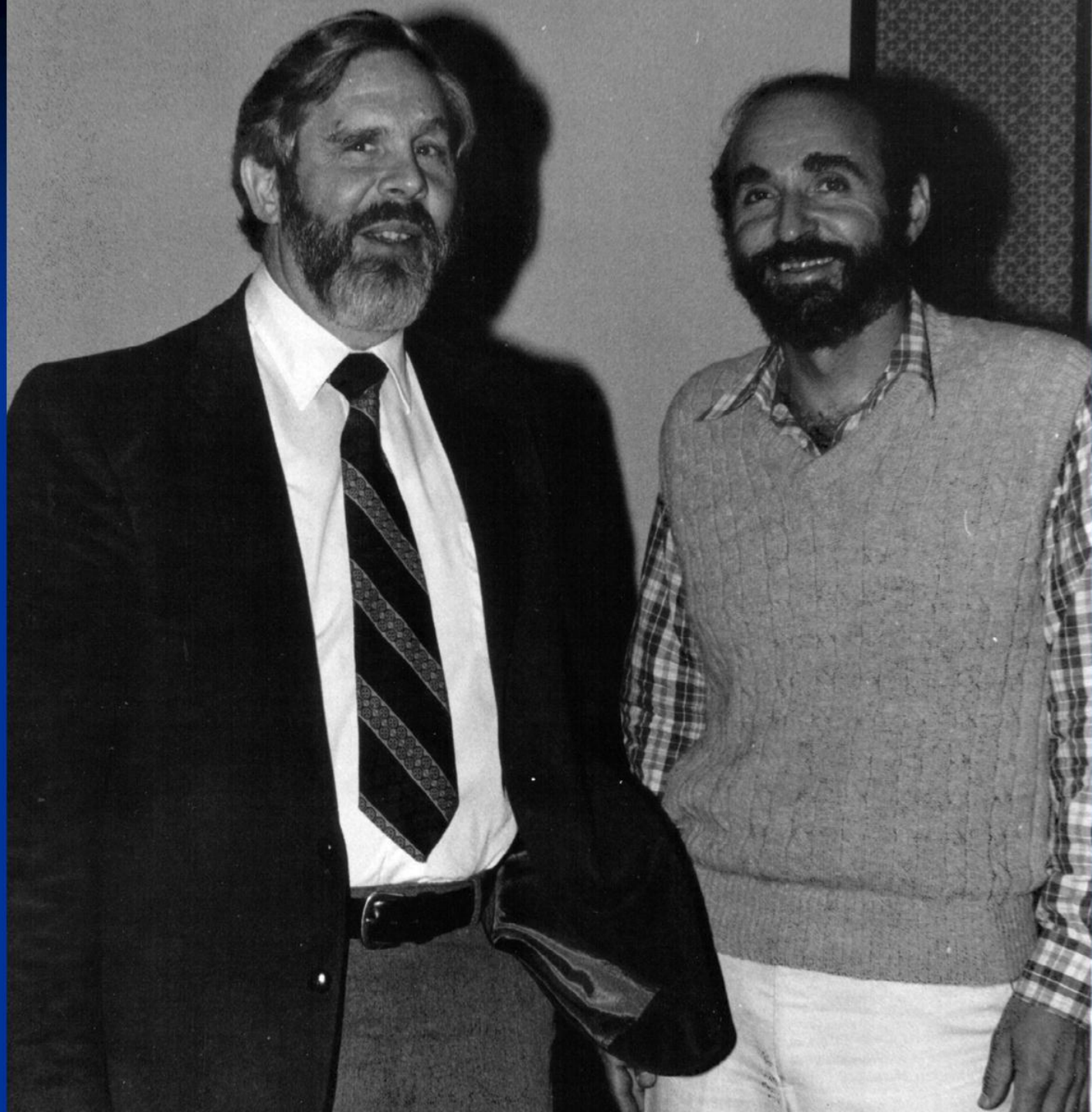


4th Annual
Joseph Howe
Oration lecture

Presented by
Victor Tong, DACBR
Cleveland Chiropractic College, LA
May 26, 2011



USC County Hospital, LA



The Forgotten Roles of a Radiologist

Inspired by

JACR, February 2011, Vol. 8:2, pp. 104-108

From Radiography to CT, MRI



JACR, Feb 2011, Vol. 8:2, pp. 104-108

- David Levine MD & Vijay Rao MD think that Tele-radiology may lead to commoditization of Radiology
- Reports will be available quicker & less costly, 24/7.
- Quality of patient care will suffer because some of the roles of the radiologists are overlooked.
- It poses a threat to the specialty of Radiology, as their works can be outsourced overseas.

Solution to threats: Focus on the hidden values of a Radiologist

- There are many important roles assumed by the specialty of Radiology other than a 1-page report
- Radiology department can assist clinicians with expertise in when, how, and where to perform imaging, is indispensable to quality health care delivery.
- Radiology contributes to patient care /management in addition to accurate Dx.

Roles of a Radiologist

- 1. Pre-examination consultation.
- 2. Quality Assurance of Exam
- 3. Actual Diagnostic Interpretation
- 4. Post-examination consultation & recommendation (referral or follow up)
- 5. Education and Research: Treatment & Prognosis

Role #1: Pre-exam evaluation

- a. Best way to protect the public from unnecessary radiation is through appropriate selection of patient for appropriate examination.
- b. The best radiologist in the world cannot arrive at the accurate diagnosis if the wrong examination is ordered.
- c. Modality of choice and selection of view/sequence are equally important for Dx.

1a. No Pre-exam Consultation X-ray taken for shoulder pain. Dx?



What if true symptoms are: shoulder pain with a cough?



- Pancost tumor
- Thoracic outlet syndrome
- Pulmonary infarct
- Drooping shoulder syndrome

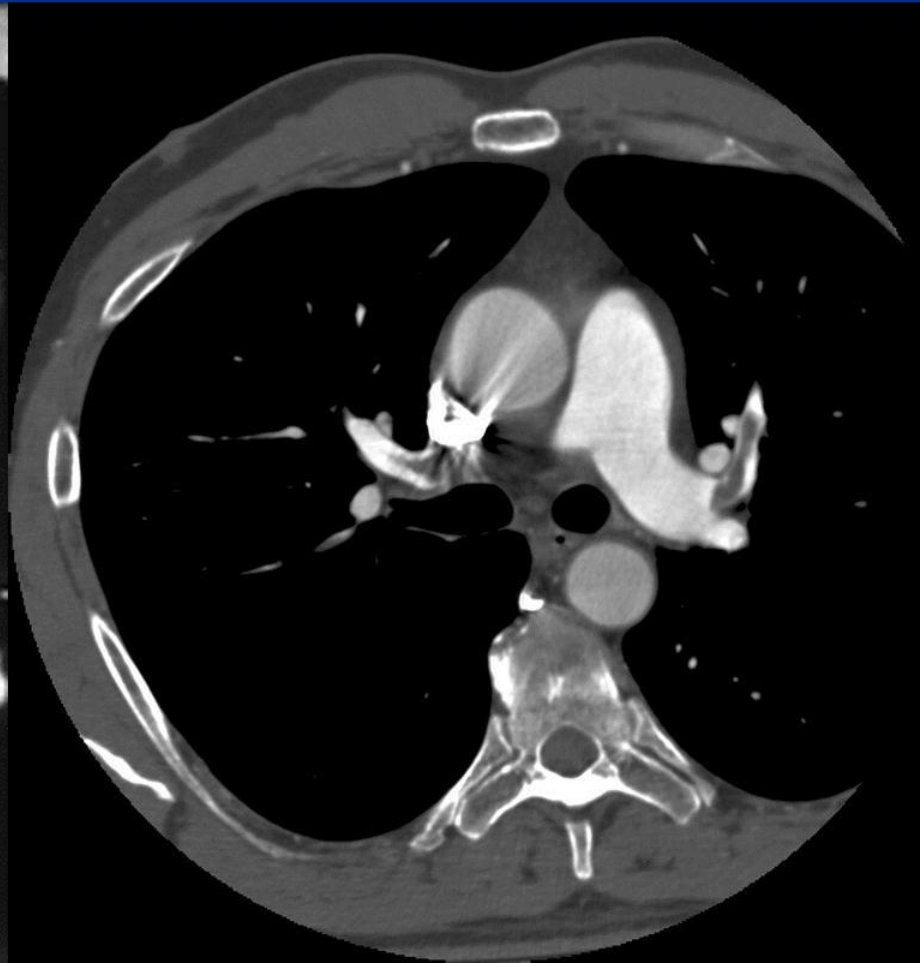
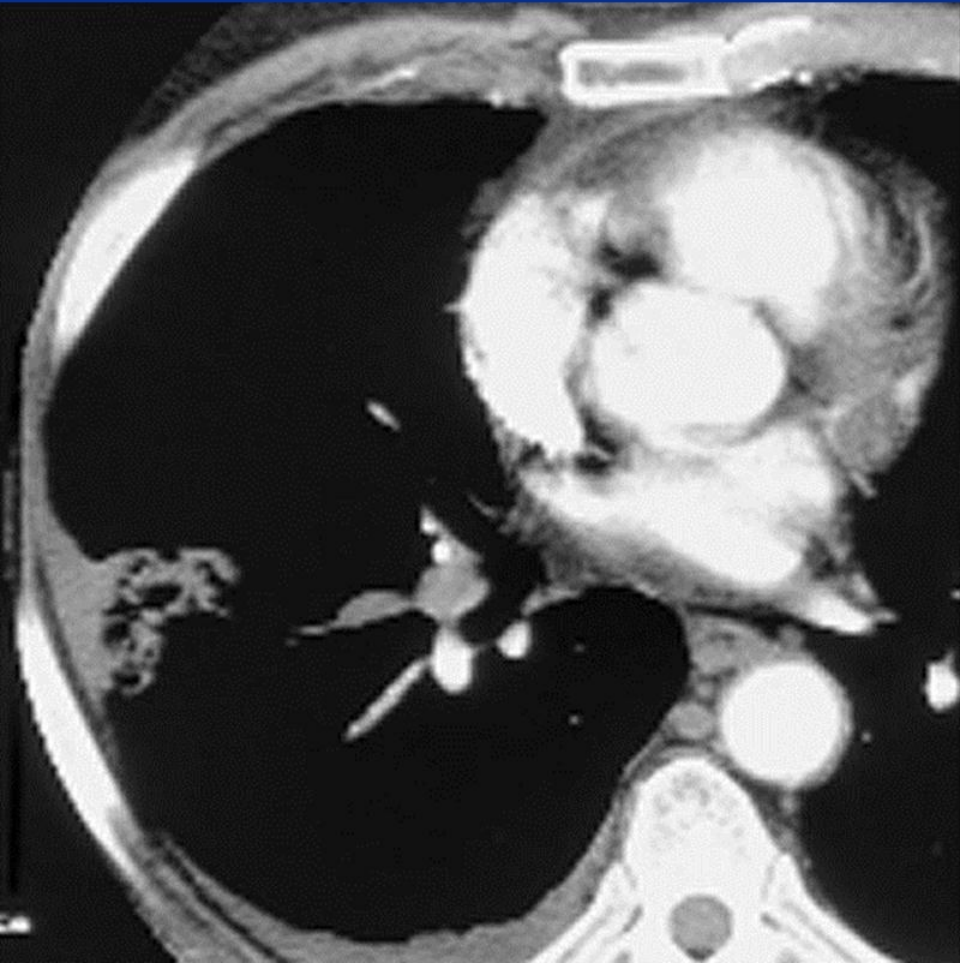
Responsibilities of providers

- Clinician: check patient record & symptoms to evaluate appropriateness of x-ray examination based on all physical exam findings.
- Should have a working diagnosis at all time.
- Radiologist: advise any special view be included, e.g., ask for a chest examinations to confirm the
Diagnosis

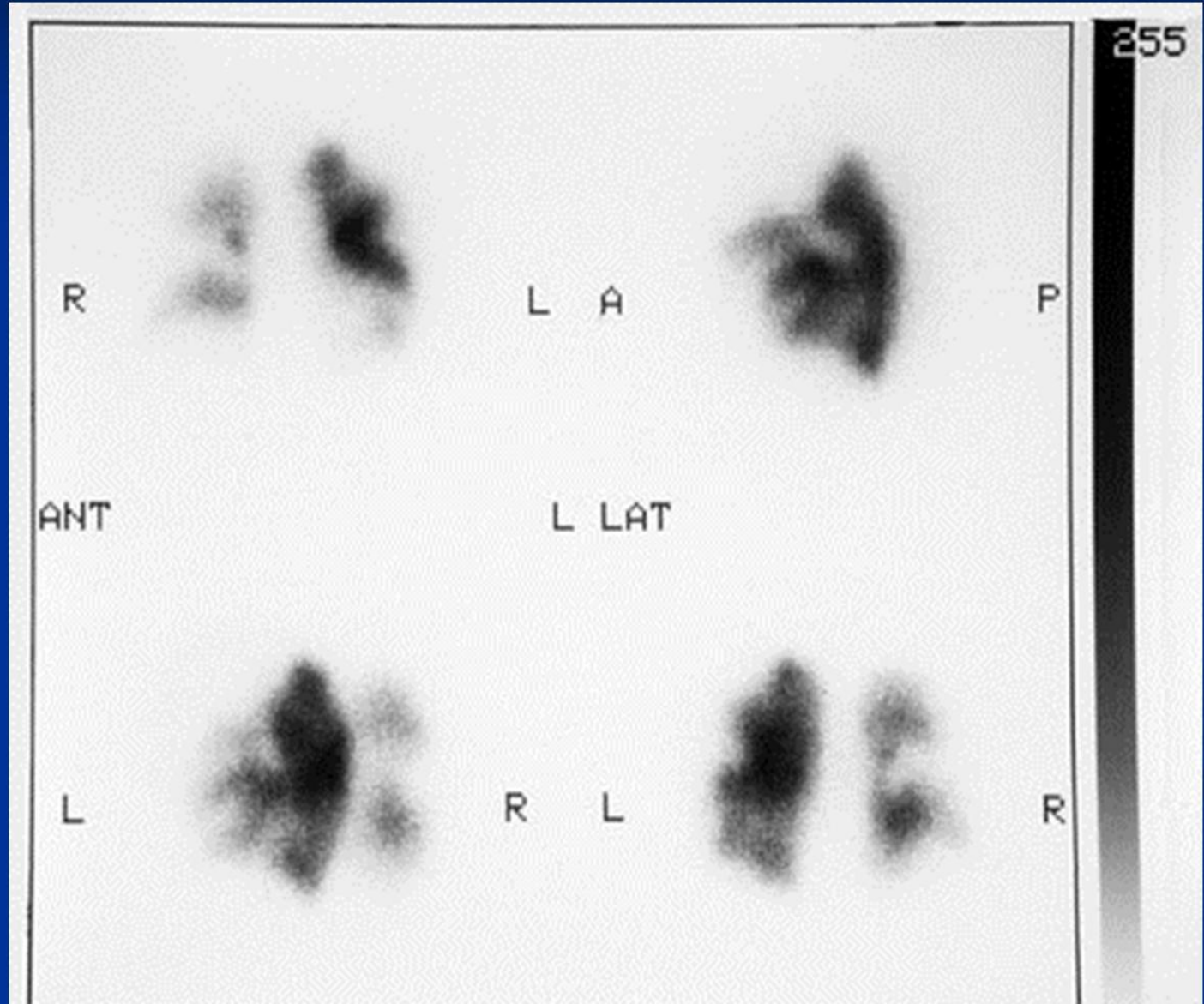
Diagnosis for Case 1a: Pulmonary infarct from embolism

- S/S: dyspnea, tachycardia, chest pain
- Pulmonary hypertension.
- Accentuated hilar vasculature
- Chest films may be negative.
- Rarely, a wedge shaped, pleural based pulmonary radiopacity (Hampton's hump) is detectable
- Pulmonary embolism can be recurrent and massive
- May cause sudden cardiac arrest
- Anticoagulatory therapy may be necessary.

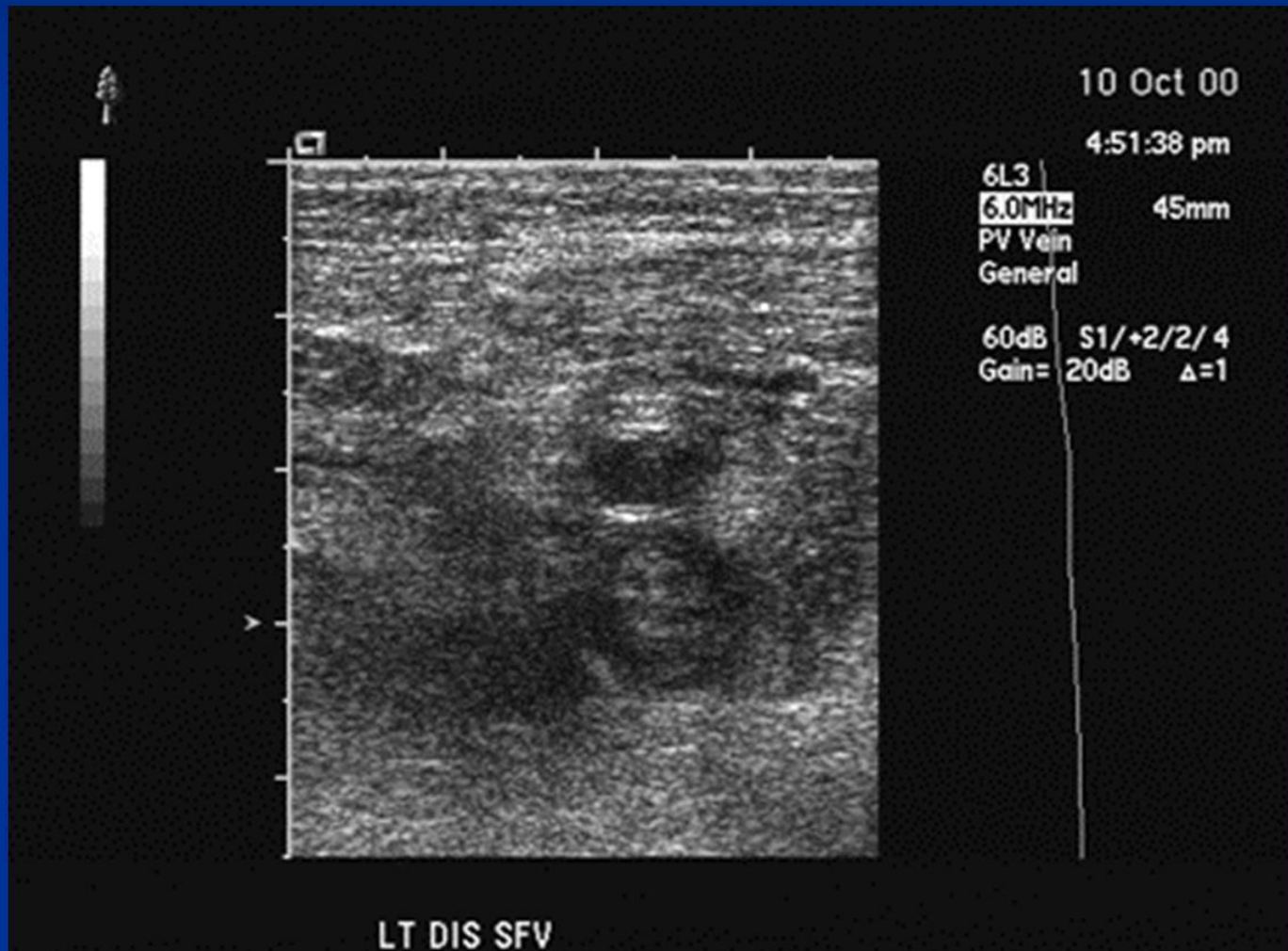
**CT angiography is modality of choice
for confirmation of pulmonary
embolism w. filling defects**



Bilateral lung perfusion defects



Sonogram show thrombus of the left distal saphenous vein under the artery



Role #2. Quality Assurance &

“Good enough” is NEVER good enough.

Artifact create confusion and may cost patient additional diagnostic procedures.

Never accept single view study as diagnostic study.

Be sure there are sufficient views

Radiation dose should not be a concern when there is clinical justification for additional view.

Be sure to evaluate all corners of the films

Case 2a

Female patient with min LBP

Chiropractor sent films to a
Radiologist, for ruling out pathology



One area of concern is _____

- Alignment-pelvis
- Bone- femur
- Joint-L5 disc
- Soft tissue- gall bladder



The hip area shows _____ on close up



- Femoral head erosion
- Permeative lesion
- Geographic lesion at the femur
- Multiple punch out lesion

Logical thinking suggests pathology such as _____

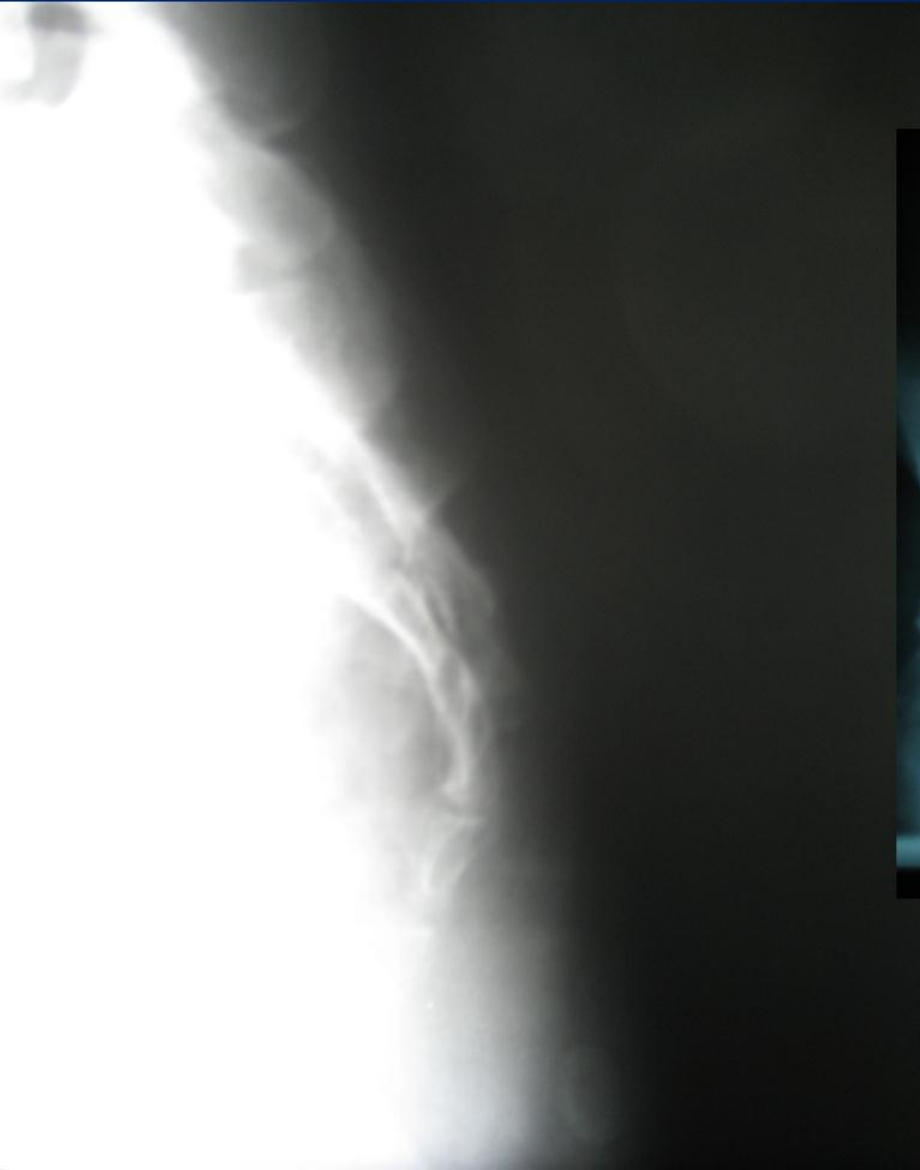
- Tumor
- Arthritis
- Infection
- Trauma



Hold it! How sure are you?

- Normal
- Normal variant
- Artifact
- Pathology

Could it be artifacts?



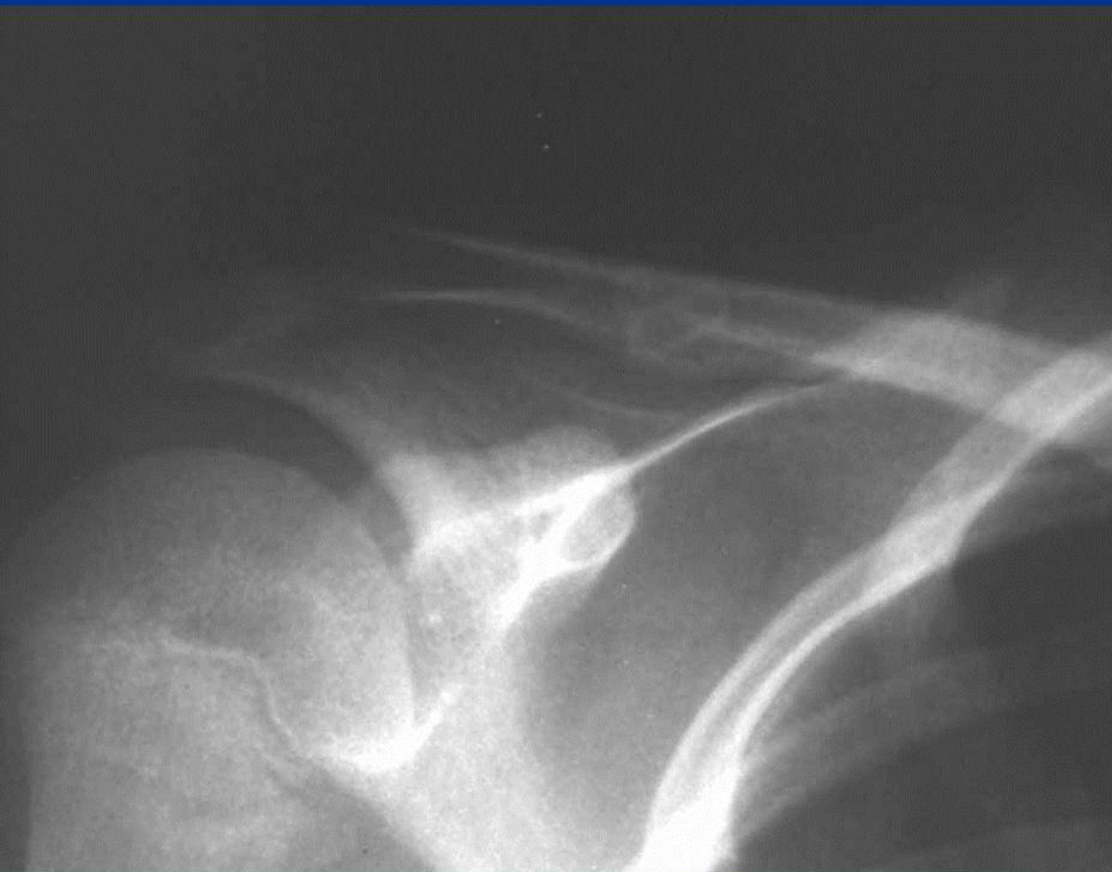
Discussion: button on the pants

- Patient should be properly gowned as a routine.
- Bra should be removed even for lumbar spine examination
- Best to use a hot light
- Scan all areas
- Before ordering more study on suspicious pathology on the x-ray, chiropractors better check with the radiologist first. It may save you some future embarrassment.

Case 2b

14 year old female with shoulder pain.

Do you suspect any pathology?



- Salter Harris injury?
- Soap bubbly lesion?
- Scapular fracture?
- Clothing artifact?

Lesson from case 2b

- You cannot begin to diagnose unless you are sure that the films are free of artifact and of optimal quality.
- Suboptimal films may lead to additional exposure and diagnostic examinations that could have been avoided.

Case 2c. Repeat film appears suboptimal. What kind of artifact is it?



- Screen artifact
- Clothing artifact
- Iatrogenic artifact
- Cat scratch artifact

Role #3: Provide report with Accurate Diagnoses

- Symptoms related diagnosis
- Incidental findings of significance

3a. Elderly female with back pain

3/15/10



How can film quality be improved?

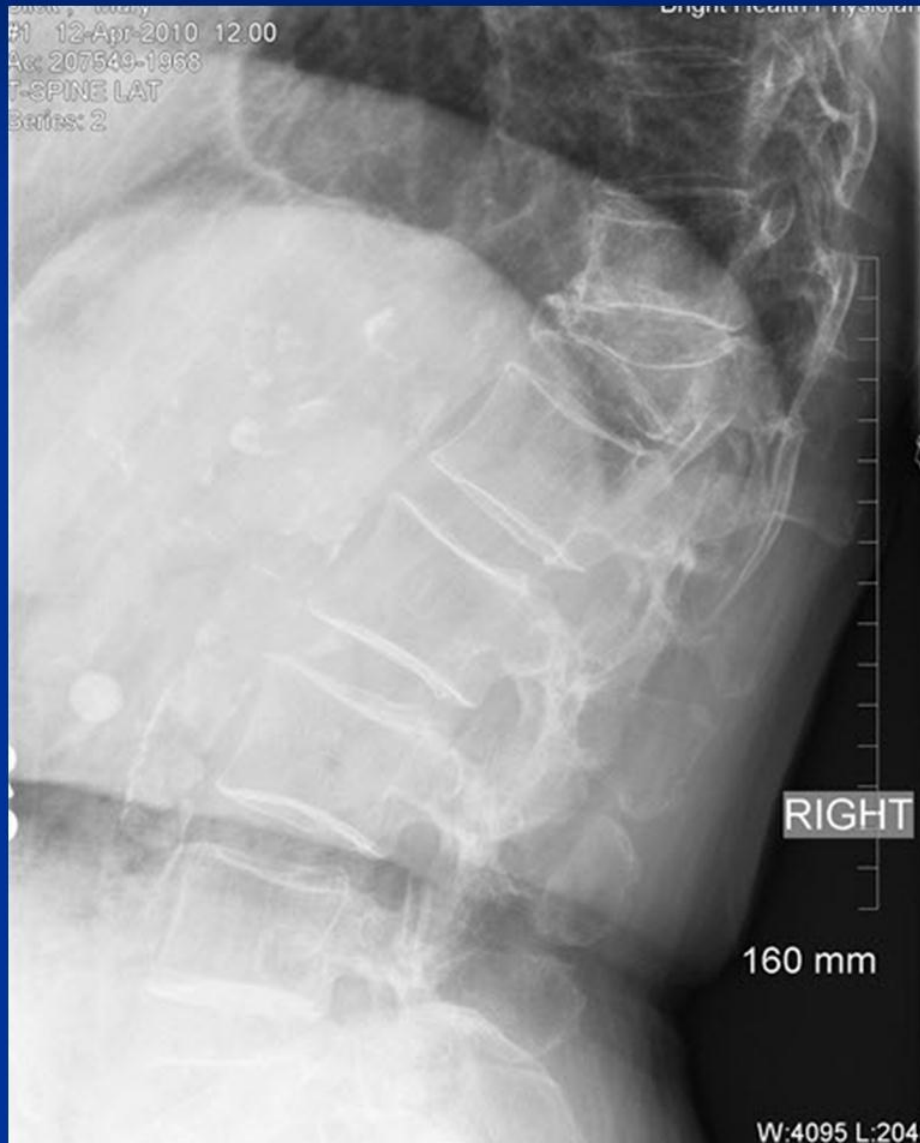
- Penetration factors
- Patient's arm positioning
- Collimation
- Placement of ID marker
- Additional films

Additional lat lumbar film in 4/12/10



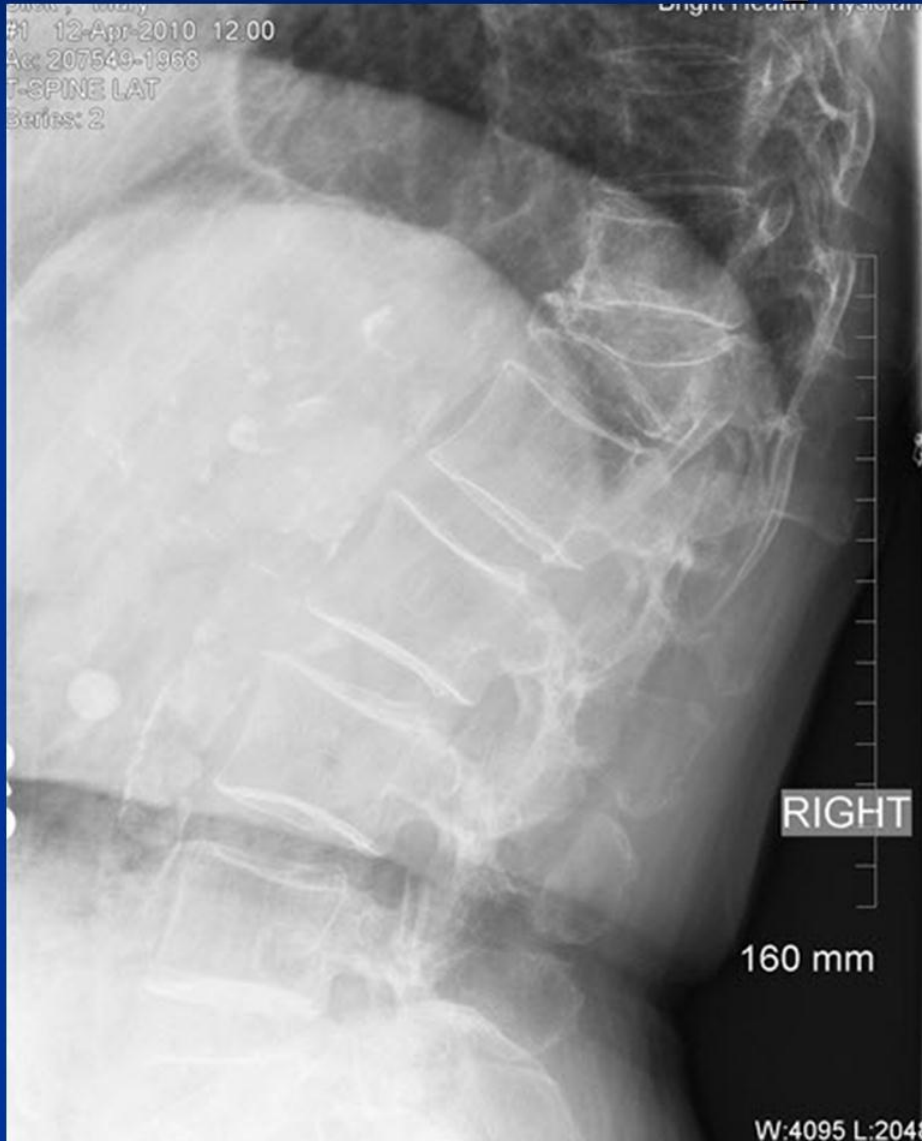
- Atherosclerosis
- Osteoporosis
- Compression fx
- Gall bladder stone
- Marker placement inappropriate

Better marker placement



- see T12 fracture clearly
- Gall stone seen again
- What else is found incidentally?

Saccular structure above the diaphragm



- see T12 fracture clearly
- Also note a air filled cavity above the diaphragm

#1 12-Apr-2010 12:08
Ac: 207549-1968
T-SPINE LAT
Series: 3

RIGHT

160 mm

Another spot film

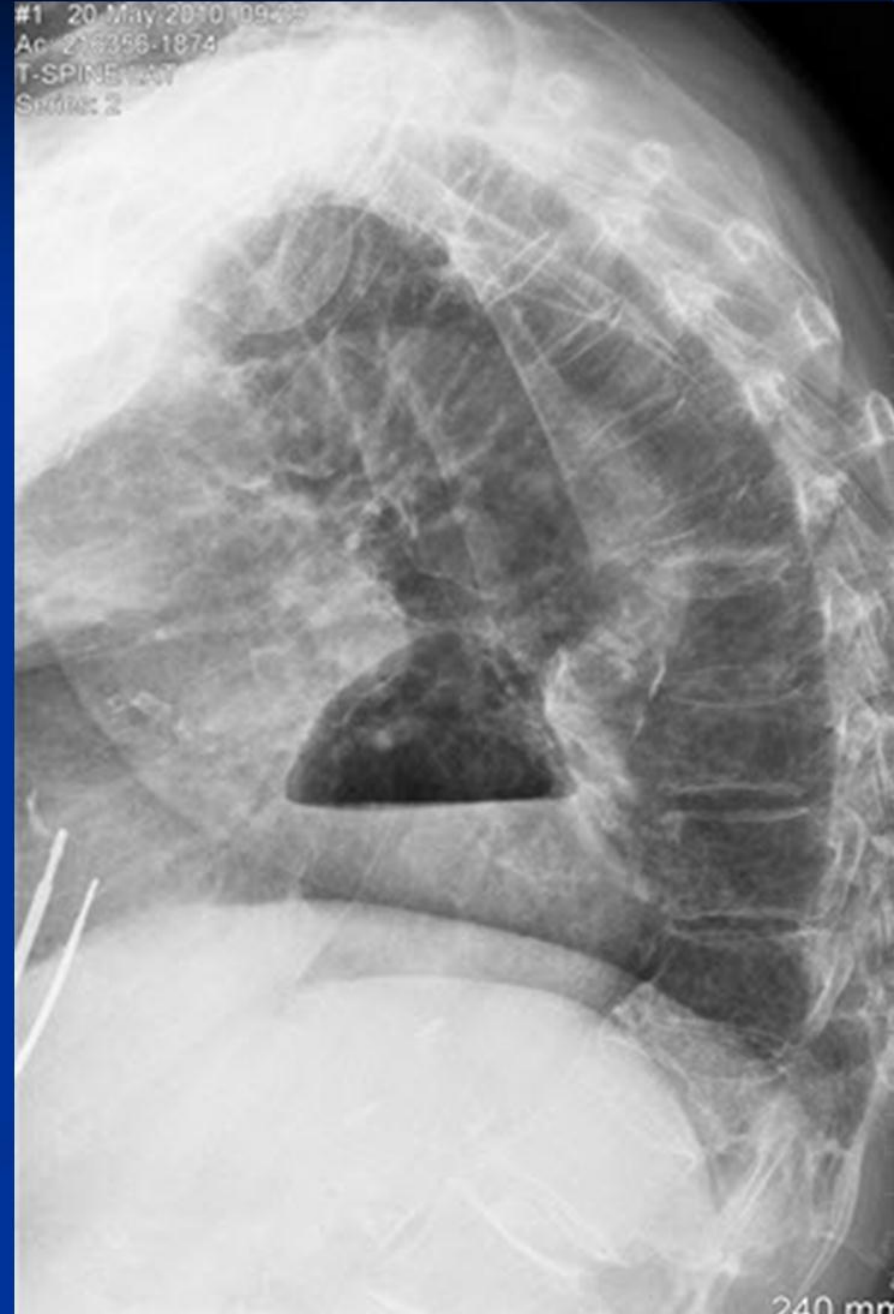
- Right marker in wrong place again
- What else do you see?

May 20, 10 another TS was ordered

#1 20-May-2010 09:29
Ac: 216356-1874
T-SPINE AP
Series: 1



#1 20-May-2010 10:43
Ac: 216356-1874
T-SPINE LAT
Series: 2



Lessons

- Even sectional study could be non-diagnostic
- Details in positioning, marker are equally important for diagnostic quality of images
- History of patient symptom is important for appropriate selection of x-ray exam
- Additional spot films are critical for precise localization of pathology and clear delineation of lesion

Osteoporosis

CMAJ 2010; 182:E610-8

- Most adult osteoporosis patients have deficiency in Vitamin D
- Daily dose <400IU insufficient to prevent fracture
- Canadian guideline recommends daily 400-1000 IU for low risk fracture patient
- 800-2000 IU for mod risk + monitor the 25-OH-D level after 3 months of implementation
- Daily dose < 4000IU is not likely to be harmful (e.g, kidney stones, etc.)



In Treating Your Postmenopausal Osteoporosis Patients
at High Risk for Fracture, Help...

Be a Force Against Fracture

[How Prolia® Works »](#)

Prolia® helps keep osteoclasts from resorbing bone¹

[Prolia® Efficacy »](#)

Reduces fracture risk and increases BMD at key sites^{*1,2}

[Prolia® Safety Profile »](#)

Review the safety profile of Prolia®

[RANK Ligand and Bone Loss »](#)

Learn about RANK Ligand – an essential mediator of osteoclast-induced bone loss³

[Prolia® Dosing and Administration »](#)

A subcutaneous injection administered every 6 months in your office¹

[Reimbursement and Coverage »](#)

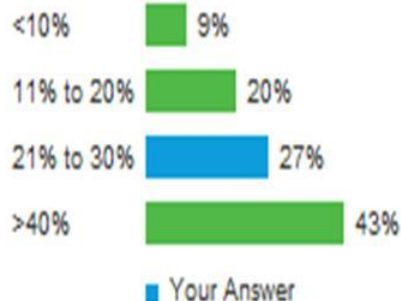
Get insurance support and coverage information through ProliaPlus™

[Patient Profiles »](#)

Learn about potential candidates for Prolia®

POLL

What percentage of your postmenopausal osteoporosis patients are at high risk for fracture?



Atypical non-displaced femoral fatigue fx from bisphosphonates tx



- May 2011 NEJM
- Sweden studied 12,777 females over 50 who had hip fractures in 2008
- 1271 are subtrochanteric or diaphyseal fx
- 59 are atypical
- 46 of the 59 took bisphosphonates =78%
- DRUG HOLIDAY: stop for 1- 2 yr after 5 yr of tx.

Case 3b

- History of getting robbed, pushed down on the ground, and beaten up.
- Mid thoracic and shoulder pain
- Physical examination reveals cracking sound of the cervical soft tissue on palpation
- What DX do you suspect?
- What type of x-ray would you take?
 - Neck
 - Shoulder
 - Chest
 - Thoracic spine

ACC#
IM: 1

Rodriguez, Manuel
DOB: 6/18/1954
ID: 53885





Do you see any pathology?

- Compression fracture
- Rib fractures
- Shoulder dislocation
- Clavicle fracture
- Lung tumor
- Cardiomegaly
- Pleural effusion



Do you see any pathology?

- Compression fracture
- Rib fracture
- Shoulder dislocation
- Clavicle fracture
- Lung tumor
- Cardiomegaly
- Pleural effusion



What type of follow up x-ray evaluation would you recommend?

- Cervical spine x-ray?
- Shoulder x-ray?
- MR of the head?
- CT of the neck?



R



Dx

- Subcutaneous emphysema
- 3rd, 4th, 5th & 6th fractures
- Scapular fracture
- Scapulothoracic joint separation

Role #4 Post-Examination Consultation

- Treatment alternative
- Prognosis
- Follow up diagnostic study
- Referral to other specialists

4a Chiropractic intern hurt his finger in a basketball game, no prior pain





Diagnosis

- Classical enchondroma at the terminal phalanx of the right middle finger
- Occult Pathological Fracture with cortical break

What is the next step for a working diagnosis of enchondroma with fx?

- Splint the finger, follow up and observe
- Refer to radiologist
- If necessary refer to orthopedist (depending on symptoms, size, location, fracture appearance, etc.)
- If necessary, select advance imaging / biopsy to confirm the diagnosis



Before & after (8 months apart)



Before & After (8 mo apart)



4b. Patient with mild wrist injury

- The wrist was found to be negative
- However, there is an incidental finding that is of concern.

Where is the area of concern?



Pick your best choice

- Scaphoid
- Lunate
- 5th metacarpus
- Distal ulna
- Radial metaphysis



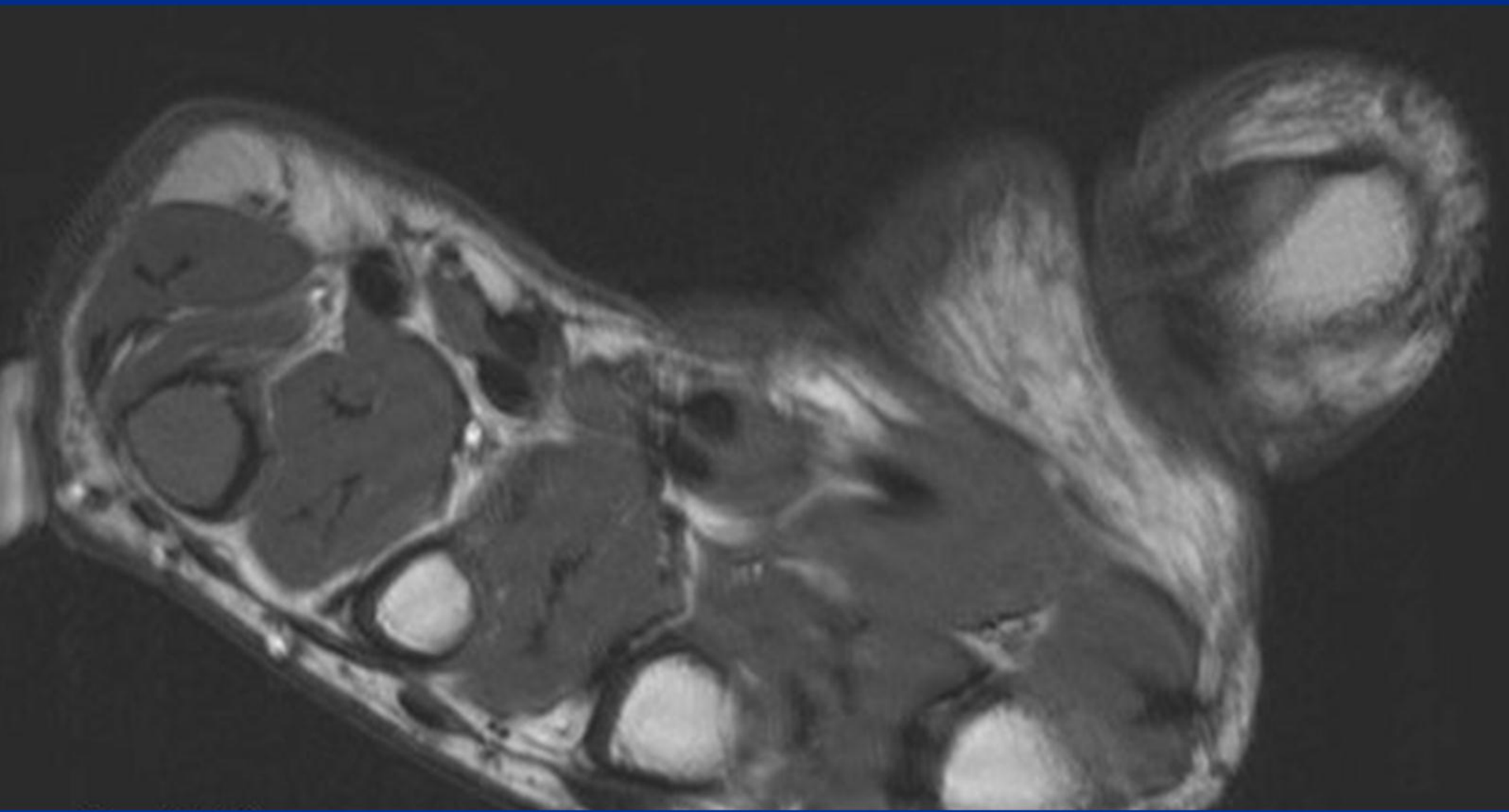
Answer: 5th metacarpal bone



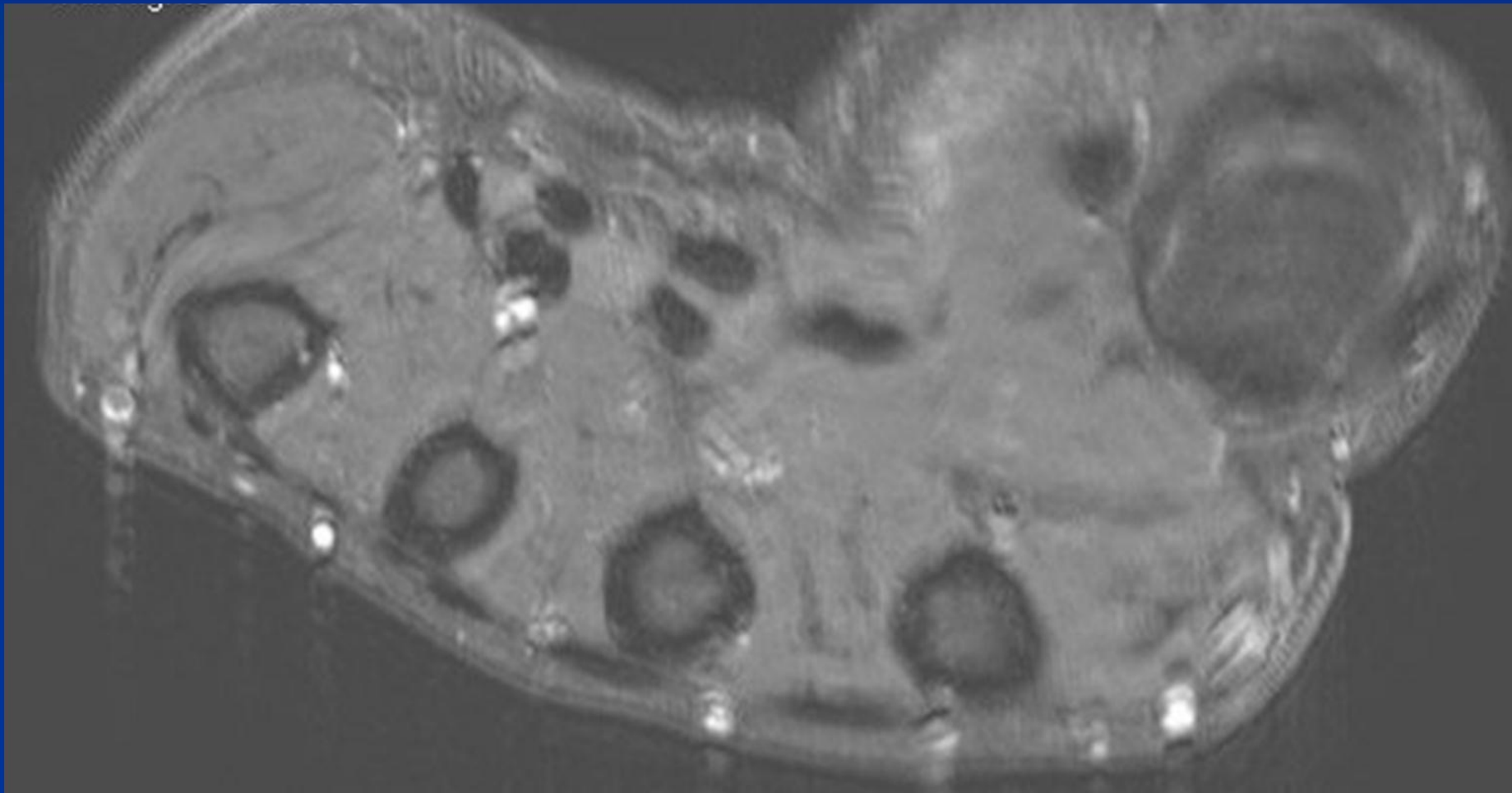
Which modality is least likely to be recommended further confirmation?

- Scintigraphy
- CT
- MR

Lets look at the MRI, T1WI



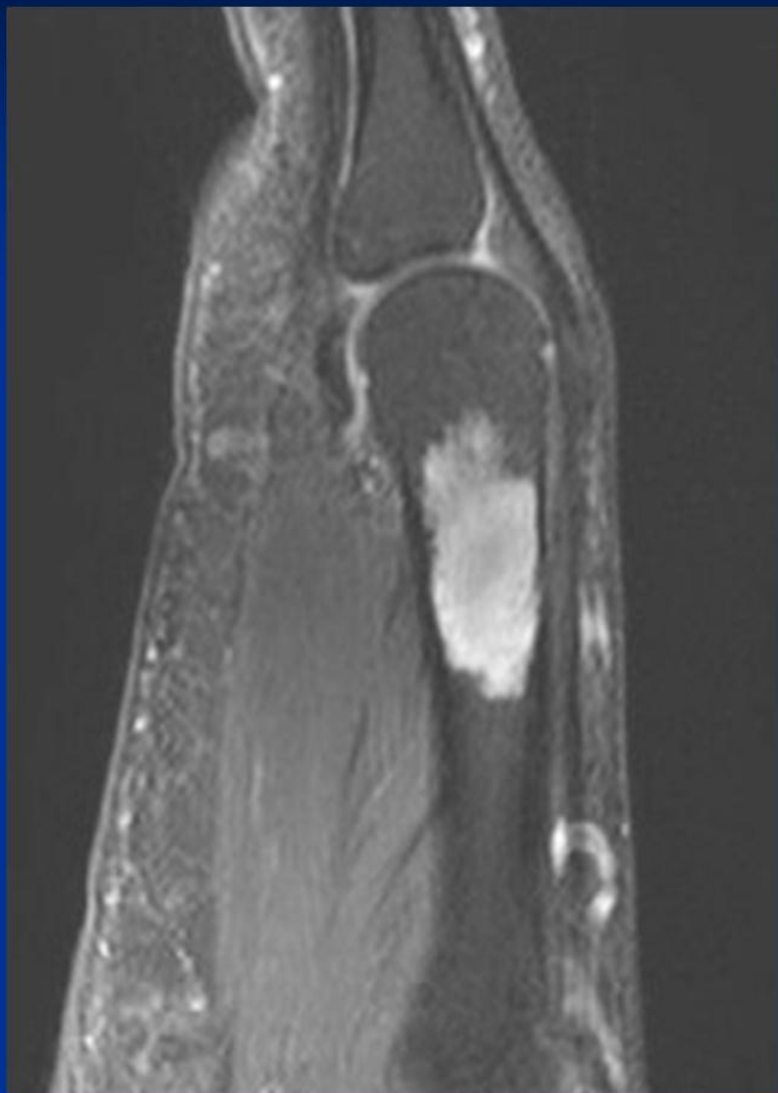
T2WI of the proximal hand



T2WI



Enchondroma



- High signal on T2 MR
- Low to intermediate signal on T1
- No enhancement on contrast study.
- Bone scan is negative.
- CT show only the morphological size and shape of the lesion

Conclusion

- Some of the pathological findings are totally incidental because they are asymptomatic.
- Sensitivity of detecting certain lesion on conventional radiograph may be low.
- Even with advance imaging, selection of the appropriate exam can be challenging.
- Appropriateness of pursuing definitive confirmation is a clinical call.

4c. 50 yr old male with chronic LBP



- AP lumbar film show a piece of calcific density at the pelvic basin
- Lateral is totally negative
- DDx include prostate calcification or bladder stone
- What is the next step for DDx?

Follow up recommendation

- Consult with your radiologist
- Order PSA
- Perform digital exam
- Order another recumbent pelvic film
- Refer to urologist

Recumbent pelvic film shows elevation of the urinary bladder

Image has been reviewed

ACCP

IM: 6

Duran, Jerry

DOB: 11/16/1951

ID: 52932

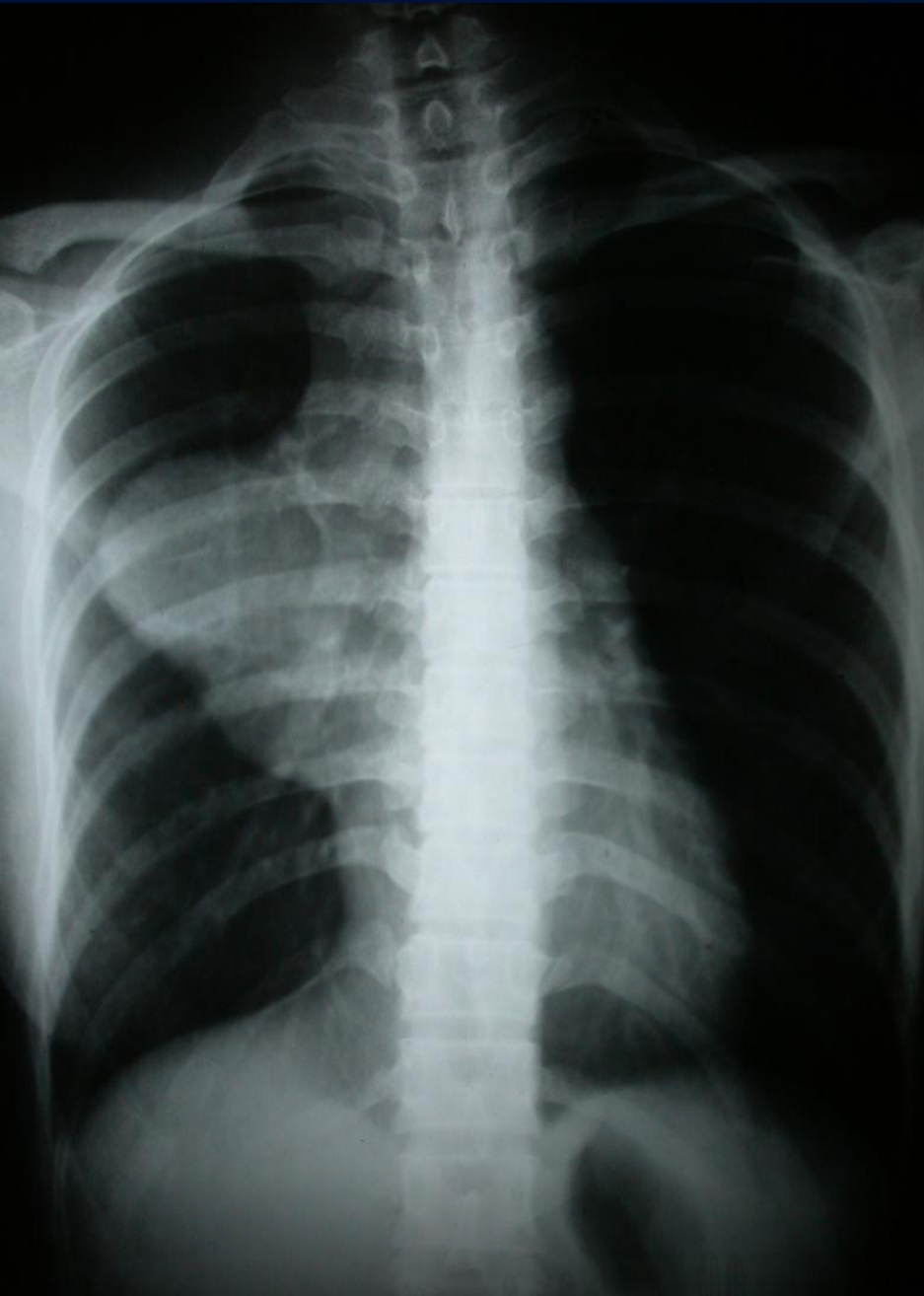


Clinical Diagnosis

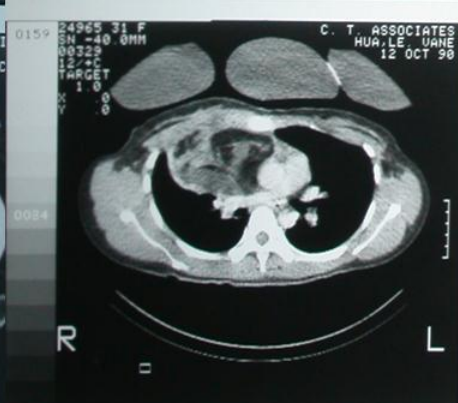
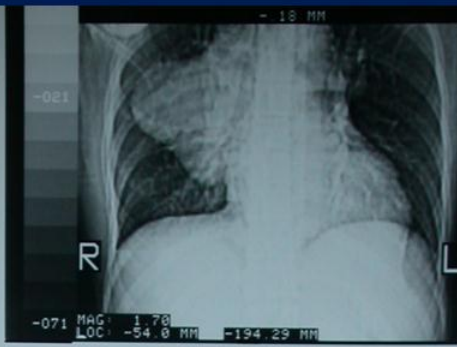
- chronic prostatitis with calcification
- PSA came back elevated 10 days later

4d. 31 yr female with tightness of the chest & thoracic pain visited a DC

- Recent immigrant since last year
- She had positive skin test and subsequent negative chest film for the INS department
- However, recent complaint brought her to the office of a chiropractor
- More recent film indicated an abnormal mass.
- Follow up CT of the chest was ordered before referral was initiated.



CT of the chest



Thoracic surgeon's report

- Lobulated mass in the mediastinum
- Pathologist reported the diagnosis of teratoma
- After the surgical excision, patient was referred back to the DC for physical therapy for 6 month.
- As a result, both the pathologist and the thoracic surgeon and gain a better understanding of chiropractic during the process.

Lessons learned

- Films older than one yr old may not be valid for current patient complaints
- Properly worked up study can help cultivate interprofessional understanding and relationship

Role#5 education & research

- Interaction with general practitioners
- Education in DC program
- Post graduate residency training
- Continuing education programs
- Publication of case study, paper
- Scientific research
- Textbook publishing

**A 62 y o male with
cervical fusion & lower
motor neuron lesion**

Dr Victor Tong, DACBR

Courtesy of Dr. Richard Anderson

Los Alamitos

History

- 62 yr old male suffered from cervical disc herniation after an injury from auto accident
- Conservative care failed to relieve pain and symptoms
- Patient underwent cervical spine fusion
- Muscle weakness, atonia develop in one arm even after surgery.
- Surgeon says it is a normal reaction that will eventually go away.
- Patient seek 2nd opinion from another local chiropractor.

Perhaps, it is “Parsonage Turner syndrome”

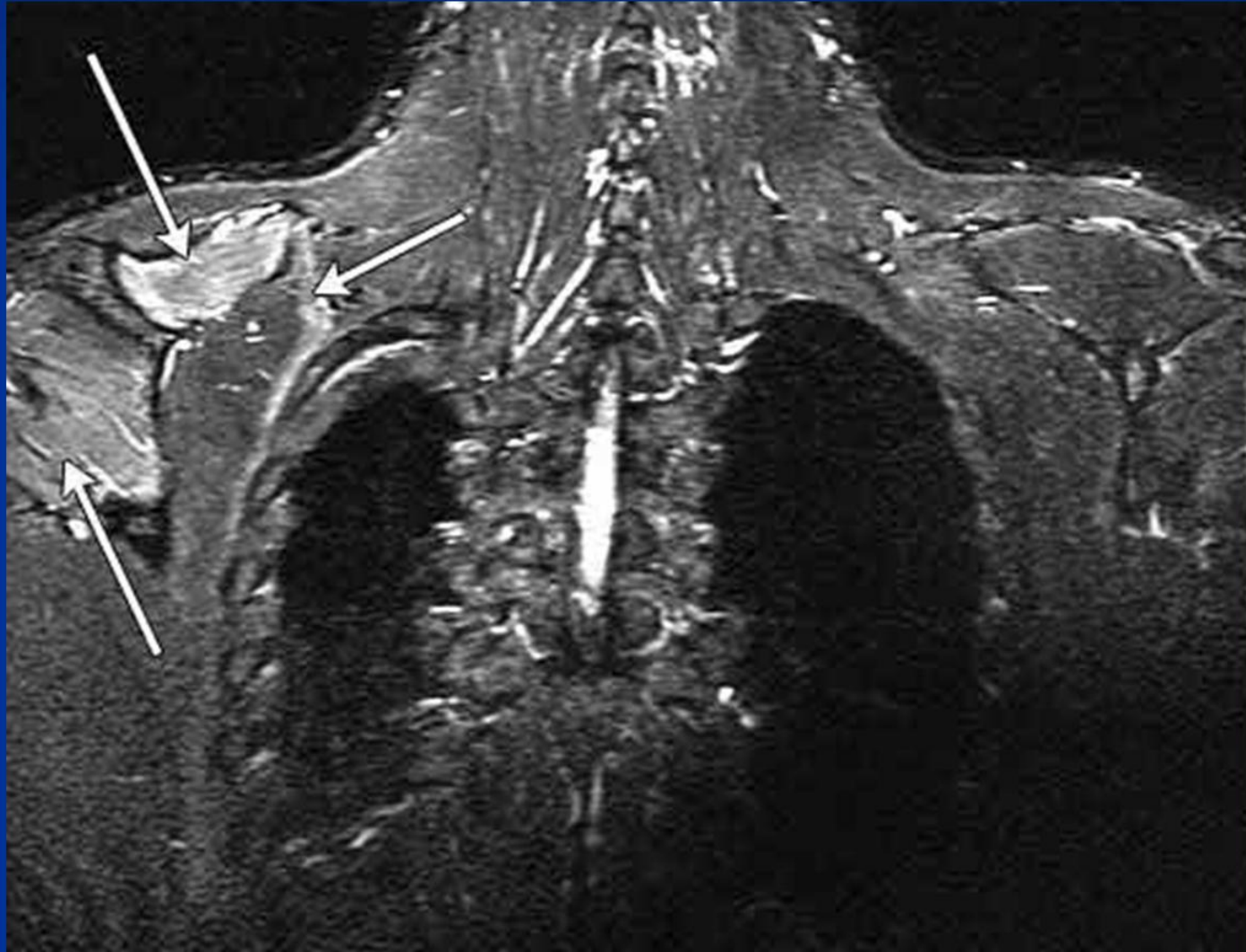
- AKA, acute brachial neuritis, brachial neuropathy, neurologic amyotrophy.
- May follow immunization, viral illness or surgery
- Symptoms of muscle weakness, muscle atrophy, atonia, abnormal sensation, drooping or winging of the scapula, etc.
- Eventually may partially or completely resolve and return to some degree of normal function, despite muscle wasting.

Example of Parsonage Turner S.

- 9 month before and after treatment: PT & analgesic medication (NEJM)



Increased signal of the ant serratus, supra and infraspinatus muscles on STIR MRI



Ant Serratus and Infraspinatus muscle signal increase on STIR



Patient insists on
finding the
confirmation with MR

Im: 15/15
Cor: P28.2 (COI)

2010 Apr 15
Acq Tm: 10:18:58.577516

Mag: 3.2x

256 x 179
Lt. Shoulder w/c

R_P

L_P

ET: 7
TR: 3500.0
TE: 39.0

4.0thk/0.4sp
Id:DCM / Lin:DCM / Id:ID

W:200 L:100

DCM: 10.0 x 10.0



Se: 3/5
Im: 15/15
Ax: 125.8

Mag: 3.2x

Acc:
2010 Apr 15
Acq Tm: 10:13:52.842502

256 x 204
Lt. Shoulder w/o

R

L

ET: 1
TR: 600.0
TE: 11.0

5.0thk/0.5sp



Im: 11/15
Sag: L148.8 (COI)

2010 Apr 15
Acq Tm: 10:24:27.970017

Mag: 2.5x

320 x 224
Lt. Shoulder w/o

A_R

P_L

ET: 19
TR: 3400.0
TE: 111.0

5.0thk/0.5sp
Id:DCM / Lin:DCM / Id:ID



...or: P26.2 (COI)

Acq Tm: 10:16:17.81250

Mag: 2.5x

320 x 25
Lt. Shoulder w/

T: 23
R: 4300.0
E: 118.0

.0thk/0.0sp
I:DCM / Lin:DCM / Id:ID
V:622 I:306

DEOV: 16.0 x 16.0cr

Quadrilateral Space

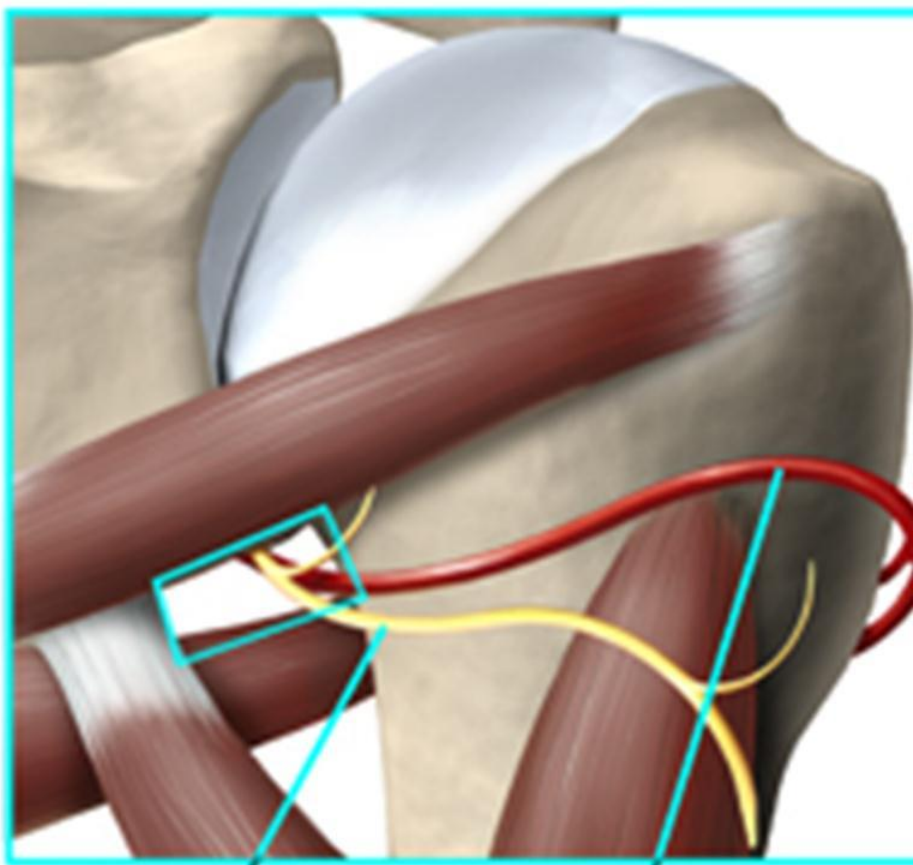
Scapula,
posterior view

Humerus

Teres
minor

Teres
major

Long head,
triceps



Axillary
nerve

Posterior
circumflex
artery

Causes of quadrilateral space syndrome

- Improper use of crutches
- Excessive overhead, throwing exercises e.g, swimming

Confirmation of Quadrilateral space syndrome

- EMG: poor nerve innervation to specific mus
- MRI: show atrophy of deltoid & teres minor
- CTA: see blood flow through the post circumflex art in relationship to bones
- Nerve block: lidocaine relieve pain of the axillary nerve







TONG & ASSOCIATES

2011 CE SEMINARS

SOUTHERN CA/NORTHERN CA/NEVADA/IL

CO-SPONSOR: CLEVELAND CHIROPRACTIC COLLEGE

Seminar Dates, Series & Locations

05/14/11	Sat A	Ontario
05/21/11	Sat C	Thousand Oaks/Camarillo
05/26/11	Thu A	Pleasant Hill
05/28/11	Sat C	Anaheim/Garden Grove
06/04/11	Sat A	San Diego
06/11/11	Sat B	Los Angeles
06/16/11	Thu A	San Jose
06/18/11	Sat C	Las Vegas, NV
06/25/11	Sat IL	Arlington Hts, Chicago
06/26/11	Sun IL	Arlington Hts, Chicago
07/16/11	Sat C	Burbank
07/21/11	Thu A	Oakland
07/23/11	Sat A	LAX
07/30/11	Sat C	Bakersfield
08/06/11	Sat A	Sacramento
08/20/11	Sat A	Monrovia
08/25/11	Thu C	Los Angeles
08/27/11	Sat C	Irvine

12 hr CE credits: 7:00 am—7:20 pm

X-Ray Diagnosis: 5 or 8 CE credits

Victor Tong, DACBR

Jennifer Pedley, DACBR

Clinical Procedure: 3 CE credits

Shawn Steel, ESQ

Matthew Zandi, ESQ

David Hofheimer, DC, ESQ

Adjustive Technique: 4 or 7 CE credits

Mitch Carter, DC

Robert Cooperstein, DC

Rick Morris, DC, CCSP



Seminar Series (cancel, approved by multiple states)

A 5 hr X-ray Diagnosis + 3 hr Clinical Practice + 4 hr of Adjustive Technique

B 5 hr X-ray Diagnosis + 7 hr of Adjustive Technique

C 8 hr X-ray Diagnosis + 4 hr of Adjustive Technique

IL 8 hr X-ray, Risk Management +2 hr Chiro Functional Assessment & Rehab + 2 hr Techniques

The End

Thanks you for your attention!