The Foot in Diabetes.

Natalie Bennett
Community Diabetes Lead Podiatrist
SWYPFT
Barnsley Podiatry Services
natalie.bennett@swyt.nhs.uk

Diabetic Foot Ulceration ‘A Foot Attack?’

- Time
- Mortality rate greater than many cancers. (Young 2013) Patients with foot ulcers twice as likely to die than those without (Brownrigg et al, 2012)
- Mortality rates from diabetic foot ulceration: (Morbach et al 2012) @5 years 45.8%, @ 10 years 70.4%. Age, renal function and PAD significantly increase risk of amputation and death.

The statistics.

- 2.5% of people with diabetes have a foot ulcer at any given time.
- ‘85% of lower extremity amputations in people with diabetes are preceded by chronic, non-healing foot ulcers’ (Kastenbauer et al. 2001)
- 1 pound of every £150 of NHS spend is on foot ulceration or amputation each year.
- The number of people diagnosed with diabetes increased by 25% between 2006-2011
- Locally - The number of people diagnosed with diabetes on an annual basis is significantly higher than the England average.

Barnsley CCG footcare activity between April 2010 and March 2014 (yhpho)

- Episodes of care in hospital for diabetic foot disease per 1000 people
- Number of days in hospital for diabetic foot disease per 1000 people.
- % episodes of care with more than 1 inpatient stay
- % patients more than four episodes of care for diabetic foot disease within 3 years.
- Major amputations per 1000 people 17+ with diabetes
- Minor amputations per 1000 people 17+ with diabetes
- Amputations per 1000 people 17+ with diabetes.
- Number of days in hospital for amputations per 1000 people 17+ with diabetes.

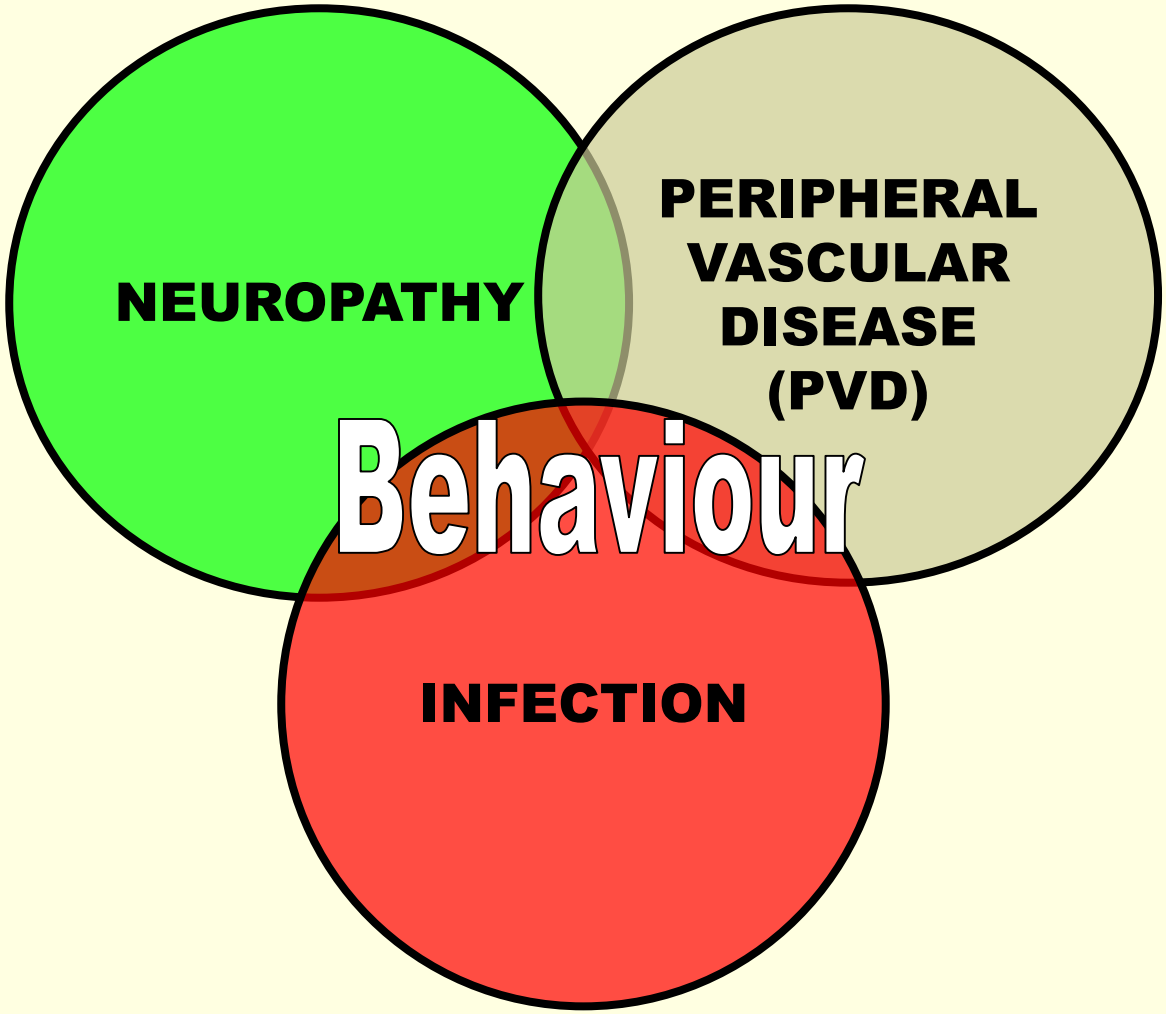
RED = significantly higher than England Value

AMBER = No significant difference from england value

GREEN = Significantly lower than England value

ULCER DEVELOPMENT

KEY RISKS



Neuropathy

‘Symptoms and/or signs or peripheral nerve dysfunction in people with diabetes after exclusion of other causes ADA’

- PERIPHERAL SENSORY NEUROPATHY
- MOTOR NEUROPATHY
- AUTONOMIC NEUROPATHY
- PAINFUL NEUROPATHY

PERIPHERAL SENSORY NEUROPATHY

Loss of "protective pain" sensation – *harm without hurt*

MOTOR NEUROPATHY

AUTONOMIC NEUROPATHY

Arterio-Venous Shunting

Prevention/ Management:

- Education = Prevention
  - Foot check
  - Foot wear
  - Foot care.
- Management of risk factors:
  - Diabetes control
  - Blood pressure control
  - Smoking/alcohol consumption/weight management
- Refer to Podiatry for increased risk foot protection

Diabetic Peripheral Neuropathic Pain

- ?underdiagnosed and undertreated.
- Reduced quality of life.
- Affects16-26% of people with diabetes (Tesfaye 2010).

- Pain- often described as burning, shooting, stabbing,deep aches, freezing or like an electric shock
- Is usually symmetrical
- The pain can be spontaneous,
- Can be intermittent or continuous
- Often worse at night causing sleep depravation
- Can be exacerbated by external stimuli e.g. clothing or bed sheets.
- **For pharmacological management refer to NICE Clinical Guideline 173.**

Peripheral Arterial Disease

Key Facts:

- Vascular disease is the main cause of death and disability in England and the major cause of premature mortality in Barnsley.
- Those persons with lower limb arterial disease are at greatest risk of systemic vascular disease (Heart attack, stroke, amputation)
- Those with foot ulceration and advanced peripheral arterial disease have poorest outcomes.
- 20% of people over 60 have PAD
- Increases with diabetes, smoking, poor diet. (high in Barnsley)

Evidence of Peripheral arterial disease.

- Monophasic/ absent foot pulses.
- Colour, temperature, trophic changes
- Claudication/rest pain
- Examine for wounds/discolouration.
- ABPI ?reliability in diabetes.

Prevention/Management. (Refer to NICE Clinical Guideline 147)

- Risk Factors:
  - Raised lipid levels.
  - Raised BP.
  - Smoking.
  - Diabetes control

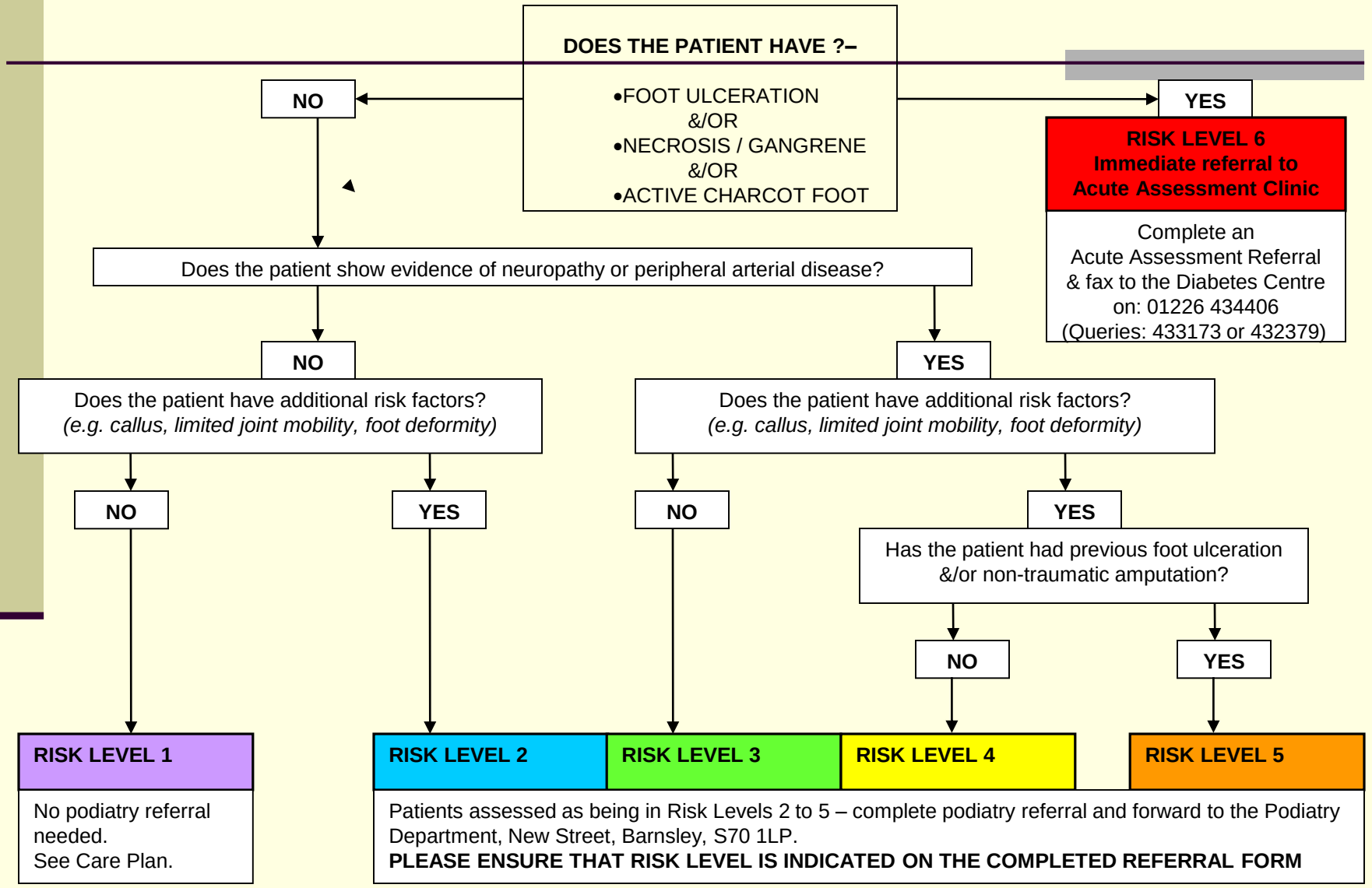
  - Address claudication pain
  - Refer to Podiatry for increased risk foot protection.
  - Refer onto vascular urgently if critically ischeamic, deteriorating or has ulceration/necrosis.

Annual Foot Screening – Risk stratification.

- **Low Current risk**- Normal sensation and palpable pulses. (Educate, address risk factors and continue with annual screen).
- **Moderate risk** – Neuropathy or absent foot pulses or other risk factor (Educate, address risk factors and refer to podiatry team).
- **High risk** – Previous ulceration/amputation – optimise medical management, - should already be under care of podiatry. If not refer to podiatry.
- **Foot Emergency/ Foot attack!**– Ulceration, Necrosis, suspected osteomyelitis, suspected Charcot. – Refer within 24 hours to diabetic foot clinic @ BDGH. Currently via Fax:

01226 434406

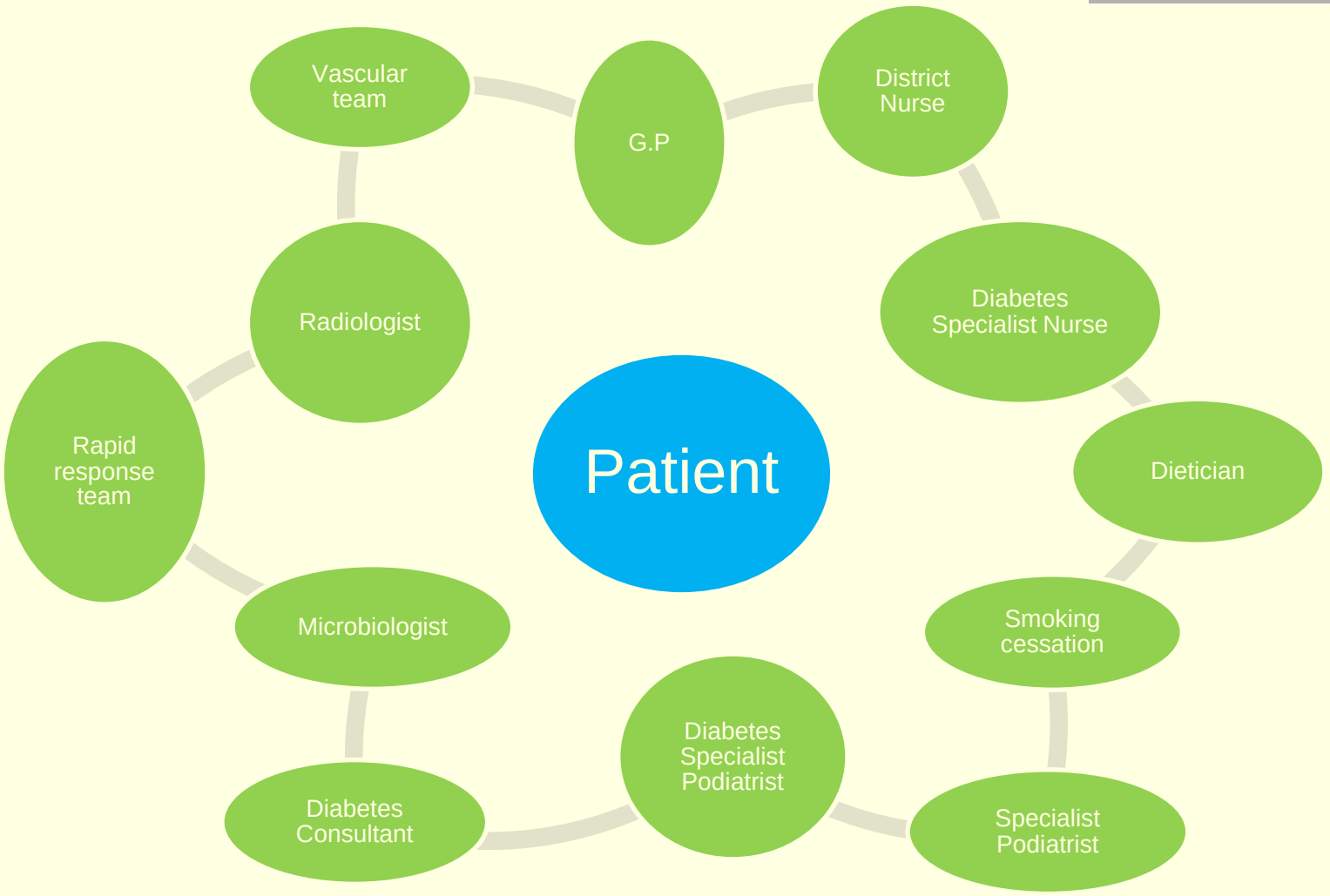
Diabetes footcare referral pathway



The Integrated Foot Protection Team

- ‘Provides a seamless service and smooth transition of patients across services to ensure care is provided in the right place at the right time by the right person.’
- Each team member has an important role to play in the prevention and management of diabetic foot problems at various stages of the disease process.

The Foot Protection Team



Diabetic foot ulceration

Neuropathic Foot ulceration

- Painless
- Heavy surrounding callus
- Plantar sites subject to weight-bearing stresses due to pes cavus type deformity.
- Warm, well perfused foot.

Neuropathic foot ulceration


30/07/2009

Ischemic Foot ulceration

- Painful.
- Punched out appearance.
- Minimal peripheral callus (Halo).
- Sloughy, poorly perfused wound bed.
- Cool, dusky pink foot, monophasic/absent pulses.
- Edges of the foot including apices of the toes subject to trauma from footwear

Ischemic Foot Ulceration

- Most ulcers have some extent of both components


03/08/2009


13/08/2009


13/08/2009

Management of diabetic foot ulceration requires the skills of various health professionals to:

- Optimise medical management – diabetes control and cardiovascular risk factors.
- Vascular investigation/ management
- Microbiological control
- Wound management
- Debridement (if appropriate)
- Offloading devices
- Appropriate Dressing selection
- Arrange follow up care

Debridement

Important

- Aggressive debridement in neuropathic ulcers
- Minimal debridement in neuroischemic

ADVANTAGES

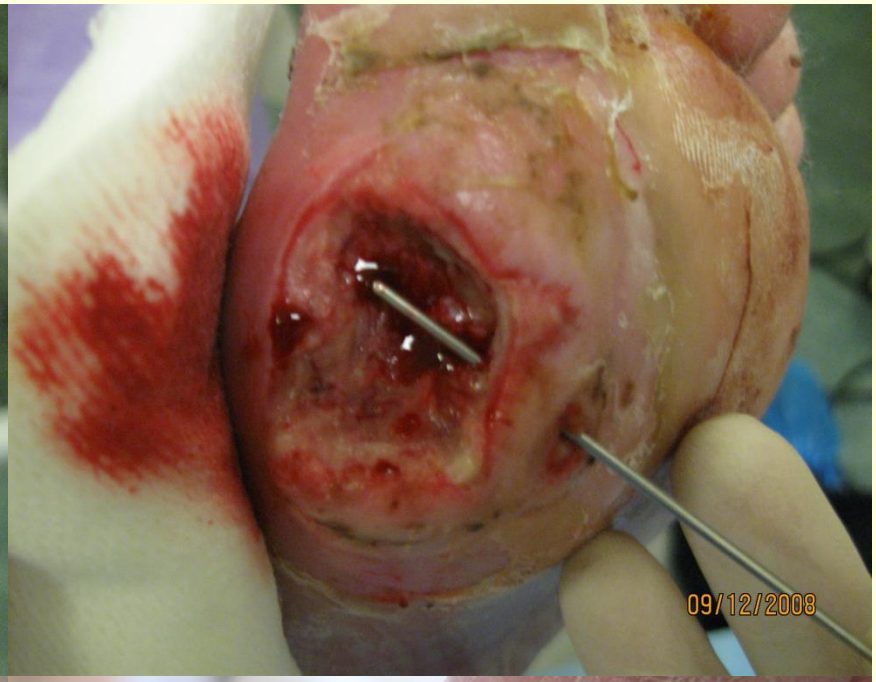
1. Removal of necrotic & devitalising tissue containing a reservoir of bacteria reduces infection risk
2. Aids the assessment of depth and severity of ulcer - allows bony involvement to be identified?
3. Debridement leading to bleeding results in increased growth factors to be released.
4. Reduces pressure around the periphery of the ulcer therefore encouraging closure
5. Allows for deeper more accurate swabbing

Sharp Debridement

Sharp Debridement

Versajet Debridement


09/12/2008


09/12/2008


02/02/2009


26/03/2009

- Thick sloughy infected wound
- Green exudate:

pseudomonas infection

Post Debridement:

- Cleaner wound
- Bone revealed: confirming osteomyelitis

NEUROARTHROPATHY *(CHARCOT FOOT)*

- Typical age of onset 50-60 years
- Prevalence 1 - 2.5%
- Progressive destructive joint disease
- 80% of cases >10 years duration diabetes
- Usually unilateral (9 – 35% of cases bilateral)

- PREDISPOSING FACTORS
  - Autonomic neuropathy
  - Motor neuropathy
  - Trauma to foot
  - Long duration of diabetes

Stages of Neuroarthropathy

- **Acute Inflammatory (crucial stage for preventing deformity)**
  - Erythema, oedema, warm foot
  - DD – DVT, GOUT, CELLULITIS
  - May feel pain (Resembling neuropathic pain)
  - X-ray normal, no break in skin
  - Often associated with trauma

Suspect Charcot and refer on:

- Evidence of sensory neuropathy
- Hot, swollen foot
- May/maynot be painful

Management of Charcot

- Diabetes Control
- Blood pressure control
- Reduction of alcohol
- Below knee total contact cast and non weight bearing.

Chronic Charcot

- Fragments fuse, re-stabilization of foot
  - Stable but deformed foot

Increased Risk of ulceration due to altered pressure sites.

Poor outcome of Charcot Neuroarthropathy.

Ulceration and necrosis following Charcot.

Case 1

- Male age 46
- Metabolic syndrome
- H/O Pancreatitis
- Hyperlipidaemia
- Diabetic maculopathy
- BMI 29 from 44 following gastric bypass and cholecystectomy January 2009.
- Diabetes mellitus previously treated with insulin, now on Metformin.
- Recent HbA1C 7.3%
- Meds: Multivitamin, Metformin, Atorvaststin, Aspirin.

History of foot Conditions

- Significant sensory neuropathy.
- All pedal pulses palpable (bi/triphasic with doppler)
- Previous history of diabetic Foot ulceration.
- Recent resolution of charcot neuroarthropathy to the right foot.

Patient self referred after holiday abroad had noticed toe discharging and discoloured with malodour present. Elevated blood sugars and feeling ‘unwell’.

Presentation @ foot clinic (Post sharp debridement)

- Cellulitic, sausage shaped toe with apical sloughy ulceration probing to bone.

Flip Flop Sign?

Management:

- Bloods: Raised ESR and CRP
- Xray: No definite evidence of osteomyelitis. (Probe to bone = highly suspicious and early changes may not be evident on plain film Xray (Armstrong et al 2007).
  - ununited fracture at the base of the second metatarsal characteristic of charcot osteoarthropathy.

- **Infection Management**
- Swab: Staphylococcus aureus and Beta-haemolytic streptococcus.
- Admission for I.V Flucloxacillin 1g, Benzypenicillin 1.2g and metronidazole 500mg. Able to be discharged home after 3 days with rapid response.
- Vascular referral for possible digital amputation.

Debridement of necrotic/sloughy tissue:

- Reduce bacterial load
- Produce an acute wound
- Promote healing

Pressure relief

- Offloading needed to address ulceration and Charcot neuroarthropathy:
  - Total contact cast contraindicated due to osteomyelitis.
  - DH walker used

2 weeks post first presentation:

- Cellulitis reduced.
- Ulcer has reduced in depth and size.

Case 2.

- Male aged 66
- Type I diabetes 30 years. HbA1c 8.1
- H/O Excessive alcohol consumption
- Hypertension
- Depression
- Reflux oesophagitis
- Registered partially sighted
- Bilateral cataract
- Epilepsy

Medications

- Novorapid 8,8,8
- Glargine 20 Units
- Phenytoin 100mg bd
- Aspirin 75mg od
- Ramipril 10mg od
- Lansoprazole
- Thiamine

History of foot problems

- Extensive sensory neuropathy.
- Good foot pulses
- History of numerous diabetic foot ulceration.
- Previous Trans metatarsal head amputation left foot.

Presentation: Burn from wheat bag right lateral malleolous.

Management

- Patient already taking Flucloxacillin and co-amoxiclav antibiotic.
- Bloods
- Swab taken
- Antimicrobial dressings
- Referral to plastics for possible skin graft

1 week later

- Patient feeling unwell (flu like symptoms).
- Increased blood sugars
- Spreading cellulitis
- Previous swab result = Viriden streptococcus
- Previous CRP slightly elevated (45)

Management

- Reswabed
- Bloods retaken = CRP increased to 153.5
- X ray = Suspicious of osteomyelitis
- Admission for I.V Benzypenicillin, flucloxacillin, Mteronidazole discharged with rapid response 1 day.
- After 16 weeks changed to I.V Teicoplanin due to elevated LFT’s

8 days later

- Cellulitis reduced, Feeling well
- large Sloughy ulceration

Post debridement

- Removal of adherent, sloughy tissue revealed infected lateral malleolous. (Osteomyelitic bone sample = Stapylococcus aureus)

Post skin Graft

- Dense sloughy area over infected malleolous unable to take.

- Pre and post debridement

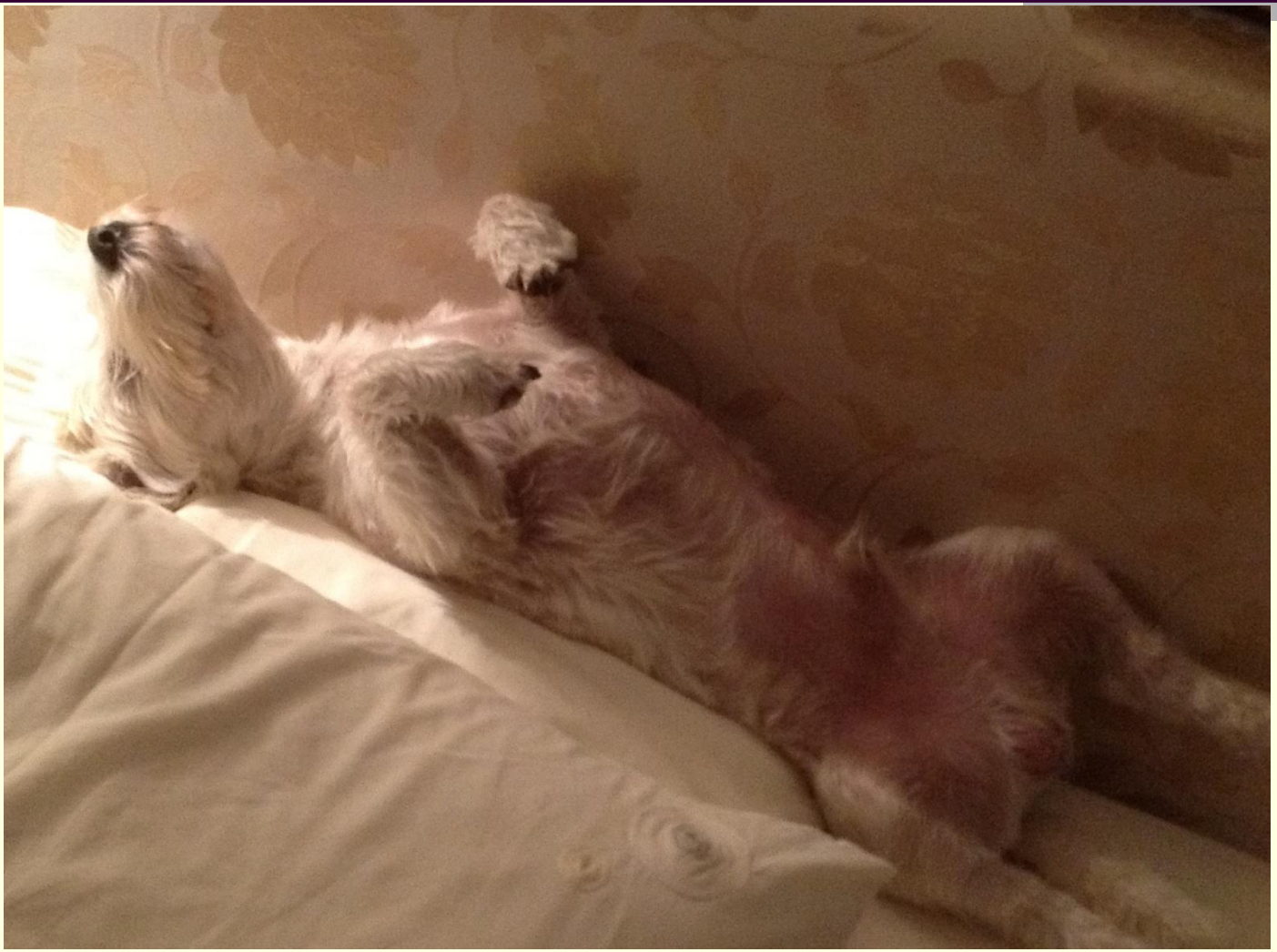
8 weeks later

16 weeks later

Versajet Debridement

12 weeks post debridement

THE END



Contacts

Sarah- May Poppleton Diabetes Lead Podiatrist BHNFT: 01226 432379

Natalie Bennett Community Diabetes Lead Podiatrist. New Street Health Centre:

01226 433173

Email: natalie.bennett@swyt.nhs.uk