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DIABETIC FOOT ULCER IN PREGNANCY - A REVIEW

General Surgery

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ABSTRACT

A foot is a complicated osteoarticular system. The complex structure and variability predispose it to the formation of foot deformity. The cause deformities of the feet are weakened muscle tissue and ligaments, systemic diseases: obesity, musculoskeletal defects, neurological diseases, rheumatism, diabetes, pregnancy, improper shoes or socks. They interfere with the function of the foot and are reflected in the distribution of support points. The aim of this study was to assess the impact of diabetes on pregnancy and the mechanics of the foot and the risk of developing diabetic foot.

Material and methods: The study took part in healthy and diseased women with type 1 diabetes in pregnancy. Evaluation of static foot was performed using podoscope, made up of mirrors, lights and camera. The camera described the distribution of the pressure on the glass plate, which the person being investigated was standing on. It recorded the reflection of feet and transmit them to a computer. Description the results consisted of defining relevant indicators. The evaluation was performed using the dynamic pressure Parotec system, the measuring cylinder placed inside the patient's shoe provided with sensors recording the foot pressure distribution on the ground while standing and walking. The data were stored on a memory card loaded into the computer, where the analysis took place. It has been calculated the average values of pressures exerted on the various zones of the foot.

KEYWORDS

Management of foot ulcer in Gestational Diabetes Mellitus

GDM with foot ulcer is characterized by increased risk of macrosomia and birth complications and an increased risk of maternal diabetes after pregnancy. The association of macrosomia and birth complications with oral glucose tolerance test (OGTT) results is continuous, with no clear inflection points . In other words, risks increase with progressive hyperglycemia. Although there is some heterogeneity, many randomized controlled trials suggest that the risk of GDM with foot ulcer may be reduced by diet, exercise, and lifestyle counselling.

Lifestyle Management

After diagnosis, treatment starts with medical nutrition therapy, physical activity, and weight management depending on pregestational glucose monitoring aiming for the targets recommended by the Fifth International Workshop-Conference on Gestational Diabetes Mellitus.

○ Fasting ≤95 mg/dL (5.3 mmol/L) and either
○ One-hour postprandial ≤140 mg/dL (7.8 mmol/L) or
○ Two-hour postprandial ≤120 mg/dL (6.7 mmol/L)

Depending on the population, studies suggest that 70–85% of women diagnosed with GDM under Carpenter-Coustan or National Diabetes Data Group (NDDG) criteria can control GDM with lifestyle modification alone; it is anticipated that this proportion will increase using the lower International Association of the Diabetes and Pregnancy Study Groups (IADPSG) diagnostic thresholds.

Pharmacological Therapy

Women with greater initial degrees of hyperglycemia may require early initiation of pharmacological therapy. Treatment has been demonstrated to improve perinatal outcomes in two large randomized studies as summarized in a U.S. Preventive Services Task Force review Insulin is the first-line agent recommended for treatment of GDM in the U.S. Individual randomized controlled trials support the efficacy and short-term safety of metformin (pregnancy category B) and glyburide (pregnancy category B) for the treatment of GDM. However, both agents cross the placenta, and long-term safety data are not available for either agent.

Sulfonylureas

More recently, several meta-analyses and large observational studies examining maternal and fetal outcomes have suggested that sulfonylureas, such as glyburide, may be inferior to insulin and metformin due to increased risk of neonatal hypoglycemia and macrosomia with this class.

Metformin

Metformin, which is associated with a lower risk of hypoglycemia and potential lower weight gain, may be preferable to insulin for maternal health if it suffices to control hyperglycemia ; however, metformin may slightly increase the risk of prematurity. None of these studies or meta-analyses evaluated long-term outcomes in the offspring. Thus, patients treated with oral agents should be informed that they cross the placenta and, while no adverse effects on the fetus have been demonstrated, long-term studies are lacking.

Insulin

Insulin may be required to treat hyperglycemia.

Screening and diagnosis

Blood pressure should be measured at every routine diabetes visit. Patients found to have systolic blood pressure ≥130 or diastolic blood pressure ≥80 mmHg should have blood pressure confirmed on a separate day. Orthostatic measurement of blood pressure should be performed to assess for the presence of autonomic neuropathy.

Goals

- Patients with diabetes should be treated to a systolic blood pressure <130 mmHg.
- Patients with diabetes should be treated to a diastolic blood pressure <80 mmHg.

Treatment

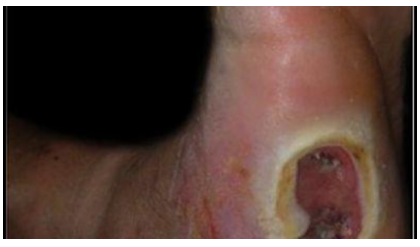
- Patients with a systolic blood pressure of 130–139 mmHg or a diastolic blood pressure of 80–89 mmHg should be given lifestyle and behavioral therapy alone for a maximum of 3 months and then, if targets are not achieved, in addition, should be treated pharmacologically.
- Patients with hypertension (systolic blood pressure ≥140 or diastolic blood pressure ≥90 mmHg) should receive drug therapy in addition to lifestyle and behavioral therapy.
- Initial drug therapy may be with any drug class currently indicated for the treatment of hypertension. However, some drug classes (ACE inhibitors, β-blockers, and diuretics) have been repeatedly shown to be particularly beneficial in reducing CVD events during the treatment of uncomplicated hypertension and are therefore preferred agents for initial therapy. If ACE inhibitors are not tolerated, ARBs may be used. Additional drugs may be chosen from these classes or another drug class.
- If ACE inhibitors or ARBs are used, monitor renal function and serum potassium levels.
- In patients with type 1 diabetes, with or without hypertension, with

any degree of albuminuria, ACE inhibitors have been shown to delay the progression of nephropathy. In patients with type 2 diabetes, hypertension and microalbuminuria, ACE inhibitors and ARBs have been shown to delay the progression to macroalbuminuria. In those with type 2 diabetes, hypertension, macroalbuminuria (>300 mg/day), nephropathy, or renal insufficiency, an ARB should be strongly considered.

- If one class is not tolerated, the other should be substituted.
- In patients >55 years of age, with hypertension or without hypertension but with another cardiovascular risk factor (history of CVD, dyslipidemia, microalbuminuria, smoking), an ACE inhibitor (if not contraindicated) should be considered to reduce the risk of cardiovascular events.
- In patients with microalbuminuria or overt nephropathy, in whom ACE inhibitors or ARBs are not well tolerated, a non-DCCB or β-blocker should be considered.
- In patients with a recent myocardial infarction, β-blockers, in addition, should be considered to reduce mortality.
- In elderly hypertensive patients, blood pressure should be lowered gradually to avoid complications.
- Patients not achieving target blood pressure on three drugs, including a diuretic, and/or patients with significant renal disease (see below) should be referred to a specialist experienced in the care of patients with hypertension.

Debridement

- Debridement consists of removal of all necrotic tissue, peri-wound callus, and foreign bodies down to viable tissue. Proper debridement is necessary to decrease the risk of infection and reduce peri-wound pressure, which can impede normal wound contraction and healing. After debridement, the wound should be irrigated with saline or cleanser, and a dressing should be applied.
- Dressings should prevent tissue dessication, absorb excess fluid, and protect the wound from contamination. There are hundreds of dressings on the market, including hydrogels, foams, calcium alginates, absorbent polymers, growth factors, and skin replacements. Becaplermin contains the β-chain platelet-derived growth factor and has been shown in double-blind placebo-controlled trials to significantly increase the incidence of complete wound healing. Its use should be considered for ulcers that are not healing with standard dressings.
- In case of an abscess, incision and drainage are essential, with debridement of all abscessed tissue. Many limbs have been saved by timely incision and drainage procedures; conversely, many limbs have been lost by failure to perform these procedures. Treating a deep abscess with antibiotics alone leads to delayed appropriate therapy and further morbidity and mortality.



RESULTS:

It was found that the increase in body weight resulting from the advancement of women pregnancy increases the load exerted on the foot. Forces are growing in subsequent trimesters of pregnancy reaching a maximum at the end of the third trimester. The longitudinal and transverse arches of the foot are reducing. After the birth, the pressure exerted on each area of the foot decreases, arches of the foot are getting back to starting position.

CONCLUSIONS:

Number of foot deformities is higher in women with type 1 diabetes. It grow the risk of developing diabetic foot. Concluding, diabetic foot ulceration is generally preventable. The first step in ulcer prevention is the careful screening for foot problems and detection of patients at high risk. More research is still required to improve the diagnosis of conditions leading to foot ulceration. Diversity in the diagnostic criteria and the lack of cut off hinders the standardization of management plans. Multi-disciplinary team approach is required to effectively manage the different aspects of diabetic foot syndrome. Standard wound care is recommended, while modern treatment modalities have shown some promising results in recent studies.

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