Peripheral artery disease

**Diagnosis**

1. Examine a patient with diabetes annually for the presence of peripheral artery disease (PAD); this should include, at a minimum, taking a history and palpating foot pulses. (GRADE recommendation: strong; Quality of evidence: low)

2. Evaluate a patient with diabetes and a foot ulcer for the presence of PAD. Determine, as part of this examination, ankle or pedal Doppler arterial waveforms; measure both ankle systolic pressure and systolic ankle brachial index (ABI). (Strong; Low)

3. We recommend the use of bedside non-invasive tests to exclude PAD. No single modality has been shown to be optimal. Measuring ABI (with <0.9 considered abnormal) is useful for the detection of PAD. Tests that largely exclude PAD are the presence of ABI 0.9-1.3, toe brachial index (TBI) ≥0.75 and the presence of triphasic pedal Doppler arterial waveforms. (Strong; Low)

**Prognosis**

4. In patients with a foot ulcer in diabetes and PAD, no specific symptoms or signs of PAD reliably predict healing of the ulcer. However, one of the following simple bedside tests should be used to inform the patient and healthcare professional about the healing potential of the ulcer. Any of the following findings increases the pre-test probability of healing by at least 25%: a skin perfusion pressure ≥40mmHg; a toe pressure ≥30mmHg; or, a TcPO2 ≥25 mmHg. (Strong; Moderate)

5. Consider urgent vascular imaging and revascularisation in patients with a foot ulcer in diabetes where the toe pressure is <30mmHg or the TcPO2 <25 mmHg. (Strong; Low)

6. Consider vascular imaging and revascularisation in all patients with a foot ulcer in diabetes and PAD, irrespective of the results of bedside tests, when the ulcer does not improve within 6 weeks despite optimal management. (Strong; Low)

7. Diabetic microangiopathy should not be considered to be the cause of poor wound healing in patients with a foot ulcer. (Strong; Low)

8. In patients with a non-healing ulcer with either an ankle pressure <50mm Hg or ABI <0.5 consider urgent vascular imaging and revascularisation. (Strong; Moderate)

**Treatment**

9. Colour Doppler ultrasound, CT-angiography, MR-angiography or intra-arterial digital subtraction angiography can each be used to obtain anatomical information when revascularisation is being considered. The entire lower extremity arterial circulation should be evaluated, with detailed visualization of below-the-knee and pedal arteries. (Strong; Low)

10. The aim of revascularisation is to restore direct flow to at least one of the foot arteries, preferably the artery that supplies the anatomical region of the wound, with the aim of achieving a minimum skin perfusion pressure ≥40mmHg; a toe pressure ≥30mmHg; or, a TcPO2 ≥25 mmHg (Strong; Low)

11. A centre treating patients with a foot ulcer in diabetes should have the expertise in and rapid access to facilities necessary to diagnose and treat PAD; both endovascular techniques and bypass surgery should be available. (Strong; Low)

12. There is inadequate evidence to establish which revascularisation technique is superior and decisions should be made in a multidisciplinary team on a number of individual factors, such as morphological distribution of PAD, availability of autogenous vein, patient co-morbidities and local expertise. (Strong; Low)

13. After a revascularisation procedure for a foot ulcer in diabetes, the patient should be treated by a multidisciplinary team as part of a comprehensive care plan. (Strong; Low)

14. Patients with signs of PAD and a foot infection are at particularly high risk for major limb amputation and require emergency treatment. (Strong; Moderate)

15. Avoid revascularisation in patients in whom, from the patient perspective, the risk-benefit ratio for the probability of success is unfavourable. (Strong; Low)
16. All patients with diabetes and an ischemic foot ulcer should receive aggressive cardiovascular risk management including support for cessation of smoking, treatment of hypertension and prescription of a statin as well as low-dose aspirin or clopidogrel. (Strong; Low)

**Foot infection**

*Classification / diagnosis*

1. Diabetic foot infection must be diagnosed clinically, based on the presence of local or systemic signs or symptoms of inflammation (Strong; Low).
2. Assess the severity of any diabetic foot infection using the Infectious Diseases Society of America/International Working Group on the Diabetic Foot classification scheme (Strong; Moderate)

**Osteomyelitis**

3. For an infected open wound, perform a probe-to-bone test; in a patient at low risk for osteomyelitis a negative test largely rules out the diagnosis, while in a high risk patient a positive test is largely diagnostic (Strong; High)
4. Markedly elevated serum inflammatory markers, especially erythrocyte sedimentation rate, are suggestive of osteomyelitis in suspected cases (Weak; Moderate)
5. A definite diagnosis of bone infection usually requires positive results on microbiological (and, optimally, histological) and examinations of an aseptically obtained bone sample, but this is usually required only when the diagnosis is in doubt or determining the causative pathogen’s antibiotic susceptibility is crucial (Strong; Moderate)
6. A probable diagnosis of bone infection is reasonable if there are positive results on a combination of diagnostic tests, such as probe-to-bone, serum inflammatory markers, plain X-ray, MRI or radionuclide scanning (Strong; Weak)
7. Avoid using results of soft tissue or sinus tract specimens for selecting antibiotic therapy for osteomyelitis as they do not accurately reflect bone culture results (Strong; Moderate)
8. Obtain plain X-rays of the foot in all cases of non-superficial diabetic foot infection. (Strong; Low)
9. Use MRI when an advanced imaging test is needed for diagnosing diabetic foot osteomyelitis (Strong; Moderate)
10. When MRI is not available or contraindicated, consider a white blood cell-labelled radionuclide scan, or possibly SPECT/CT or 18 F- FDG PET/CT scans (Weak; Moderate)

**Assessing severity**

11. At initial evaluation of any infected foot, obtain vital signs and appropriate blood tests, debride the wound, probe and assess the depth and extent of the infection to establish its severity (Strong; Moderate)
12. At initial evaluation assess arterial perfusion and decide whether and when further vascular assessment or revascularization is needed (Strong; Low)

**Microbiological considerations**

13. Obtain cultures, preferably of a tissue specimen rather than a swab, of infected wounds to determine the causative microorganisms and their antibiotic sensitivity (Strong; High)
14. Do not obtain repeat cultures unless the patient is not clinically responding to treatment, or occasionally for infection control surveillance of resistant pathogens (Strong; Low)
15. Send collected specimens to the microbiology laboratory promptly, in sterile transport containers, accompanied by clinical information on the type of specimen and location of the wound (Strong; Low)

**Surgical treatment**

16. Consult a surgical specialist in selected cases of moderate, and all cases of severe, DFI (Weak; Low)
17. Perform urgent surgical interventions in cases of deep abscesses, compartment syndrome and virtually all necrotizing soft tissue infections (Strong; Low)
18. Consider surgical intervention in cases of osteomyelitis accompanied by: spreading soft tissue infection; destroyed soft tissue envelope; progressive bone destruction on X-ray, or bone protruding through the ulcer (Strong; Low)

**Antimicrobial therapy**

19. While virtually all clinically infected diabetic foot wounds require antimicrobial therapy do not treat clinically uninfected wounds with antimicrobial therapy (Strong; Low)

20. Select specific antibiotic agents for treatment based on the likely or proven causative pathogens, their antibiotic susceptibilities, the clinical severity of the infection, evidence of efficacy of the agent for DFI and costs (Strong; Moderate)

21. A course of antibiotic therapy of 1-2 weeks is usually adequate for most mild and moderate infections (Strong; High)

22. Administer parenteral therapy initially for most severe infections and some moderate infections, with a switch to oral therapy when the infection is responding (Strong; Low)

23. Do not select a specific type of dressing for a diabetic foot infection with the aim of preventing an infection or improving its outcome (Strong; High)

24. For diabetic foot osteomyelitis we recommend 6 weeks of antibiotic therapy for patients who do not undergo resection of infected bone and no more than a week of antibiotic treatment if all infected bone is resected. (Strong; Moderate)

25. We suggest not using any adjunctive treatments for diabetic foot infection. (Weak; Low)

26. When treating a diabetic foot infection, assess for use of traditional remedies, previous antibiotic use, and consider local bacterial pathogens and their susceptibility profile. (Strong; Low)