



Joining the dots... Diabetes Mellitus and Foot disease

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Two weeks ago, a patient presented to our diabetic foot clinic with a Diabetic Foot Ulcer (DFU) on the bottom of his foot. When we discussed how this occurred, he was very quick to point out that it was because 'the pharmacist told him to use a corn plaster' therefore it was nothing to do with him! Upon assessment, it was clear that while the inappropriate use of the 'corn plaster' had caused an acid burn and DFU, this was merely a symptom of underlying Diabetic Foot Syndrome (DFS) (Apelqvist, 2018).

The question that needs to be considered when anyone presents with DFU is what elements of DFS are involved? In this article we will try to connect the different elements of Diabetes Mellitus (DM) which predispose individuals to DFS, how to address them and what the readers of IPN can do should it present in their practice.

Diabetic Foot Syndrome (DFS)

DM is a disorder of glucose haemostasis which causes high blood glucose (hyperglycaemia). If high blood glucose levels persist then complications of DM will develop (Bonora and DeFronzo, 2018). These complications cause damage in the wall of blood vessels throughout

body systems. The combination of damage to both large and small blood vessels is what ultimately leads to the presence of DFS manifesting in DFU. The complex interplay between large vessel disease causing peripheral arterial disease (PAD) as well as small vessel disease leading to peripheral diabetic sensory neuropathy are the underlying cause of the syndrome.

These are what ultimately induces ulceration after trauma and increases the risk of amputation. Diabetes is the most common reason for non-traumatic amputation globally and with up to 85% of preceded by an episode of ulceration, it is something that needs our attention (Apelqvist 2018).

Managing Diabetic Foot Syndrome

The management of DFS begins with preventing the development of DFS by effective glycaemic control. Clinical trials and studies have shown that intensive glycaemic control reduces the incidence of ulceration, and decreases the risk of amputation (Nathan and Group, 2014, Stratton et al., 2000). As a result, the purpose of treatment for DM is to achieve and maintain normal glucose levels in order to reduce the incidence of all DM complications. As a primary tool for assessing glycaemic control, the HbA1c test is an indirect measure of average glycaemia. It has strong predictive value for diabetes complications and should be performed routinely in all patients with diabetes. A target of 53mmol/l or below is recommended by guidelines as the optimal target for patients with DM (Association, 2020a). In contrast, self-monitoring of blood glucose (SMBG) allows real-time measurement of glucose levels collected by individuals. This is typically achieved using personal blood glucose meters to measure finger prick blood samples several times per day (Polonsky et al., 2017). Therefore, it is important for patients to have a good understanding of what their glucose targets are and how well they are achieving such targets (Ismail-Beigi et al., 2011).

Knowledge of prevailing glucose trends through the use of SMBG, especially in those on insulin therapy, provides the ability to tailor therapy and empower the patients to play a more active role in managing diabetes and prevent diabetes complications (Association, 2020b). This involves appropriate patient SMBG skills training which should be reinforced on a regular basis.

Managing Diabetic Foot Ulceration (DFU)

The management of any episode of ulceration is difficult and necessitates a wide series of interventions best delivered in a multidisciplinary diabetic foot team (MDFT). The HSE national model of care states that patients with active diabetic foot ulceration should be referred to the MDFT based in the level 4 hospital within 1 working day (Group, 2011). Once a referral is received the MDFT usually is able to offer an appointment for assessment within a further working day. This means that treatment can be commenced with 2 working days of presentation. Despite this, many patients

are referred late and this leads to poor outcomes (Manu et al., 2018). It is accepted that primary care healthcare providers are often unaware of the importance of referral, and moreover – where, when and how to refer (Askey et al., 2020).

Upon assessment within the MDFT, the patient will receive an assessment of the foot and lower limb considering the risk factors for DFS as well as a management plan for the current episode of DFU.

Depending on the primary underlying cause of ulceration, the wound will be assessed and management plan will be developed (Schaper et al., 2020). The management of any ulceration will be multifaceted and combine re-vascularisation, infection management, debridement of dead tissue and offloading of pressure in the primary instance. In addition, hyperglycaemia treatment will be intensified and this, in conjunction with careful wound care, will complete the management plan. This should all be performed in the context of the MDFT and up to 26 different HCPs may be involved in the development of the management plan (Blanchette et al., 2020).

As the strictness of the referral pathways show, the presence of any foot pathology in a person with diabetes is a cause for concern. It is important that patients with diabetes and any foot problem are suitably investigated. The use of over the counter treatments for foot pathologies should be considered in the wider understanding of the increased risk of foot disease in this cohort of patients. This group of patients are more prone to numerous skin and nail pathologies as well as local infections such as Tinea Pedis (Bristow, 2008). Patients should know what their foot risk status is, or at least know when their feet were last reviewed by a HCP (Bus et al., 2020). Guidelines suggest that patients with DM receive a foot assessment at least once a year and those at increased risk more frequently. The processes involved in conducting a foot assessment are simple and involve the identification of risk factors which place patients at an increased risk for the development of DFS (Bus et al., 2020). Any HCP should be able to complete a foot assessment in a patient with DM. Patients may present in search of over the counter treatments for foot pathologies which should alert to the need for a further investigation and assessment.

After Diabetic Foot Ulceration (DFU) / In Remission

Following any episode of DFU, the patient should be termed as 'in remission'. This is because while the symptom of the DFS (being the episode of ulceration) has now resolved the underlying disease process remains and therefore the symptoms of the disease will recur (Armstrong et al., 2007, Boghossian et al., 2018, Armstrong and Mills, 2013). Rates of



DFU recurrence are up to 40% 1 year following DFU (Boghossian et al., 2018). In such cases it is imperative that the patients are referred to a foot protection service which exists in every CHO in the country (Group, 2011). Patients and HCPs need to know who to contact - and how- if the need arises. Patients may be confused as to where to attend and which service is most appropriate to provide care (Wilson et al., 2020). It is therefore of the utmost importance that patients and their families are educated about the persistence of DFS even in the absence of DFU. Non-ulcerative foot pathologies in such cases cannot be underestimated and require professional attention. The presence of callus on the foot in a patient with a history has been likened to the presence of a breast lump in a patient with a history of breast cancer (Armstrong et al., 2017). Indeed, mortality secondary to foot disease is higher than many cancers (Armstrong et al., 2007).

To conclude, the gentleman we described in the opening paragraph is a case worth noting – on this occasion the inappropriate use of the corn plaster causing an acid burn was addressed and the DFU resolved. Of greater importance is the fact that treatment of poor glycaemic control has been intensified, as well as management of cardiovascular risk factors to reduce the risk of further episodes of DFU. This patient was linked with a foot protection service local home. He also received personalised education about self-management of DM and foot pathologies as well as personal responsibility about foot care practices! This may not have happened had the patient not been referred to the MDFT. We recommend that all HCPs investigate referral pathways for their local diabetic foot teams so that should they find the need to access the services they can do so promptly. Most MDFTs are happy to provide advice and support to colleagues in this regard. It is important to make the connection between diabetes, glycaemic control, DFS, foot pathologies, DFU and amputation. There is no such thing as a simple lesion on the foot in a patient with DM. Helen Keller stated that alone we can do little but together we can do so much.

References available on request