DIABETIC FOOT

The complications of longstanding diabetes mellitus often appear in the foot, causing chronic disability.
More than 30 per cent of patients attending diabetic clinics have evidence of peripheral neuropathy or vascular disease and about 40 per cent of non-trauma related amputations for complications of diabetes.

Epidemiology :

-15% of those with diabetes will, develop an ulcer.
-15% of patients develop osteomyelitis& 15% amputation .
-80% of foot ulcers are precipitated by external trauma.
-20% of diabetics admitted to hospitals because of foot problems.

Cellulitis occurs 10 times more frequently in diabetics.
Osteomyelitis of the foot 15 times more frequently in diabetics than non-diabetics.
Diabetic patients are 15 times at risk of Bellow Knee Amputation.
Nearly half of non-traumatic Lower Limb Amputation caused by diabetes.
70% of lower limb amputations (LLA) , begin with a foot ulcer ~50% of diabetics with LLA require 2nd LLA within 5 years.
5 year survival rate ~50% after Below Knee Amputation .

NATURAL HISTORY OF DIABETIC FOOT

It's unwise to consider that major diabetic foot problem occur all of sudden, there is (high risk foot) which means ,there are :

1-Predisposing factors (Neuro-and angiopathy)
2-Precipitating factors (Trauma and tinea)
3-Perpetuating factors (Pt's factors & delay healing)

WHAT'S THE HIGH RISK FOOT ?

Long duration and uncontrolled D.M …Plus one or more:

-Peripheral neuropathy
-Peripheral vascular disease
-Trauma
-Previous ulcers

-Diabetic nephropathy or retinopathy
-Obesity
-Lack of education
-Male gender ??!!

Factors affecting the foot are:
(1) a predisposition to peripheral vascular disease.
(2) damage to peripheral nerves.
(3) reduced resistance to infection.

(4) osteoporosis.

Peripheral vascular disease:

Atherosclerosis affects mainly the medium-sized vessels below the knee. The patient may complain of claudication or ischemic changes and ulceration in the foot.

The skin feels smooth and cold, the nails show trophic changes and the pulses are weak or absent .
Doppler studies should corroborate the clinical findings. Superficial ulceration occurs on the toes , deep ulceration typically under the heel; unlike neuropathic ulcers, these are painful and tender .
Digital vessel occlusion may cause dry gangrene of one or more toes; proximal vascular occlusion is less common but more serious, sometimes resulting in extensive wet gangrene.

Peripheral neuropathy:
Early on, patients are usually unaware of the abnormality but clinical tests will discover loss of vibration and joint position sense and diminished temperature discrimination in the feet. Symptoms , when they occur, are mainly due to sensor impairment. symmetrical numbness and paraesthesia , dryness and blistering of the skin, superficial burns and skin cracks or ulceration due to shoe scuffing or localized pressure.
Motor loss usually manifests as claw toes with high arches and this, in turn, may predispose to plantar ulceration

Neuropathic joint disease ;(Charcot joints '):

It occur in less than 1 per cent of diabetic patients, yet diabetes is the commonest cause of a neuropathic joint in Europe and America (leprosy and tertiary syphilis being the other common causes worldwide). The mid tarsal joints are the most commonly affected,

followed by the(metatarso phalyngeal joint) MTP and ankle joints. There is usually a provocative incident , such as a twisting injury or a fracture, following which the joint collapses relatively painlessly.

X-rays show marked and fairly rapid destruction of the articular surfaces. These changes are easily mistaken for infection but the simultaneous involvement of several small joints and the lack of systemic signs point to a neuropathic disorder. Joint aspiration and micro biological investigation will also help to exclude infection .

In late cases there may be severe deformity and loss of function. A rocker bottom deformity from collapse of the midfoot is diagnostic.

Osteoporosis:

There is a generalized loss of bone density in diabetes. In the foot the changes may be severe enough to result in insufficiency fractures around the ankle or in the metatarsals.

Infection:

Diabetes , if not controlled, is known to have a deleterious effect on white cell function. This, combined with local ischaemia , insensitivity to skin injury and localized pressure due to deformity, make sepsis an ever recurring hazard.

CLASSIFICATION OF DIABETIC FOOT ULCER:

Wagner Grading System :

Grade 0 skin intact but " foot at risk".
Grade 1 : Superficial Diabetic Ulcer & localized .
Grade 2 : Deep ulcer & extension Involves ligament, tendon, joint capsule or fascia ,No abscess or Osteomyelitis .
Grade 3 : Deep ulcer with abscess or Osteomyelitis.
Grade 4 : Gangrene to portion of forefoot .
Grade 5 : Extensive gangrene of entire foot.

Examination and investigations for
- early signs of neuropathy should include the (testing for skin sensibility) and (testing for vibration sense).
-Peripheral vascular examination is enhanced by using a Doppler ultrasound probe.

-Ulcers must be swabbed for infecting organisms; frequently, multiple bacterial types are isolated anaerobes make a regular appearance).
- X ray examination may reveal periosteal reactions, osteoporosis, cortical defects near the articular margins and osteolysis often collectively described as diabetic osteopathy.

Management :
The orthopaedic surgeon will usually be one member of a multidisciplinary team comprising a physician (or endocrinologist), surgeon, chiropodist and orthotist .
The best way of preventing complications is to insist on regular attendance at a diabetic clinic,full compliance with medication, examination for early signs of vascular or neurological abnormality, advice on foot care and footwear and a high level of skin hygiene.

Great care is needed with nail trimming; skin cracks should be kept clean and covered and ulcers should be treated with local dressings and antibiotics if necessary.
Occasionally , septicaemia calls for admission to hospital and treatment with intravenous antibiotics .
Ischaemic changes need the attention of a vascular surgeon who can advise on ways of improving the local blood supply. Arteriography may show that bypass surgery is feasible.
Dry gangrene of the toe can be allowed to demarcate before local amputation; severe occlusive disease with wet gangrene may call for immediate amputation .
Indolent neuropathic ulcers require patient dressing and , if infected, antibiotic treatment. Total contact casts may avoid the need for prolonged inpatient stays or bed rest If a bony high spot ' is identified, it should be trimmed or excised .
Custom made shoes with total contact insoles must follow the successful healing of these ulcers to avoid recurrence .

fractures should be treated, if possible , without immobilizing the limb; or, if a cast is essential it should be retained for the shortest possible period.
Neuropathic joint disease is a major challenge. Arthrodesis is fraught with difficulty, due to a very poor union rate, and sometimes is simply not feasible .
Containment ' of the problem in a weight relieving orthosis may be the best option.