SPECT/CT Wrist
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Wrist pain

- Wrist joint - complicated anatomy
- Complex biomechanics
- Imaging and management of wrist pain presents a significant challenge
- Significant economic burden

Intra-capsular
- Vascular
  - Arterial
    - Radial
    - Ulnar
  - Venous
  - Median nerve (Guyon's canal) of carpal tunnel syndrome
  - Ulnar nerve (Guyon's canal)
- Nerve entrapment due to synovitis
- Ligament tear
- Triangular fibrocartilage complex tear
- Distal radioulnar joint subluxation
- Arthritis
  - Rheumatoid arthritis
  - Other connective tissue diseases
  - Psoriasis
  - Metabolic diseases (gout/pseudogout/hyperparathyroidism)
  - Infectious diseases (common/atypical agent)
  - Osteoarthritis (primary [CMC 1, STT joint] secondary [SLAC])
- Neoplasm
  -enchondroma
  - Osteoid osteoma
  - Pigmented villonodular synovitis
  - Other (giant cell tumour)
  - Ganglia (extra-osseous/intra-osseous/occult)
- Avascular necrosis
  - Lunate (Kienbock's)
  - Scaphoid (Preiser's)
- Other
  - Osteochondromatosis
  - Carpal boss
  - Carpal coalition

Extra-capsular
- Neuropathy
  - Median nerve (carpal tunnel) of carpal tunnel syndrome
  - Ulnar nerve (Guyon's canal)
  - Distal posterior interosseous nerve syndrome
  - Thoracic outlet syndrome
  - Neurogenic
- Tendinopathy
  - Extensor carpi ulnaris tendon subluxation
  - Tendovaginitis (De Quervain's)
  - Repetitive strain injury
- Multisystemic disease
- Infectious
Algorithm for chronic wrist pain.

Bone scintigraphy
- Highly sensitive
- Low specificity
- Radiation exposure

Co-registration of anatomy and function
- Side by side
- X-ray + Bone scan with markers

Study at GSTT – 2001

N=35
In 14/27 patients with positive BS, X-ray coregistration improved specificity.

Limitations remain
- X-ray – low sensitivity,
- 2 Dimensional = lower specificity compared to 3d imaging
Coregistration of SPECT + CT


Problems
- Scans acquired at different times
- Patient position
- Movement
- Soft tissue issues
- Manual registration

Hybrid SPECT/CT

- Anatomy + Function in a single session
- Convenient to the patient
- Cost effective to the system

Increasing evidence
- 961 – Articles
- 110 review articles
SPECT
- Collimators: LEHR parallel hole
- 128 projections @ 20 s.
- 128 × 128 matrix,
- Pixel size = 4.664 mm.
- The SPECT scan took approximately 25 minutes.

Localisation CT:
- 120 kV,
- 100 mAs/slice,
- Pitch = 1.188
- Rotation time = 0.75 s,
- Collimation = 16 × 0.75 mm.
- Slice thickness of 1.5 mm.
- 1 minute to complete.

Diagnostic CT:
- 140 kV,
- 150 mAs/slice,
- Pitch = 0.438
- Rotation time = 0.75 s,
- Slice thickness of 0.8 mm.
- 1 minute to complete.
Image analysis

- Nuc med physician
- MSK radiologist
Planar Blood Pool and Delayed views of wrist in a patient with previous trauma and continuing pain in left wrist.

Coronal view of fused scan. Note a cyst in the scapula below the area of uptake but does not show any uptake.

CT of left wrist. Multiplanar views shows subluxation of 1st metacarpal radial to the trapezium as cause of pain.
SPECT/CT in the evaluation of wrist pain

- 26/31 patients (84%), SPECT-CT provided additional information
- Accurate localisation in 22 patients (71%)
- Additional/new abnormalities in 13 patients (42%)
- The patient management was influenced by the SPECT-CT results in 15/24 (62%).

SPECT/CT Vs MRI

- Recent study from Lucerne – SPECT/CT better specificity than MRI
- MRI more sensitive than SPECT/CT

To summarise...

• Imaging wrist pain remains challenging
• Bone scintigraphy plays an important role
• SPECT/CT has a major role to play
• Teamwork core to success

Thanks!!

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