain sensation disorders. Neuropathy leads to a change in the shape of the foot - neuropathic diabetic foot (elevation of the longitudinal vault, hammer fingers). As a result of the forces exerted on the affected areas, a callus corneum hard epidermis is formed, which leads to further damage to deeper tissues. As a result of the disturbed sensation, the patient often does not feel pain resulting from e.g. a blow or pressure of wrongly chosen shoes, which may cause the damage to be unnoticed by the patient. A very important prophylactic element in a person with diabetes mellitus is to perform a sensory and pulse examination on the feet. Ischemia and disturbed healing may be the result of atherosclerotic changes. Early intervention and implementation of appropriate prophylaxis, actions and treatment may prevent further development of damage and permanent disability. It is important to achieve the correct glycemic value as soon as possible.[3]

Wagner classification - describing the degree of advancement of DF:

- Degree 0 - no ulcers present, high risk of DF,
- Degree I - presence of superficial ulcers,
- Degree II - the presence of superficial ulcers along with inflammation of the skin, penetrating the muscles and joints,
- Degree III - advanced ulceration (presence of abscesses, inflammation of the bone),
- Degree IV - limited necrosis in the fingers,
- Degree V - whole foot gangrene, sepsis (necessity of limb amputation).

MAIN PART

Diabetes is an incurable disease that can cause many complications. It is very important to regularly check the level of glycemia, observe the feet and perform clinical examinations of the feet (neurological, vascular, pedobarographic, microbiological and bone inflammation examinations). Poorly treated diabetes may lead to the development of diabetic

[1] Wanot B, Nierobisz E. Amputacja kończyny dolnej jako najcięższe powikłanie cukrzycy. Medycyna Rodzinna 2017; 20 (1): 68-73.

[2] Sojka M, Jargiełło T. Leczenie wewnątrznaczyniowe zespołu stopy cukrzycowej. Postępy Nauk Medycznych 2012, 25 (5): 428-433.

[3] Korzon-Burakowska A. Zespół stopy cukrzycowej – patogeneza i praktyczne aspekty postępowania. Choroby Serca i Naczyń 2007; 4 (2): 93–98.

foot syndrome. Depending on the degree of development of DF, the patient is at risk of permanent disability (amputation of the limb) in order to save the rest of the limb or life of the patient (sepsis). [4]

Paulina Mościcka and co-authors of the article "Zespół stopy cukrzycowej jako najczęstsze powikłanie cukrzycy – opis przypadku" published in the magazine "Pielęgniarstwo chirurgiczne i angiologiczne" write about diabetic foot syndrome as a serious complication of diabetes, significantly worsening the health condition and comfort of the patient and threatening his life (sepsis). Regular control of glycemia values and foot condition can often protect the patient from DF. Most often, this complication occurs as a result of the patient's discontinuation of self-monitoring. The education of diabetics plays a very important role (explaining the importance of glycemic control, personal hygiene and foot control). Diabetic foot syndrome occurs most frequently in patients between 55 and 65 years of age, and is more frequently diagnosed in male patients. The PEDIS scale is the most frequently used in the assessment of the stage of DF. When diabetic foot syndrome occurs, it is very important to start treatment immediately, correct the level of glycemia, apply specialist dressings and relieve pressure on places exposed to oppression (e.g. specialist footwear). Continuous education of the patient is the basis for prevention that significantly reduces the risk of diabetic complications. [5]

The article "Zespół stopy cukrzycowej – problem wciąż aktualny" written by Maria Korzonek and co-authors describes the importance of education of diabetic patients and self-control in minimizing diabetic complications. Prophylaxis of diabetic foot syndrome is based mainly on control of glycemia by the patient, regular foot control, wearing insoles and shoes to reduce pressure on the exposed areas. Chronic hyperglycaemia, neuropathy, atherosclerotic lesions, infections and injuries are the factors causing the occurrence of DF. Diabetic foot syndrome is an infection with ulceration and/or deep tissue destruction, peripheral vascular diseases (e.g. atherosclerosis) and neurological disorders. As a result of advanced diabetic foot syndrome, the doctor may decide to amputate the fingers or lower limb. Properly selected treatment of infection in DF may protect the patient from permanent disability. As a result of increased pressure on the exposed areas, calluses may appear, which may lead to ulcerations. The most common neuropathic foot syndrome is diabetic foot syndrome - the patient does not feel pain or temperature, and therefore may not feel the damaging factors. Neuropathy leads to a change in the shape of the lower limb. In diabetic patients the incidence of infection is more frequent than in healthy people and more difficult to treat. Ischemic foot syndrome is characterized by resting pain and pale is also cold, blue and hairless, there are visible damage and dry necrosis in the distal parts of the foot, while the diabetic neuropathic foot is warm, there is visible redness and presence of hair, dilatable necrosis, damage, calluses on the sole part of the foot, pain sensations are significantly disturbed. The basis of DF treatment is to equalize glycemia, blood pressure, lipid values, education of the patient and relieve stress on the exposed areas. The use of antibiotic therapy, surgical procedures and appropriate dressings are the next stage of treatment of diabetic foot syndrome. There are also other methods of DF treatment, such as VAC therapy (vacuum wound treatment, negative pressure, closed drainage system), larval therapy (wound cleaning), hyperbaric oxygen therapy (reduction of infection). The type of dressing depends on the type of ulceration and infection. [6]

[4] Popławska-Kita A. Stopa cukrzycowa. Dermatologia geriatryczna. Pod red. Andrzeja Kaszuby, Jacka Szepietowskiego, Zygmunta Adamskiego 2016; 2: 329-343.

[5] Mościcka P. Zespół stopy cukrzycowej jako najczęstsze powikłanie cukrzycy – opis przypadku. Pielęgniarstwo chirurgiczne i angiologiczne 2016; 2: 1-5.

[6] Korzonek M, Markiel A. Zespół stopy cukrzycowej – problem wciąż aktualny. Pielęgniarstwo chirurgiczne i angiologiczne 2016; 1: 1-8.

The incidence of diabetes has increased significantly in recent years. As a result of poorly treated diabetes, many complications may occur. One of them is diabetic foot syndrome. Anna Karpińska and co-authors of the article "Znaczenie fizjoterapii w prewencji i leczeniu cukrzycy typu 2, z uwzględnieniem zespołu stopy cukrzycowej" write about the importance of physiotherapy and physical activity. A common complication occurring in people with diabetes is the occurrence of diabetic neuropathy (abnormal pain sensation, temperature, wound healing, foot deformity). Diabetic foot syndrome is a result of poorly balanced glycemia and pressure on the exposed areas.

The prevention of people with type 2 diabetes is based on regular self-regulation of glycemia level, foot condition and systematic physical activity (e.g. swimming, cycling, Nordic walking). Physical exercise is selected individually to the patient's capabilities, too intensive training may lead to a sudden drop or increase in blood glucose levels. In case of foot damage, the lower limb should be relieved, special shoes or insoles should be used. Physiotherapy and balneotherapy are one of the methods of improving the patient's swelling, pain and anti-inflammatory effects. [7]

Ischemic diabetic foot syndrome is one of the complications of poorly treated or uncontrolled diabetes. Ewelina Drela and Grzegorz Mielcarz in the article "Zespół stopy cukrzycowej niedokrwiennej – od epidemiologii do diagnostyki" published in "Pielęgniarstwo chirurgiczne i angiologiczne" describe how the complication of ischemic foot syndrome occurs. As a result of ischaemia of tissues and metabolic factors, the development of lower limb pathology leading to the development of DF may occur. In the advanced stage of damage development, there is a need for amputation leading to disability and a significant reduction in the patient's quality of life. Diabetic foot syndrome is a result of blood vessel damage (reduced blood flow) increasing the risk of lower limb damage. A characteristic symptom of ischaemic foot syndrome is the pain felt during walking, receding at rest and pale, cold, blue lower limb. A very important element preventing the formation of DF is prevention - determination of the risk level of development of DF, periodic examinations, appropriate care and foot hygiene, regular control of glycemia levels and education of the patient.[8]

SUMMARY

Diabetes is an incurable disease which, as a result of poorly managed treatment or insufficient self-control, can significantly reduce the quality and comfort of life of patients. Diabetic foot syndrome is a dangerous complication of patients often leading to lower limb amputation. Prevention and education of patients should be one of the main elements of treatment. Patients often have insufficient knowledge about the complications of diabetes.

The lower extremities are at risk of many injuries and damages, which are much more difficult to heal in diabetics. People with diabetes mellitus often experience pain disorder, so it is very important to regularly check the skin of the feet. Most often we encounter the development of diabetic neuropathic foot (disorder of sensation), we also distinguish the syndrome of ischemic diabetic foot caused by impaired blood flow or mixed diabetic foot syndrome. Proper treatment of diabetes, self-control and prophylaxis may protect the patient from permanent disability (lower limb amputation). The treatment of diabetic foot syndrome is mainly based on antibiotic therapy, glycemic control and appropriate dressings and methods (VAC, larval therapy). In the event of damage, it is important to relieve the foot, using appropriate footwear or insoles.

[7] Karpińska A. Znaczenie fizjoterapii w prewencji i leczeniu cukrzycy typu 2, z uwzględnieniem zespołu stopy cukrzycowej. Pielęgniarstwo chirurgiczne i angiologiczne 2018; 2: 39-43.

[8] Drela E, Mielcarz G. Zespół stopy cukrzycowej niedokrwiennej – od epidemiologii do diagnostyki. Pielęgniarstwo chirurgiczne i angiologiczne 2017; 11 (3): 73-77.

The incidence of diabetes is constantly increasing. It is a civilisation disease of the 21st century. Insufficient knowledge of patients may lead to complications reducing the quality of life. Education of the patient, periodic examinations and appropriate prophylaxis and self-control significantly reduce the risk of diabetic complications.

CONCLUSIONS

1. Diabetic foot syndrome is a serious complication threatening the life and health of the patient, often causing permanent disability (amputation of fingers, limbs) and reducing the comfort of life. Educating a diabetic patient is a very important element to avoid complications (control of glycemic values, personal hygiene, foot control, appropriate footwear).
2. Diabetic foot syndrome is a difficult and long-lasting complication of poorly treated diabetes mellitus. The education of the patient plays a very important role. Lack of self-control of glycemia values and lack of regularity in hygiene and foot observation may lead to the development of DF. As a result of extensive necrosis or in case of sepsis, the doctor decides about the necessity of amputation in order to save the rest of the limb or the life of the patient, causing permanent disability.
3. Appropriate prophylaxis, treatment and education of people with type 2 diabetes allows to reduce the risk of diabetic complications. Individually selected physical activity, physiotherapy and balneotherapy bring many health benefits.
4. As a result of poorly treated or uncontrolled diabetes, the patient may develop ischaemic foot syndromes. Disturbed blood flow in blood vessels may cause damage. Diabetic foot syndrome may lead to an amputation of the lower limb causing severe disability. An important element is prevention and education of the patient.

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