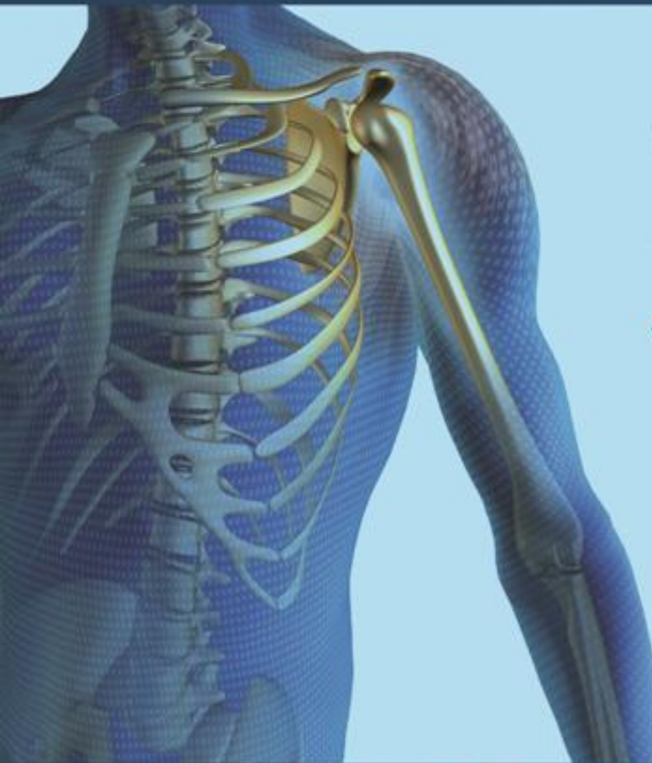

Orthopedics & Sports Medicine SYMPOSIUM

Presented by:

PERSONALIZED CARE

Causes of Joint Pain and Workup of Rheumatologic Conditions

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Orthopedic Etiology

1. Traumatic injuries
   Contusions (soft tissue, bone), Sprains, Strains, Fractures, Acute Compartment Syndrome

2. Overuse Injuries
   Tendinitis/Tendinosis and bursitis, Myofascial Pain, Stress fractures, OCD, Apophysitis, Chronic Exertional Compartment Syndrome, OA

A. Extrinsic Factors: Work, Exercise (sports, gym)
- I. Faulty training (volume, intensity)- Rest
- II . Faulty technique
- III. Faulty equipment

B. Intrinsic Factors:
- I. Anatomical abnormalities causing malalignment and faulty biomechanics: decreased muscle flexibility or strength, joint hypomobility, tibial torsion, leg length discrepancy, Cervical Postural Syndrome, Scapular dyskinesis

Neurologic Etiology

1. Nerve Entraptment
   - A. Central
     - i. Cervical or Lumbar disc herniation: radicular pain
     - ii. Case: 35 year old female with lateral hip pain, distal thigh pain and anterior knee numbness
   - B. Peripheral
     - i. Carpal Tunnel Syndrome
2. Peripheral Neuropathy
   - i. idiopathic, diabetic, alcohol, many others

Other Causes of Joint Pain

1. Cancer or Mass
   case: thoracic back pain from lung CA
2. Infection: Osteomyelitis, Septic Arthritis, Cellulitis
   case: thigh and knee cellulitis
3. **Rheumatologic:** joint pain and swelling without trauma
4. Others: Granulomatous dz (Sarcoidosis), Muscle Disorders (Polymyositis), Hemochromatosis, Marfan’s

Vascular Disorders

- Thoracic Aortic Aneurysm
- Axillary Vein thrombosis
- Radial Artery Aneurysm
- Peripheral Arterial Disease
- Popliteal Artery Entrapment
- DVT

Endocrine Disorders

- Hypo/Hyper calcemia
- Low vitamin D
- Thyroid Disorder

Medications

Drug induce Polyarthralgia:

- Statins
- B-blockers
- Quinolone
- Acyclovir

Referred Pain

Referred Pain from nearby joint

a. Upper arm pain from RC impingement
b. Knee pain from hip OA

Referred Pain from Trunk Organ

a. Shoulder pain from heart or gallbladder disease
b. Pelvic/Hip pain from GYN/GU/GI problems

Other causes

- Complex Regional Pain Syndrome: Persistent pain after trauma/dz +/- sympathetic dysregulation (swelling, sweating, discoloration)

- Fibromyalgia:
  Diffuse body aches, tender points, fatigue, insomnia
- Chronic Pain Disorder associated with Psychological factors
- Somatization Disorder: unconsciously creating multiple physical symptoms
- Conversion Disorder: unconsciously creating a neurologic or psychiatric symptoms

- Factitious Disorder: consciously creating a symptom for an unconscious gain (sick role)
- Malingering: consciously creating symptoms for a secondary gain

Joint pain due to Rheumatologic conditions

Rheumatologic sign and symptoms

- Inflammation of the joint/s: effusion, warmth and erythema
- WITHOUT trauma
- Polyarticular: symmetric vs asymmetric or Oligoarticular
- Morning Stiffness lasting more than one hour

***Fibromyalgia: diffuse joint pain, sometimes symmetric, morning stiffness, subjective sense of swelling <u>but no obvious signs of synovitis</u>

Rheumatologic DDx

- Systemic Rheumatic Disease:
  Rheumatoid Arthritis, Juvenile Idiopathic Arthritis (aka JRA)
  SLupus E, Scleroderma, PMR
- Spondyloarthropathies: **Ankylosing Spondylitis, Reactive Arthritis (aka Reiter's),** Psoriatic Arthritis, Arthropathy of IBD
- Crystal induced Synovitis: **Gout**, **Pseudogout**

- **Viral infections:** Parvovirus B19, Adenov , EBV, hep B & C, HIV
- Direct bacterial infections: N. Gono, Bacterial endocarditis
- Other infections: **Lyme**, TB, Syphilis
- Indirect bacterial infxn: Group A Strep (RheumFev), Chla (RA)
- Systemic Vasculitis: PAN, Wegener's

WORKUP

- **Many rheumatologic lab tests lack desired specificity, results should be interpreted in the clinical context.**

Table – Comparison of diagnostic criteria for rheumatoid arthritis, scleroderma, and mixed connective tissue disease

Diagnostic criteria	Rheumatoid arthritis	Scleroderma	Mixed connective tissue disease
Serological criteria	Positive rheumatoid factor	ACA, Scl-70, Th/To, RNA Pol 1, RNA Pol III, U3 RNP, U1RNP, PM-Scl	Positive anti-RNP at a hemagglutination titer of 1:1600 or higher
Clinical criteria	Morning stiffness for at least 1 hour for a duration of 6 or more weeks Swelling of at least 3 joints for 6 or more weeks Swelling of wrist or metacarpophalangeal or proximal interphalangeal joints for 6 or more weeks Symmetry of swollen joint areas for 6 or more weeks Subcutaneous nodules Radiographic features typical of rheumatoid arthritis	Proximal scleroderma Sclerodactyly Digital tip pitting/loss of substance of distal finger pads Bibasilar pulmonary fibrosis	Edema of hands Synovitis Myositis (laboratory or biopsy proven) Raynaud phenomenon Acrosclerosis (with or without proximal scleroderma)
	For definitive diagnosis, 4 or more of the criteria are required	For definitive diagnosis, at least the sole major criterion or 2 or more minor criteria are required	For definitive diagnosis, serological criteria plus at least 3 of the 5 clinical criteria are required

ACA, anticentromere antibodies; RNP, ribonucleoprotein.

Initial Workup

- **Joint aspiration:**
  WBC >2,000-inflammation, >50,000-infection
  Culture- infection
  Crystals: Gout, Pseudogout

- **ESR, CRP**: inflammatory markers- most inflammatory arthritides, infection, cancer, age, pregnancy

- **CBC**: anemia, leukopenia, thrombocytopenia (SLE, RA, P-B19)
- **BMP** - high Cr (SLE, Wegeners, vasculitis), Ca2+ (hyperPTH)
- **ALT**- elevated (SLE, PAN, Sarcoidosis)

Initial Workup

- **ANA**
  - Very sensitive for SLE, Drug I lupus, MCTD; Polymyositis, Scleroderma, Sjogrens
  - healthy persons (+ in 5 to 10% of population, only 1 in 100 persons with + ANA will have SLE)
  - negative test rules out SLE
- **Rheumatoid Factor (RF)**
  - lacks sensitivity (80%) (negative in 20% of persons w/RA) & lacks specificity for RA
  - also positive in SLE, Sjogrens, ReA, chronic infections, and
  - healthy persons (5 to 10% of general population)
- **Anti-CCP:** anti-cyclic citrullinated peptide antibody
  - as sensitive (70-85%) and more specific (90-96%) than RF
  - may predict eventual development into RA in undifferentiated arthritis or healthy individual. Marker of erosive disease in RA

Initial Workup

- **HLA B27**
  - Very Sensitive for Spondyloarthropathies (>90% for Ank Sp), but not necessary for Dx
  - healthy person (+ in 8% of white persons)
- **Lyme**
- **TSH**

Further Workup

- STD: **Chlam, Gonorrhea ,**HIV, hepatitis Syphilis - False positive VDRL (SLE, anticardiolipin Ab syndrome)
- ASO
- Uric Acid: Gout
  - can be normal even during acute gouty attack
  - 95% of pts with elevated uric acid are aSx
- U/A: proteinuria, hematuria (SLE, Wegener's, PAN)

Further Workup

- **Creatine Kinase,**

  aldolase, anti-Jo Ab (Polymyositis)

- Anti-Ro, Anti-La: Sjogren's, SLE, healthy persons
- Anti Ds DNA, anti-Sm Ab: specific for SLE, not sensi
- Antihistones Ab: Drug induced lupus (very sensitive)
- Anticentromere Ab: sensi & speci limited Scleroderma
- Antitopoisomerase I- specific for diffuse Scleroderma
- Anti- RNP : very sensitive for MCTD
- C-ANCA: Wegener's (very sensitive)

- EKG: AV Block: Lyme, Ankylosing Spondylitis
- CXR**:** Nodules (Sarcoidosis), Upper lobe fibrosis (ankylosingS), Diffuse Fibrosis (Scleroderma), Serositis (SLE, RA)
- SI joint X-ray: sacroilitis in Ankylosing Spondylitis

  \- early X-rays are normal. MRI ???

Case #1

- 29 year old G3P2 at 20 weeks comes in complaining of general malaise, subjective fever, nasal congestion, sore throat, nausea.
- Develops pain and swelling of the wrist and finger joints.

TORCHES

- **TO**xoplasmosis, **R**ubella, **C**ytomegalovirus, **HE**rpes simplex, **S**yphilis
- O for "other agents: Hepatitis B, VZV, HIV, and Parvovirus B19

Viral Arthropathy: Parvovirus B19

– Prodromal Sxs: Fever, Coryza, Pharyngitis

- Rash in children after 2 wks of Sxs:
  - Cheek erythema ("Slapped Cheek") followed by reticular maculopapular, pruritic rash of trunk & extremities
- Polyarthritis in 60% of Adults (W>M) after 1-3 wks of Sxs
  - Self limited course in 90% of patients
- Pregnant women 30% risk of transmission to fetus. Risk of Hydrops fetalis amd Risk of fetal demise (2-6%)

Case #2

- 28-year-old male with history of chronic hepatitis C complains of left ankle and bilateral heel pain for the past month causing difficulties with walking.
- The pain started shortly after he rode his dirt bike for hours without wearing his protective foot gear.
- During this time he also developed bilateral knee effusions.
- No other complaints including Low back or hip pain, Skin lesions, Diarrhea or Hematochezia

PHYSICAL EXAMINATION

- Moderate **bilateral knee effusions** without tenderness to palpation, full ROM.
- **Bilateral ankle effussion** left > right
- Significant tenderness to palpation bilaterally over the calcaneus medial tubercle and longitudinal arch at the proximal plantar fascia.

DIFFERENTIAL DIAGNOSIS

- Traumatic injury of the lower extremities (stress fracture, sprain)
- Rheumatologic condition (Rheumatoid Arthritis, Gout, Reactive Arthritis)
- Hepatitis C Cryoglobulinemia with associated arthritis
- Septic Arthritis

Workup

- CBC, BMP, AST, ALT, Bilirubin: Normal
- **Sed Rate (103), CRP (12.6)**

- ANA , RF, anti CCP, Lyme Abs, TSH: Negative
  HLA B-27: Positive

- STD: Gonorrhea, HIV, Hep B, RPR: Negative
  Positive Chlamydia

- **Knee joint aspirate**: WBC 4554,negative culture, no crystals

Diagnosis and Treatment

Reactive Arthritis

- Doxycycline Hyclate 100 mg two times a day for 3 months – not compliant
- Indomethacin 50 mg three times daily switched to Anaprox 550 mg BID
- Ultram as needed for pain
- Knee and Plantar Fascia steroid injections
- Prednisone 5 day course – no improvement
- Sulfasalazine 500 mg BID – discontinued
- **Rheumatologic Consult**

Case #3

- 18 year old male complains of bilateral knee pain and swelling for the past year. Bilateral wrist pain for the past couple of months
- Morning stiffness < 30 minutes
- No other complaints

- Physical exam: **Bilateral knee effusions**, left worse than right

Workup

- CBC, BMP, ALT : normal
- **Sed rate: 19 (0-15)**
- **CRP: 2.2 (0-0.5)**

- ANA: negative
- RF: negative <7 (0-13)
- Anti-CCP: negative

- **HLA B27: positive**
- Lyme: negative
- TSH: normal

- Chlamydia, Gono: negative
- HIV: negative

- Knee joint aspiration:
  cell count: 2657
  culture: negative
  crystals: none

- Knee X-ray: normal

Diagnosis and Treatment

- Working Diagnosis: Reactive Arthritis vs Juvenile Idiopathic Arthritis
- Anaprox 550 mg BID, referral to Rheumatology

Rheumatology (4 months later)

- Diagnosis: Juvenile Rheumatoid Arthritis, "however positive HLA B27 puts him at risk for spondyloarthropathy" ???
- Lumbar spine and SI joint X-ray: normal
- Sulfasalazine 1000 mg BID, second line Methotrexate

Case #4

- 11 year old boy with right wrist pain
- Possible MOI: 2 weeks prior twisted wrist after a fall while playing football.
- P/E: right wrist effusion, tenderness, limited ROM, tender over anatomic snuffbox
- X-ray: dorsal soft tissue swelling, no fracture
- Dx: wrist sprain, unable to rule out scaphoid fx
- Tx: PRICE, NSAID, thumb spica splint, follow up in one week
- Mom returned by the end of appointment and mentioned that pt has complaint of knee and ankle pain in the past

Case #4

- Persistent wrist pain, now bilateral, both swollen
- Bilateral knee ankle pain and swelling for the past 6 months to a year
- Questionable morning stiffness lasting > 1hr
- No URI for the past 6 months
- Physical exam (head to toe): bilateral wrists, knees and ankle effusions, warm without erythema.

Normal pharynx

Workup

- CBC, BMP, ALT: normal
- **CRP= 0.8 (0-0.5), Sed rate = 38 (0-15)**

- ANA: negative
- **RF: positive** 12 (0-13)
- **anti-CCP IgG:** positive 51 (<20- >59)

- Lyme Ab: negative
- HLA B27: negative

- **ASO: 1010 (>250)**

Diagnosis and Treatment

- Working Diagnosis: Acute Rheumatic Fever vs Polyarticular Juvenile Idiopathic Arthritis

ARF Criteria: 2 major or 1 major plus 2 minor criteria

- Major criteria:
  Polyarthritis (76%) – starting in the legs and migrating upwards
  Carditis (50%), Chorea (20%),, Subcutaneous nodules (20%), Erytherna marginatum (Rare)
- Minor criteria:
  Fever, **Arthralgia**, Previous RhFor RHD, **Elevated ESR, CRP;** Leucocytosis; Prolonged PR

  Increased Strep titers ASO and others –Increases within one week of Streptococcal Respiratory infection (Early Penicillin prevents ASO rise). Peaks 2-4 weeks after infection
  Positive throat culture for group A streptococcus

- If ARF suspected: Echocardiogram and Penicillin IM monthly
- Tx: 2 OTC Aleve (440 mg) BID

Consult

Rheumatology Dx: **Polyarticular Juvenile Idiopathic Arthritis**

- ASO, anti DNaseB to rule out Strep infection?
- TSH, vitamin D level
- ESR, CRP to follow inflammation
- Naproxen 500 mg BID
- **Methotrexate SQ injections** weekly: 15 mg →17.5 →20 mg (with Folic Acid)
- Labs prior to Methotrexate: CBC, AST, ALT, BUN, Cr, UA, LD, uric acid. PPD