

DIABETIC FOOT ULCERS WITH PERIPHERAL VASCULAR DISEASE

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ABSTRACT:

AIM: To do a review on diabetic foot ulcer with peripheral vascular disease.

BACKGROUND: Diabetes Mellitus is metabolic disorder that impedes the normal steps of the wound healing process. Diabetes can affect every system in the body such as hands, axilla and neck, eyes, feet and insulin injecting sites. This review is focussed on diabetic foot ulcer with peripheral vascular disease. Foot is the frequent site of complication in patients with diabetes. Foot ulcers occur due to trauma in presence of neuropathy or vascular disease or with infections that are due to disruption of the epidermis. Peripheral vascular disease (PVD) is a blood circulation disorders those blood vessels outside the heart and brain to narrow, resulting in spasm or block. This occurs mainly in the artery and veins. PVD typically causes pain in the feet. The risk of peripheral vascular disease is increased in diabetic patients. Endothelial dysfunction, vascular smooth muscle dysfunction, inflammation are the important factors leading to peripheral vascular disease.

REASON: To understand and to gain knowledge about the association between the diabetic foot ulcer and peripheral vascular disease.

INTRODUCTION:

Foot wounds are now the most common diabetes-related cause of hospitalisation and are a frequent precursor to amputation (1–3). Individuals with diabetes has higher risk of foot ulcer than the no diabetic individuals. Lower extremity disease, including peripheral arterial disease, peripheral neuropathy, foot ulceration, or lower extremity amputation, is twice as common in diabetic persons compared with non diabetic persons and it affects most of the diabetic persons who are above the age of 40 years. Studies suggest that among the persons having diabetes mellitus, the lifetime risk of developing a foot ulcer is estimated to be 15% (4). Diabetic foot ulcer is of two groups neuropathic ulcer (occurring in neuropathic feet) and neuro ischemic (occurring in feet with ischemia)(5).

DEFINITION OF ULCER:

Skin ulcer is defined as breach in the continuity of the surface epithelium. The duration of an ulcer is essential to know whether it is a healing or a non healing ulcer but in case of a diabetic foot ulcer there is lack of information due to the loss of sensation. Therefore diabetic foot ulcer is a full thickness wound below the ankle in diabetic patients without considering the duration (6). The criteria considered for describing diabetic foot ulcer are perfusion, extent, size, depth, infection and sensation (7).

PATHOPHYSIOLOGY:

Three major causative factors the first one high blood sugar level resulting in decreases immunity, the second one being peripheral neuropathy which occurs in majority of the individuals with diabetics this results in loss of protective sensation and the other cause being excessive pressure in the plantar region. The third reason is microangiopathy with or without peripheral vascular disease.

OTHER FACTORS:

Atherosclerotic peripheral vascular disease, which is twice as common in persons with diabetes as in persons without diabetes and particularly affects the femoropopliteal and smaller vessels below the knee(8). Diabetes is also associated with several intrinsic wound-healing disturbances, including impaired collagen cross-linking and matrix metalloproteinase function (9,10) and immunologic perturbations, especially in polymorphonuclear leukocyte function(11,12)

NEUROPATHIC ULCER:

Neuropathic ulcers occurs commonly in the plantar aspect of the foot under the metatarsal heads or on the plantar aspect of the toes. The most common cause is the mechanical forces of gait which results in callus formation which indeed is a pre ulcerative condition. If callus formation is present then immediate removal of the callus should be done. If not removed then there will be autolysis and haematoma formation under the callus occurs. This leads to tissue necrosis and finally a cavity filled with serous fluid.

NEUROISCHAEMIC ULCERS:

This type of ulcers are seen commonly on the margins of the feet mainly in the medial surface especially on the medial surface of the first metatarsophalangeal joint and over the lateral aspect of the fifth metatarsophalangeal joint. They also occur on the tip of

the toe or toe nails .classical sign of pre ulceration is seen . First sign is blisters which later develop into pale granulation tissue . It is important to probe the ulcer to check if it is extending to the bone .

Wound control is done by debriding the wound and maggot therapy is most commonly used in cases of ischaemic ulcers and vacuum assisted closure is done after debridement. Mechanical aids such as air cast or a scotch cast boots are used. In case if casting is not available then temporary shoes with coughing get insoles can be used

LOWER EXTREMITY ARTERIAL DISEASES:

LEAD is identified by intermittent claudication and or absence of peripheral pulse in the lower legs and feet. LEAD can be detected before clinical manifestations . X-rays can be used to detect the arterial calcifications that can detect the arterial diseases with or without an occlusive component . Ultrasound is a gold standard test for the detection and diagnosis of LEAD. Manifestation of LEAD includes decreased arterial perfusion resulting in absence or decreased peripheral pulses and may lead to intermittent claudication, increased risk for infections, ulcers, gangrene and finally leading to amputation. Palpation of peripheral pulses serves as a diagnostic tool in identifying LEAD. Claudication is an important feature present in diabetic individuals presenting LEAD.

Temperature, anatomical variation and expertise in palpation of peripheral pulses contribute to variation in clinical findings. Absence of pulses remains significant and absence of posterior popliteal or femoral with or without bruits indicates occlusive LEAD. Age, sex, hypertension, hyperlipidemia, diabetes increases the risk for LEAD. But platelet derived specific protein, beta thromboglobulin increases the risk for peripheral vascular diseases. Foot ulcers can occur in conjunction with or without LEAD. Foot ulcers do not necessarily leads to progression of LEAD, as they occur due to decreased arterial perfusion

DETECTION:

Peripheral vascular disease is detected by ankle brachial index which is the systolic blood pressure in the ankle to that of the radial artery. An ABI of 0.90 or less suggests peripheral vascular disease, while higher than 1.1 may represent a falsely elevated pressure caused by medial arterial calcinosis.(13)

MICROBIOLOGICAL CONTROL:

Whenever an ulcer occurs there are more risks for the microbial effects . Infection may range from local infection to gangrene. But in cases of ischaemic and neuropathic ulcers the inflammatory reactions are less. Such cases requires proper SAMPLE collection, gram staining, and culturing to identify the causative organism to treat the existing condition .

LOCAL SIGNS OF WOUND INFECTION :

Base of the ulcer becoming moist and change from healthy pink to pale granulation tissue with slough
Unpleasant odour
Pus discharge.

CONCLUSION:

Diabetic foot ulcer is a most common problem across the globe . Diabetic Patients should be educated regarding the preventive care and protection . Patient education formats have included lectures, hands-on-workshops, skills exercises, behavioural modification programs, and telephone reminder. Patients should be educated about the changes in the feet that is swelling, colour changes, pain and breaks in the skin

Patients should also be suggested to under go regular or annual visits to the physician . Prevention at primary and secondary levels are essential. Primary prevention involves controlling the risk factors such as obesity, hyperlipidaemia ,hyperglycaemia etc. secondary prevention includes the correction of these risk factors and delaying the progression of the diseases further.

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