Rheumatic Manifestations of Endocrine Diseases

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Disclosures

• No financial disclosures

• 1 relevant disclosure to this talk:
  • I am not only a rheumatologist, I am also an internist

Overview

• Musculoskeletal symptoms are common in endocrine and metabolic disorders
  – Some are easy to recognize while others can be more subtle
  – Can mimic those of actual rheumatic disease

• Recognition is important
  – May be some of the earliest clues to underlying endocrine or metabolic disorder
  – Avoid pitfall of misdiagnosis

Vignette #1

• 45 Year old male with progressive skin tightening of his hands, no history of GERD or Raynaud’s phenomenon, and negative ANA.

Vignette #1

• The most likely positive test result in this patient would be:
  • A. Rheumatoid Factor
  • B. Anti Scl-70
  • C. Anti-Centromere Antibody
  • D. Elevated HgA1C

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A growing epidemic of diabetes

Source: Data for 1960-1998 from the National Health Interview Survey, NCHS, CDC
Projected data for 2000-2050 from the Behavioral Risk Factor Surveillance System, Division of Diabetes Translation, CDC

Soft tissue complications of Diabetes
- Limited Joint Mobility Syndrome (Cheiropathy – shown)
- DISH (type II DM)
- Adhesive Capsulitis
- Neuropathic (Charcot) Arthropathy – DJD X 10, including unusual DJD in joints like ankle
- Flexor tenosynovitis, tendon nodules (trigger finger), and dupuytren’s stenosing tenosynovitis
- Carpal Tunnel Syndrome
- Diabetic muscle infarction
- Osteoporosis (type I DM, weaker association)

Diabetes: Proposed Effects of hyperglycemia on the musculo-skeletal system
- Stimulation of fibrous tissue proliferation
- Small vessel vasculopathy and tissue ischemia
- Neuropathy: Direct toxic effect

(Really a bunch of hand waving!)

Soft tissue complications of Diabetes

- Limited Joint Mobility Syndrome: Diabetic Cheiropathy
  - Incidence correlates
    - Disease duration (usually >10 yrs)
    - Suboptimal glycemic control
  - Most commonly involves the hands
    - Can also involve shoulders, knees, and feet
  - Etiology: Palmar fasciitis leads to progressive thickening and lightening of skin
  - Excellent mimic of scleroderma and sclerodactyly
  - Can become quite disabling
  - Glycemic control and physical/occupational therapy may slow progression

Limited Joint Mobility Syndrome: Diabetic Cheiropathy

Progressively thickened, waxy, and shiny skin
Prayer Sign

- The patient places his or her hands together as if in prayer
- Patients with limited mobility syndrome are unable to make complete contact between the palmar surfaces of their fingers

Vignette #2

48 YO male with a history of DMII presents with a two year history of mild-moderate pain and stiffness in his mid and low back. He now notes 6 months of increasing neck pain and dysphagia.

Vignette #2

Vignette #2

Which of the following statements about this patient’s condition is LEAST correct?

A. He likely has involvement of the thoracic spine
B. TNF-α blocking therapy will improve his symptoms
C. Type II diabetes is associated with this condition
D. It is more commonly reported in males

DISH: Diffuse idiopathic skeletal hyperostosis

- Excess calcification along spinal ligaments and bone formation at insertion sites of tendons and ligaments
- Higher prevalence in pts with DMII (up to 25%) but can be seen on its own
- Most commonly affects mid-thoracic spine:
  - Formal definition
    - Flowing ligamentous calcifications of at least 4 contiguous vertebrae
    - Minimal loss of disc space
    - Absence of sacroiliitis
DISH
• Usually asymptomatic (curious predilection for right side of spine)
• Osteophytes can rarely cause impingement
  – Dysphagia
  – Back pain
• In rare instances, surgical removal necessary
• Important to recognize that this is not ankylosing spondylitis

Can you tell the difference?
Diffuse Idiopathic Skeletal Hyperostosis
Ankylosing Spondylitis

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Vignette #3
• 52 year old patient with a history of type II diabetes and HTN complains of progressively increasing pain in what had been a normal left shoulder after falling.
• Physical examination demonstrates pain and near total loss of motion with abduction/adduction/external and internal rotation of her L. shoulder. The R. is normal.
• Plain films are shown to the right
• MRI reveals no tearing of the rotator cuff

Adhesive capsulitis: frozen shoulder
• May affect up to 12% of patients with types I and II diabetes cumulatively
• Usually benign, self limited
• Thought due to thickening and shrinkage of the shoulder joint capsule (not stress fractures or other pathology)
• Clinical diagnosis: plain films and MRI to rule out other internal derangements

Adhesive capsulitis: frozen shoulder
• May/may not co-exist with rotator cuff pathology
• May/may not be preceded by minor trauma of which patient is unaware
• Pain and limited range of motion are common and can rapidly progress
• Most patients respond to physical therapy as first line: Other invasive procedures only for refractory cases
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Vignette #4

- 51 year old male with type II diabetes presents complaining of painless swelling in his right ankle and foot
- Exam shown to right: Afebrile with diffuse swelling, mild tenderness, and mild erythema over dorsum of foot extending to ankle

Charcot Arthropathy

- Diabetes is the leading cause of neuropathic arthropathy
- Often painless
- Progressive sensory neuropathy (sometimes subclinical)
- Preferentially affects axons of greatest length (stocking-glove)
- Impairment of normal joint protection
- Microtraumas
- Microfractures
- Exuberant “healing” osteolysis and hyperostosis

Neuropathic (Charcot) Arthropathy

- Key signs:
  - DJD X10! (degenerative joint disease)
  - OA in a privileged joint (ankle)
  - Involvement of the metatarsal, tarsal, and talar joints most common
  - Can involve knees shoulders, etc...

- Treatment: limiting weight bearing and orthotic protective devices
  - Total contact casting 3-6 months until stable
  - Orthotic ambulation devices
  - Possible surgical fixation and stabilization if medical therapy fails

Vignette #4

- Xray shown to right reveals extreme bony destruction, fracture, and osteolysis worrisome for osteomyelitis
- Often can be difficult to distinguish from infection, especially if overlying ulcerations

Non-Surgical Treatment Options

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**Flexor Tendon Nodules and Dupuytren’s Contractures**

- Flexor tenosynovitis reported to affect between 12-15% of all Diabetic patients
- Also seen in alcoholic, HIV, epilepsy, previous trauma, “normals”
- Early in course, presents with isolated nodule(s) on flexor tendons of hand
- Symptoms develop from nodule impeding tendon motion through (A1) pulley
- Local glucocorticoid injections into tendon sheath of benefit

**Clostridium Histolyticum Collagenase**

- Contractures of MCP or PIP>20°
- Injection of collagenase into cord
- Manipulation 1 day later
- 30 day follow up with repeat injection if necessary (up to 3 times total) until 0°
- Side effects:
  - Tendon rupture (especially 5th finger)
  - Recurrence rate 6.7%

**Vignette #5**

42 year old long-standing, poorly controlled diabetic presents complaining of the abrupt onset of lateral thigh pain. On exam, a palpable tender mass is noted over the lateral thigh. Temperature and CBC are WNL. CK levels are mildly elevated at 250, blood cultures are negative. The symptoms are self-limiting and gradually subside over several weeks with conservative therapy.
Vignette #5

MRI is shown to right:

And the diagnosis is.....

T1 weighted MRI with Fat Suppression of Adductor Magnus

Diabetic Muscle Infarction

• Abrupt onset of pain in affected muscle
• Frequently with localized swelling
• Most commonly affects thigh, less involvement of the calf, almost exclusively lower extremity
• Clinical history and localized MRI findings (occasionally bx) help make diagnosis (vs. myopathy/myositis)
• Managed conservatively with rest, analgesics, and tighter metabolic control of diabetes (?anticoagulation)

Vignette #6

• 42 year old male previously diagnosed with type II diabetes presents with increasingly bothersome tingling in his bilateral hands that has now progressed to wake him up at night. His medical history is also notable for chronic back pain.

On exam, his hand is shown to the right. Tinel's test reveals reproducible tingling in the first three fingers.

Vignette #6: Radiographs

Which of the following is the next step in managing this patient's symptoms?

A. Surgical decompression of carpal tunnel
B. Carpal Tunnel Splinting
C. Order an MRI for the patient
D. Corticosteroid injection carpal tunnel
E. Order nerve conduction studies
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Diabetes and Carpal Tunnel Syndrome (CTS)

• Both DM and CTS are prevalent in western society but seem to co-exist more than would be expected by chance, alone
• Up to 20% of DM patients develop CTS
  – Up to 75% of those with limited joint mobility
• Some studies suggest it can precede formal diagnosis of DM by up to 10 years¹


CTS: Clinical Features

• Numbness or paresthesias in a distribution consistent with that innervated by the median nerve
• Symptoms are often exacerbated at night and may awaken a patient from sleep. Symptoms can progress from an irritating sensory neuropathy to weakness and wasting of the intrinsic hand muscles
• Provocation of paresthesias in a median nerve distribution by either a Phalen maneuver or Tinel sign can help confirm the diagnosis.
• Nerve conduction studies localize the site of the nerve compression to the wrist and differentiate carpal tunnel syndrome from other types of neuropathy.

CTS: Treatment

• Start with conservative measures
  – wrist splinting, particularly at night
  – refraining from exacerbating activities
• Local corticosteroid injection into the carpal tunnel if symptoms persist or motor signs develop.
  – Sometimes repeat injections needed
• Surgical decompression when injections fail

Vignette #6: Apology for sneaky question

• Why order the MRI??
• This patient actually has acromegaly and secondarily associated hyperglycemia
• Diabetes & acromegaly, EACH, can predispose to carpal tunnel syndrome – so this patient was at extra risk!
• MRI is to rule out pituitary adenoma
Acromegaly Hypertrophy of the Distal Tufts

- Spade-like bony overgrowth seen in distal tufts
- Soft tissue thickening
- Carpal Tunnel Syndrome
- Can also see early widening of joint spaces secondary to cartilage overgrowth
- Premature osteoarthritis can follow, aggressive osteophytosis, and CPPD

Acromegaly

- Musculo-skeletal complaints can be the initial presentation prompting referral to a rheumatologist
- Back pain common presenting symptom
- Early, aggressive degenerative disease (CPPD, haphazard matrix deposition and fissuring)
- Joint pain (39-78%), axial and large joint arthropathy, soft tissue overgrowth, carpal tunnel syndrome, cartilage overgrowth, DISH, and CPPD.

Vignette #7

- 42 year old female presents with complaints of chronic weight loss, tremors, and pain in her hands and feet. Physical examination reveals the following:

Hyperthyroidism: Rheumatic manifestations

- Myopathy
  - Ranges from minor aches to profound, usually proximal muscle weakness with minimal CK
  - Benefit to restoration of euthyroid state
- Arthralgias: most common in shoulders
- Osteopenia and osteoporosis
- Thyroid acropathy

Thyroid Acropachy

- Associated with clubbing, periostitis, pretibial myxedema, and diffuse soft tissue swelling and pain.
- Long-acting TSI may persist even after successful thyroid ablation.
- Transition to euthyroid state may be associated with myalgia and arthralgias
  - Some studies suggest treatment of thyroid disorders in patients with M.S symptoms only results in transient improvement
Vignette #8

- 42 year old female with known Hashimoto’s thyroiditis presents with pain in her hands and feet as well as marked swelling in her knees bilaterally. Her Chem 7 and CBC are WNL, although her ESR is 32 and ANA 1:1280.

Hypothyroidism: The great rheumatic disease mimic

- Joint pain and swelling RA/SLE
- SICCA Sjogren’s
- Muscle weakness, CKs Myositis
- High titers of ANAs All Above

Vignette #9

60 year old female presents to your office complaining of fatigue, joint, and muscle pains.

Plain films of her hands are shown to the right.

Hyperparathyroidism (Osteomalacia)

- Cystic areas of demineralization called “brown tumors”
- Erosive disease can occur in DIP, MCP, carpal, and AC joints
- Osteitis Fibrosa Cystica more common in secondary hyper-PTH, but declining
- May also be associated with diffuse bone and joint pain, proximal myopathy, neuropathy and CPPD

Hyperparathyroidism

Rugger-Jersey Spine

Small cyst

Areas of subperiosteal erosion
Hypoparathyroidism

- Usually with history of surgical damage or removal
- Muscle fatigue and weakness
- Tetany and neuromuscular irritability
- Both hyper and hypoparathyroidism cause osteopenia and increased risk of fx.

Vignette #10

47 year old Caucasian male presents to your office complaining of chronic hand and wrist pain. He reports undergoing a total knee replacement for arthritis 3 years earlier. CBC, ANA, and RF are WNL. Plain films of his hands reveal:

Hemochromatosis

Squaring of MCP Heads

Hemochromatosis: Rheumatic manifestations

- CPPD and/or apatite deposition
- Degenerative arthropathy
  - Predilection for the MCP joints, knees, hips
    - Squaring of MCP heads with tear drop osteophytes
- Osteopenia
- Cirrhosis
- “Bronze Diabetes” (increased melanin)
- Congestive heart failure

Hemochromatosis: Diagnosis

- Measurement of serum iron and transferrin saturation
  - >60% saturation suggests diagnosis
- HFE gene on chromosome 6
  - C282Y or H63D mutations seen in 90% Northern Europeans with hemochromatosis
  - 1/300 Caucasians homozygous for HFE, but disease is less common
  - Helps in counseling relatives
- Treatment: Plebotomy. ?Fe chelation

Summary

- Rheumatic manifestations may be early clues to underlying endocrine or metabolic disorder
- Some manifestations are more obvious than others and can present later in life
- Rheumatologists are expected (at least on some board questions) to have appropriate suspicion for these diseases
- Avoid possibility of being fooled by mimics into making a diagnosis of a rheumatic disease
## Summary of Mimics

Early Manifestations of Endocrine Disorders that Can Mimic Rheumatic Diseases

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<th>Endocrine Disorder</th>
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