Musculoskeletal manifestations of diabetes mellitus & its management

Presented by:

Dr Sasan Fallahi, rheumatologist,

Baharloo Hospital, Tehran University of Medical Sciences

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Musculoskeletal complications of DM

Structure (or Most Commonly Involved)	Complication
Shoulder	Adhesive capsulitis (frozen shoulder) Calcific shoulder tendinitis
Hand	Limited joint mobility syndrome (diabetic cheiroarthropathy) Flexor tenosynovitis (trigger finger) Dupuytren's disease Carpal tunnel syndrome
Feet	Charcot's osteoarthropathy
Muscle	Diabetic muscle infarction Diabetic amyotrophy
Skeletal	Diffuse idiopathic skeletal hyperostosis

Diabetic cheiroarhtropathy

- Known as stiff hand syndrome or limited joint mobility syndrome
- A fibrosing periarticular syndrome resemble scleroderma with

thick, tight skin over MCPs, PIPs, DIPs of the fingers and flexion Contracture of fingers: prayer sign.

- Other joints: wrist, elbow, knee, ankle may be involved
- Cause: accumulation of AGE products around joints
- Prevalence: 30-58% in type 1 DM & 45-76% in DM type 2
- Frequency increase with age, disease duration and poor glycemic control
- **Treatment:** no definite cure

  -Glycemic control, physical therapy towards releasing contractures

  -alternatively, local steroid injection , anti inflammatory or steroid for short duration

  -In advanced disease: surgery

Trigger finger, flexor tenosynovitis

- Fibrosis and thickening of tendon sheath
- Restricting the movement of flexor tendons within tendon sheath and inflammation
- Locking the involved finger
- Cause: accumulation of AGE products around tendon sheats.
- Prevalence is higher in DM and multiple involved fingers are also more common in DM
- Increase incidence with poor control DM type1(20%), DM type 2 (3.8%) vs 3% in good glycemic control
- **Treatment:**

  -immobilization

  -In locked finger scenario: steroid local injection

  -In multiple digit involvement: surgery more often require

  -for prevention of recurrence: stretching exercise

Dupuytren’s contracture

- Thickening of palmar fascia and flexor tendons.
- Pretendinous bands, palmar or digital nodules and flexion

Contracture of fingers.

- Cause: accumulation of AGE product around palmar fascia
- Ring, little and middle fingers are more common involved.
- Prevalence: more common in DM (16 to 42%)
- Association with microvascular complications and microalbuminuria
- Risk factors: increase age and prolonged duration of DM and overuse of hand

compression, genetic polymorphism in gen zf9 (facilitating expression of TGF-β)

- **Treatment:** splint, collagenase injection, steroid injection (less effective), fasciotomy and fasciectomy and percutaneous needle fasciotomy

Carpal tunnel syndrome

- Entrapment of median nerve in carpal tunnel in wrist
- Related to fibroproliferative connective tissue
- Inflammation and neovascularization are more prominent in DM
- Prevalence: is higher in DM
- Diagnosis is based on

  -Symptoms

  -Tinel sign

  -Phalen sign
- **Treatment:** Splint, steroid injection

  - Surgery: for severe refractory disease and thenar atrophy

Frozen shoulder (adhesive capsulitis)

- Severe pain and stiffness in shoulder with active and passive limitation in all directions of ROM. Frequently bilateral in DM
- More common in DM (11-19%). Incidence in DM type 1: 10-20%, DM type 2: 3-32%
- Increase with age and more disease duration
- Association with poorer QoL, depression & more specific complications of DM
- Plain radiography: usually normal. For DDX should be performed
- **Treatment:** local steroid injection, NSAIDs, physiotherapy

-Mobilization is the basis of management

- Alternative option: hydrodilatation

Calcific tendinitis of shoulder

- Deposition of calcium hydroxyapatite crystals in rotator cuff tendon
- More prevalent in DM (3 times)
- Only a third of them experience symptoms
- Cause is unknown. Alter in expression of MMP tissue inhibitors may play role.

Charcot’s osteoarthropathy

- A progressive degenerative disease of foot and ankle joint that leads to deformity and associated with diabetic neuropathy.
- Prevalence: 0.08 to 8.5% in DM
- Incidence: 0.1 to 5% in diabetic neuropathy and increases with duration of neuropathy and DM
- Unilateral: More common
- Risk of amputation is higher with ulceration
- Swelling, warmth and redness in ankle, tarsal and tarso-metatarsal joints are more involved. Progressive bone resorption, dislocation, fracture and deformity.
- **Physiopathology:**

-Neurotraumatic theory: Chronic repeated trauma with loss of proprioception: inflammatory cytokines & RANKL: osteoclastogenesis: bone resorption

-Neurovascular theory: increase subchondral blood flow due to autonomic dysfunction: activate osteoclasts: bone resorption

Charcot’s osteoarthropathy

- Rocker bottom appearance

- **Radiography:** useful for evaluating the extent of disease
- **Treatment:**

  -Immobilization of foot to reduce inflammation in acute phase

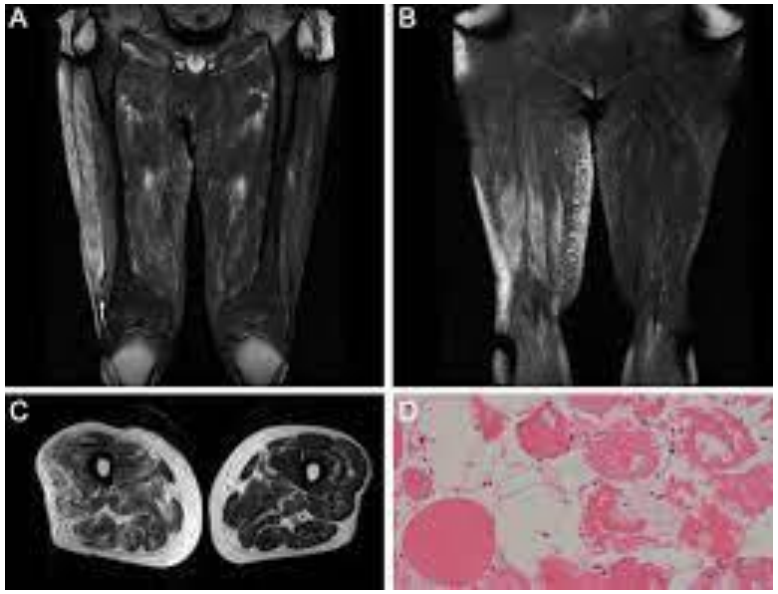
  -Off loading and orthotic support for reduce weight burden

  -Bisphosphonates: A single Pamidronate 90 mg infusion & then Alendronate 70 mg/w

  -Surgery: for chronic foot ulcer and severe deformity

Diabetic muscle infarction

- A rare condition exclusively seen in DM with spontaneous infarction of muscle without preceding injury.
- Mechanisms: microangiopathy, hypercoagulabilty, Alteration of coagulation-fibrinolytic system and endothelial dysfunction.
- Abrupt onset of pain and swelling of thigh or calf with elevated or normal CPK.
- Hypersignality in MRI T2 may be useful for diagnosis
- Incisional biopsy: muscle edema and necrosis



- **Treatment:** peripheral vasodilators, anti-atherosclerotics, tighter glycemic control, HTN treatment, analgesics, rest

Diabetic amyotrophy

- Presented as weakness of proximal muscles in lower limbs associated with pain
- Due to degeneration of proximal muscle in lumbosacral and pelvic region

- **Treatment:** glycemic control and emphasis continued physical activity and physical therapy

Diffuse idiopathic skeletal hyperostosis (DISH)

- Characterized by ossification of anterior longitudinal ligament of spine and other extra-spinal ligaments and accompanied by osteophyte formation.
- No involvement of intervertebral disk space and sacroiliac joints
- Association with clinical and subclinical DM
- Chronic elevation of serum insulin and IGF-1 leads to calcification of ligaments and enthesis regions exposed to mechanical stress
- **Treatment:**

  -analgesics and short course of anti inflammatory

  -Physiotherapy

  -Surgery: only for pressure syndromes

Other rheumatic disease associated with DM

- Gout
- Osteoarthritis
- RA
- Osteoporosis and increase risk of hip fracture