woundclub live 2017

Diabetic Foot Ulcers

Getting your patient back on their feet

smith&nephew

PracticeNursing

BRITISH JOURNAL OF COMMUNITY NURSING

IndependentNurse
For primary care and community nurses

Presentation overview

This presentation aims to:

- Explore the causes of foot ulceration in Diabetic patients.
- Provide an overview of foot assessment and management.
- Discuss use of the PICO™ NWPT system in the management of Diabetic foot ulceration.

Diabetic Foot Ulcers (DFU)

- Diabetes is a metabolic disease characterised by persistent hyperglycaemia over a prolonged period.

- DFU's are complex, chronic wounds which have a major long term impact on morbidity, mortality and quality of life.

- Patients with a DFU have an increased risk of premature death, myocardial infarction and stroke.

- The early diagnosis and management of this condition therefore presents unique challenges.

Economic data – DFU's

- 1:20 people with diabetes will develop a DFU in their lifetime (Diabetes UK, 2012)
- 1:10 result in amputation (Diabetes UK, 2012)
- Numbers of people with Diabetes around the world are increasing with estimated numbers of 552 million by 2030 (Diabetes UK, 2011)
- In the UK foot complications account for 20% of the total NHS spend (£650m) on Diabetes care (Diabetes UK, 2011)

Quality of life impact

- Physical
- Psychological
- Social wellbeing

Aetiology of DFU's

- The underlying cause of DFU's will have a significant bearing on the clinical management and this must be determined as a priority.

3 main causes of DFU's

- **Neuropathic – loss of sensation**
- **Ischaemic- poor blood flow**
- **Neuroischaemic – combined influences**

- It is suggested that the pathophysiology of DFU's has changed over the last 20 years with an increasing number of ischaemic and neuro ischaemia ulcers

Neuropathic

- Peripheral neuropathy affects sensory, motor and autonomic nerve pathways which in turn predispose to foot ulceration.

- Lack of sensory sensation is a major component of DFU's and leads to patients being vulnerable to physical, chemical and thermal trauma.(7 fold increase in the risk of ulceration)

- Motor neuropathy causes foot deformity resulting in abnormal pressure distribution over bony prominences

- Autonomic neuropathy causes dry skin causing fissures and cracking which leads to infection.

Ischaemic

- People with Diabetes are twice as likely to have peripheral arterial disease as those without. Macro vascular disease usually involves atheroma leading to artery narrowing caused by chronic inflammation and injury to the arterial wall.

- It is a major cause of limb amputation in this patient group however it has been suggested that up to 85% can be avoided with an effective management plan. (Int Best practice guidelines 2013)

- Up to 50% of patients present with arterial disease as a contributory factor to their DFU.(Hinchcliffe et al 2012)

- Microvascular disease contributes to poor ulcer healing

Features of DFUs (Wounds International 2013)

Feature	Neuropathic	Ischaemic	Neuroischaemic
Sensation	Sensory loss	Painful	Degree of sensory loss
Callus / Necrosis	Thick callus	Necrosis	Minimal callus and some necrosis
Wound bed	Pink , granulating	Pale and sloughy	Poor tissue
Foot temperature Pulses	Warm , bounding pulses	Cool – absent pulses	Cool – absent pulses
Other	Dry skin	Delayed healing	High risk of infection
Location	Weight bearing areas	Tips of toes, between toes	Margins of foot and toes
Prevalence	35%	5%	50%

Assessment

- Assessment of the DFU must be holistic and include intrinsic and extrinsic factors.
- Take a full patient history.
- Determine wound history, previous history of DFU's, amputations / surgery.
- Identify if the ulcer has been caused by neuropathy, ischaemia or both.
- What are the wound characteristics? Use of T.I.M.E.*

*Schultz GS, Sibbald RG, Falanga V et al., Wound Rep Reg (2003);11:1-28 . Wound Bed Preparation and T.I.M.E. are clinical concepts supported by Smith & Nephew

Assessment – cont's

- Are there any deformities? High arch, clawed toes, muscle wasting of plantar arch, gait changes and Hallux vulgus.
- Is it infected?
- What is the depth?
- Is there exposed bone?
- What is the level of exudate? And it's viscosity?
- What is the status of the wound edge? Is there callus present?

Specific testing for DFU'S

Loss of sensation:

Monofilament – applied at various sites along the plantar aspect of the foot – positive result is the inability to feel the monofilament when pressed against the foot.

Tuning fork – Inability to sense vibration

Avoid testing in areas of Callus– may give a false positive result

Specific testing for DFU's cont'd

Vascular status:

- Palpation of foot pulses – has a degree of inter- rater variability – note that in 8% of patients a Dorsalis pedis pulse is absent ar in 2% a Posterior tibial is absent (Int. Best Practice Guidelines 2013)

- Doppler ultrasound – ABPI – Toe pressures – useful to support clinical assessment findings

Why do DFU's fail to heal?

- Wound healing relies on a cascade of events that is well orchestrated however in the DFU there are various intrinsic factors that delay this cascade.

- Sensory loss is a direct consequence of hyperglycaemia causing numbness, pins and needles and pain. This leads to repeated trauma.

- Neuropathy causes muscle weakness , atrophy and poor balance. The development of anatomical deformities leads to stress on the foot.

Cont'd

- Autonomic neuropathy occurs following nerve damage and manifests as dry skin, a lack of sweating, distended veins and fissure development. Reduced bone density and Charcot deformity also increases stress on the vulnerable foot.

- Patients with Diabetes have a greater risk of macro vascular disease especially at the distal end of the circulatory system. Poor blood increases risk of skin breakdown and wound healing.

- Microvascular disease reduces capillary size, thickens blood vessel membranes and altered migration of white blood cells increases infection risk.

Infection in the DFU

- Trauma, stress and compressive forces increase the risk of infection in the DFU.(Falanga 2005)

- They cause an overgrowth of bacteria, decrease in white blood cells and vascular abnormalities and in combination all of these increase infection risk.

- Infection can spread rapidly in the Diabetic foot and often signs and symptoms can be masked – evidence suggests up to 50% do not present with classic signs of infection (WUWHS 2016)

- Approx. 56% of DFU's will become infected.

Infection risk factors in the DFU

- DFU present for more than 30 days
- Probe to bone
- History of recurrent DFU's
- Traumatic foot wound
- Presence of arterial disease
- Previous amputation
- Loss of sensation
- Renal insufficiency
- Walking barefoot

(Lipsey et al 2012)

DFU or Pressure ulcer?

Controversial subject

- **DFU = wound on a Diabetic patient**
- **Pressure ulcer (PU) = wound from pressure**

- A podiatrist would treat a wound on a diabetic patient as a DFU whereas a nurse may treat or define as a PU!

- A DFU has multiple aetiologies

- A PU is predominantly caused by immobility and constant pressure

DFU or Pressure ulcer? Cont'd

- Edmonds (2006) suggests that the crucial difference between a DFU and a PU is the presence of ischaemia.
- However all patients with neuropathy and or neuro ischaemia are at risk of PU's.

Classification of DFU's

- Classification systems are useful to grade DFU's according to presence and extent of various physical characteristics such as depth, size , location and appearance.

- Wagner and Texas are 2 examples

- All of them have strengths and weaknesses with some including infection and some not. Some have clearer definitions for those staff not as experienced.

They should be used consistently across the health care team.

The University of Texas Classification System for Diabetic Foot Wounds

Management

- DFU's should be treated as early as possible to improve the chance of healing.

- Effective foot care should be a partnership between patients, carers and HCP's

There are 4 main management objectives:

1. Treat the underlying disease process
2. Ensure adequate blood supply
3. Undertake local wound care including infection prevention
4. Off load the pressure

Treating the underlying cause

- Treat severe ischaemia – refer to vascular surgeon for consideration of arterial reconstruction
- Aim to achieve optimal Diabetic control and manage risk factors such as high BP, hyperlipidaemia and smoking.
- Address physical causes of trauma – footwear, foreign bodies.

Wound care

- The focus should be on radical and repeated debridement, bacterial control and moisture balance. (EWMA 2004)
- Pain management at dressing change is an important consideration
- Use the T.I.M.E.* framework to prepare the wound bed
- Sharp debridement is the gold standard
- Use of a monofilament pad - NICE recommended
- Removal of Biofilm must be addressed.

*Schultz GS, Sibbald RG, Falanga V et al., Wound Rep Reg (2003);11:1-28 . Wound Bed Preparation and T.I.M.E. are clinical concepts supported by Smith & Nephew

Wound Care – Cont'd

- All infected wounds require antibiotics +/- topical antimicrobials. Infection in a neuro ischaemic foot is more serious because of reduced blood supply.
- Achieving a moisture balance reduces risk of maceration
- Choose wound dressings that will stay in place, easy to remove without trauma and minimise pain.
- Dressings on a DFU should not be left in situ for more than 5 days especially if infection has not been fully addressed.

Multi disciplinary team working

- Evidence strongly highlights benefits of MDT involvement in the management of DFU's. *(Chrishnan 2008)* Using an integrated foot care pathway ensures the right treatment at the right time and reduces amputation rates.

- The challenge however is the provision of and access to MDT's that provide effective care for the patients with a DFU.

- In the UK there is a move towards a core team of Diabetes podiatrists, Medical speciality Dr's, Vascular surgeons, Orthopaedic surgeons, Orthotists.

- Access to 'Hot foot' clinics for urgent review

Foot care and pressure offloading

- Patient education should be an integral part of managing a patient with Diabetes.
- A Cochrane review in 2012 found insufficient evidence however that education alone without preventative measures effectively reduced the occurrence of DFU's.
- Off loading pressure of the at risk areas is important in the neuropathic foot in order to redistribute pressure evenly.
- The use of a total contact cast in patients with a unilateral DFU can reduce healing times by 6 weeks.
- Removable devices can be more practical however lack of concordance can affect outcomes.
- Footwear should be examined at every review

Using NPWT in DFU's

- NPWT is felt to improve dermal blood flow, reduce oedema, reduce bacteria, enhance wound contraction and size reduction especially after surgical debridement in a DFU.

- NWPT has also been found to be superior to conventional dressings in producing granulation tissue through encouraging angiogenesis, growth factors and endothelial cells.

Using NPWT in DFU's – cont'd

- Caution is required in selection of NPWT in patients with ischaemia where lower pressures may be required.

- In patients with deep infection this should be controlled/ removed prior to application.

PICO™ and DFU's

- The PICO NPWT system is a canister free single use negative pressure therapy. It has a life span of 7 days[1]

- The PICO pump maintains NPWT at 80mmHg (nominal) to the wound surface. Exudate is managed by the dressing through a combination of absorption and evaporation of moisture through the outer film.

- On average, the two dressings within a PICO kit can handle up to 300mls of exudate.

1. Report reference DAL-055-10-0067 – Software End of Life Timing Analysis

Evidence to support use of NPWT

- Overall the evidence to support the use of NPWT in chronic wounds is weak however it's use in DFU's has been found to have some benefit pre and post amputation. *(Cochrane 2013)*

- It has been shown that PICO™ increases the blood flow[1] and stimulates the development of granulation tissue[2-5] leading to improved healing rates with decreased nursing time.

- It is important to ensure that this therapy is initiated by specialist practitioners who are fully aware of the indications and appropriateness of it's use in this patient group.

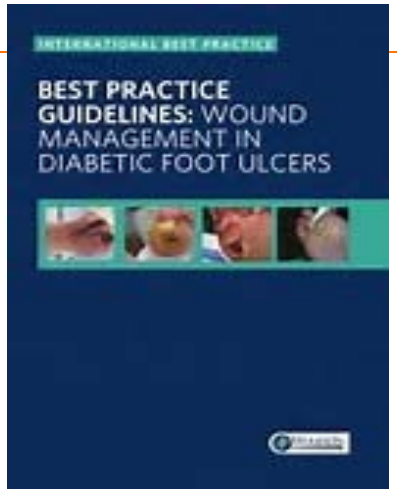
1. Malmsjo, M; Huddleston, E; Martin, R; Biological Effects of a Disposable, Canisterless Negative Pressure Wound Therapy System; Eplasty 2014. 2. Malamsjo et al., The effects of variable, intermittent and continuous negative pressure wound therapy, using foam or gauze, on wound contraction granulation tissue formulation, and ingrowth into the wound filler; Eplasty Jan 2012. 3. Dunn et al. – 2011 – Factors associated with positive outcomes in 131 patients treated with gauze-based negative pressure wound therapy. 25. Young,s; Hampton, Sylvie; Martin, R; Non-invasive assessment of negative pressure wound therapy using high frequenct diagnostic ultrasound: odeman reduction and new tissue accumulation; International Wound Journal 2012 5. Chan et al., The role of RENASYS-GO in the treatment of diabetic lower limb ulcers; a case series; Diabetic Foot and Ankle Nov 2014

Summary:

- Success outcomes when managing patients with DFU's relies on accurate diagnosis and treatment regimes based on a holistic approach and expert MDT involvement.

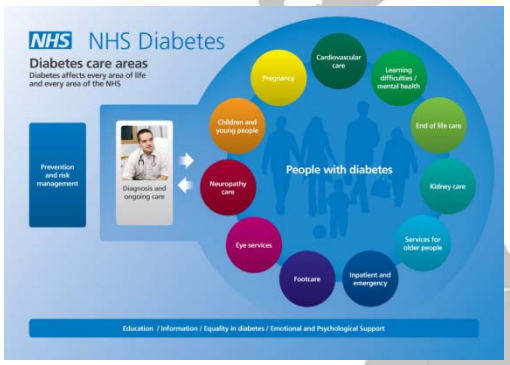
- Optimising Diabetic control, providing effective wound care, recognising and treating infection, ensuring effective pressure prevention and restoration of blood flow are the key management strategies that need to be employed


Diabetes UK is the new name of the British Diabetic Association
Diabetes UK
The charity for people with diabetes


INTERNATIONAL BEST PRACTICE
BEST PRACTICE GUIDELINES: WOUND MANAGEMENT IN DIABETIC FOOT ULCERS


DIABETES UK
CARE. CONNECT. CAMPAIGN.
10 STEPS
10 STEPS
TO HEALTHY FEET
FOR PEOPLE WITH DIABETES


Diabetes
15 HEALTHCARE ESSENTIALS
There's a minimum level of healthcare everyone with diabetes should receive:
DIABETES UK
CARE. CONNECT. CAMPAIGN.
At least once a year
1 Your blood glucose levels measured
2 Your blood pressure measured and recorded
3 Your blood fats cholesterol measured
4 Your eyes screened for signs of retinopathy
5 Your feet checked
6 Your kidney function monitored
7 Your weight checked and your waist measured
8 If you smoke, support to help you quit
9 A care planning review to discuss and agree goals between you and your healthcare team
10 Access to a local diabetes education course
11 If you are a child or young person, care from specialist diabetes paediatric healthcare professionals
12 Continuing high-quality diabetes care when you're in hospital
13 If you're a woman who is planning to have a baby, high-quality support from specialist diabetes healthcare professionals from preconception through to post-natal care
14 Help from specialist diabetes healthcare professionals to manage your diabetes
15 Emotional and psychological support


NHS NHS Diabetes
Diabetes care areas
Diabetes affects every area of life and every area of the NHS
Pregnancy
Cardiovascular care
Learning difficulties / mental health
Children and young people
End of life care
Prevention and risk management
Diagnosis and ongoing care
People with diabetes
Neuropathy care
Kidney care
Eye services
Services for older people
Footcare
Inpatient and emergency
Education / Information / Equality in diabetes / Emotional and Psychological Support

Useful References

- Foot care for people with Diabetes pathway. Managing a diabetic foot problem. NICE pathways 2017. www.nice.org.uk
- Improving foot care for people with Diabetes and saving money. An economic study in England. Diabetes UK 2017
- Best practice guidelines: Wound management in Diabetic foot ulcers. Wounds International 2013

How many people with diabetes develop a foot ulcer?

00

1 – 1:20

2 - 1:50

3 – Less than 1:20

Diabetes UK (2012) Diabetes in the UK. A position report. Available at: https://www.diabetes.org.uk/professionals/position-statements-reports/statistics/diabetes-in-the-uk-2012

How many people with diabetes develop a foot ulcer?

1 – 1:20 | 0%

2 – 1:50 | 0%

3 – Less than 1:20 | 0%

Diabetes UK (2012) Diabetes in the UK. A position report. Available at: https://www.diabetes.org.uk/professionals/position-statements-reports/statistics/diabetes-in-the-uk-2012

Neuropathy is one of the main causes of DFU's. What is the other one?

00

1 - Lack of sensation

2 - Ischaemia / poor blood flow

3 - Lack of feeling in the foot

Edmonds M (2006) Diabetic foot ulcers. BMJ, 332–407

Neuropathy is one of the main causes of DFU's. What is the other one?

1 - Lack of sensation | 0%

2 - Ischaemia / poor blood flow | 0%

3 - Lack of feeling in the foot | 0%

Edmonds M (2006) Diabetic foot ulcers. BMJ, 332–407

There are 4 main management objectives:

00

Treat the underlying disease process, ensure adequate blood supply, undertake local wound care. What is the 4th objective?

1 - Ensure the patient understands their condition

2 - Off load the pressure

3 - Ensure adequate nutrition

McIntosh C (2017) Impaired wound healing in the diabetic foot. Wound Essentials; 12 (1)

There are 4 main management objectives:

Treat the underlying disease process, ensure adequate blood supply, undertake local wound care. What is the 4th objective:

1 - Ensure the patient understands their condition | 0%

2 - Off load the pressure | 0%

3 - Ensure adequate nutrition | 0%

McIntosh C (2017) Impaired wound healing in the diabetic foot. Wound Essentials; 12 (1)