

### Case Hx

- 62 y.o.
- Neck & L arm pain
- L pectorals area & down L posterior arm
- L first 3 fingers

#### Onset

- Pushing a washing machine 6 weeks ago

#### Neck & shoulder

- Deep achy pain
- Hand feels numb & bit weak
- 7/10

#### L first 3 fingers

- Numb & sometimes tingly

AF: Working overhead, shaving, & circling head

- RF: Massaging forearm & triceps / raising arm / naproxen relieves pain

#### PMHx

- Diagnosed w/ high BP (2004)
- Recent spell of dizziness

#### Medication

- Naproxen
- Atenolol ( $\beta$  blocker)

### Physical Exam Findings

#### ROM Cx

- AROM: pain + restriction
- PROM: L + R rotation pain + restriction
- PROM: pain on extension

#### Clinical tests

- Cx maximal compression test: arm pain + numbness in L hand
- Cx distraction: relieves pain (nerve root compression)
- Doorbell sign: discomfort bilaterally
- Shoulder abduction test: relieves pain w/ L hand on head
- Shoulder depression: L pain
- TOS: negative
- Romberg: negative

- Median tension test: R uncomfortable, L POC

- Ulnar tension test: R uncomfortable, L POC

- Radial tension test: L POC

#### TTP (tender to palpation) + hypertonic

- L traps
- Levator scapulae
- Rhomboids
- Scalenes
- Pecs

#### Spinal palpations:

- C5-T1 TTP & restricted
- T6-T7 restricted extension

### Discussion

### Working diagnosis

- C7 radiculopathy (combination of muscle weakness seen) + potential associated degenerative change (based on age) & potential pre-existing (asymptomatic) disc herniation
- Traumatic sprain / strain event causing the overall symptoms we see now

### NICE guidance

- Refer for MRI & consideration of invasive management options (most pts w/ Cx radiculopathy don't need surgery)
- **Conservative management:**
- Can be considered while pt is waiting for further investigation
- Need to closely monitor neurological status
- Main concern: weakness & long-term impact on pt's ADLs
- Pt should contact GP again to discuss pharmacological options

### Less likely Dx

- **TOS:** possible from Hx but less likely as no reproduced symptoms in physical examination
- **Peripheral nerve entrapment (median / radial):** depending on the location of the entrapment, less likely to explain the whole presentation & the symptoms being aggravated by max. Cx compression & relieved by Cx distraction suggest root involvement
- **Sub-acute Cx spine sprain / strain:** may be initial onset of symptoms, it doesn't explain the current neurological picture
- Non-specific neck pain w/ associated myofascial involvement: *\* could account for part of the presentation but doesn't explain the objective neurological deficit* (comment have mechanical & myofascial involvement in pts w/ radiculopathy)\*

### Important not to miss

- **Cardiac causes & apical lung tumour:** unlikely given the whole clinical picture, including all Hx & physical examination findings
- **Cx radiculomyelopathy:** should be considered in any pt w/ neck & arm pain, especially older pts

### Separate complaint of momentary dizziness: after getting up quickly from a stooped position

- Most likely due to postural hypotension (aka. orthostatic hypotension)
- Could be cervicogenic & important not to miss (*causes would be vascular*)



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Page 1 of 5.

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### Learning Outcomes

#### Presentations of C6, C7 & C8 radiculopathy (nerve root)

##### C6:

- Radiating pain down the arm to the thumb & index finger
- Weakness in the biceps & wrist extensors
- Tingling or burning sensations in the fingers
- Difficulty w/ fine motor skills (buttoning a shirt or holding small objects)

##### C7:

- Radiating pain down the arm to the middle finger
- Weakness in the triceps & wrist flexors
- Tingling or burning sensations in the middle finger
- Difficulty with grip strength & hand dexterity

##### C8:

- Radiating pain down the arm to the ring & little finger
- Weakness in the hand intrinsic muscles
- Tingling burning sensations in the ring & little fingers
- Difficulty w/ fine motor skills (typing or writing)

#### Presentation of median & radial nerve entrapment

##### **Median nerve:** (aka. carpal tunnel syndrome)

- Numbness, tingling, or burning sensation in the thumb, index, middle, & half of the ring finger
- Weakness in the hand, especially the thumb, making it difficult to grasp objects or hold onto things
- Pain in the wrist &/or forearm, which can be worse at night or during repetitive tasks
- Feeling of clumsiness or a tendency to drop things

##### **Radial nerve:** (aka. radial tunnel syndrome)

- Pain or tenderness in the forearm or elbow, which can be worse when bending the wrist or fingers back or rotating the forearm
- Weakness in the wrist or fingers, making it difficult to grip or hold onto things
- Numbness or tingling sensation in the back of the hand, or the thumb, index, & middle finger
- Feeling of weakness or inability to extend the wrist or fingers

#### Differentiate between radiculopathy & peripheral nerve entrapment presentations

##### **Location of symptoms:**

- **Radiculopathy:** usually causes symptoms in specific area of the arm or hand that corresponds to the location of affected nerve root (e.g. C6 causes Sx in neck, shoulders, & arms, while C8 causes Sx in the ring & little fingers)
- **Peripheral nerve entrapment:** causes Sx in specific nerve distribution in the arm or hand (e.g. carpal tunnel syndrome causes Sx in the thumb, index, middle, & half of the ring finger)

##### **Pattern of Sx:**

- **Radiculopathy:** usually causes Sx that radiate along a specific nerve pathway (herniated disc causing C6 radiculopathy can cause pain that radiates down the arm to the thumb & index finger)
- **Peripheral nerve entrapment:** Usually causes Sx in a more localised area (carpal tunnel syndrome usually causes pain, numbness, & tingling in the thumb, index, middle, & half of ring finger)

##### **Onset of Sx:**

- **Radiculopathy:** usually develops gradually over time (herniated disc may take weeks or months to cause noticeable Sx)
- **Peripheral nerve entrapment:** can develop suddenly or gradually (carpal tunnel syndrome can develop suddenly due to repetitive hand movements or wrist injury)

##### **Association w/ other conditions:**

- **Radiculopathy:** often associated w/ other spinal conditions (e.g. herniated discs, spinal stenosis, or degenerative disc disease)
- **Peripheral nerve entrapment:** can be associated w/ activities or conditions that put pressure on the nerves (e.g. repetitive hand movements, wrist injuries, or certain medical conditions like diabetes)

## Management of pts w/ radiculopathy

### Conservative management:

- Rest
- Manual therapy
- Medications
- Heat & ice therapy

### Invasive management:

- Epidural steroid injections
- Surgery

### Lifestyle changes:

- Maintaining good posture & body mechanisms
- Exercise
- Maintaining a healthy weight

## Different types of TOS, how it's diagnosed & managed

### Neurogenic TOS:

- Compression of **brachial plexus**
- Shoulder, arm, & hand

### Venous TOS:

- Compression of subclavian **vein**
- Blood vessel that carries blood *from arm to heart*

### Arterial TOS:

- Compression of the subclavian **artery**
- Blood vessel that carries blood *from heart to arm*

### Diagnosis:

- Combination of medical Hx, physical examination, & diagnostic tests
- Tests: x-rays, MRI or CT scans, EMG, or nerve conduction studies

### Management:

- **Conservative management:** manual therapy, medications, lifestyle modifications
- **Invasive management:** surgery, vascular procedures (*angioplasty or stenting*)



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Page 2 of 5.

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### Learning Outcomes (cont)

#### Presentations for MI, angina & apical lung tumours

- MI** (blood flow to heart is blocked, damage or death of heart muscle):
  - Chest pain or discomfort (pressure / tightness in the chest)
  - Pain or discomfort in the arms, neck, jaw, back, or stomach
  - SOB
  - Nausea / vomiting
  - Sweating
  - Feeling lightheaded or dizzy
- Angina** (chest pain that occurs when heart muscle don't get enough blood flow / oxygen):
  - Pressure or squeezing sensation in chest
  - Pain or discomfort in the arms, neck, jaw, shoulder, or back
  - SOB
  - Nausea / vomiting
  - Sweating
  - Feeling lightheaded or dizzy
- Apical lung tumours** (lung tumour that grows in the apex of lung):
  - Chest pain
  - Coughing up blood
  - SOB
  - Hoarseness or difficulty speaking
  - Fatigue or weakness
  - Loss of appetite or weight loss
  - Swelling of the face, neck, or arms

#### Postural hypotension (aka. orthostatic hypotension)

- Definition:**
  - Drop in BP ( $\geq 20$  mm Hg systolic and/or  $\geq 10$  mm Hg diastolic) that occurs within 3 minutes of standing
- Mechanism:**
  - Normally, when person stands up, body compensates by increasing HR & constricting blood vessels to maintain BP → if postural hypotension, compensatory response is inadequate, leading to drop in BP & reduced blood flow to brain
- Symptoms:**
  - *Dizziness or lightheadedness*
  - *Fainting or near-fainting*
  - *Blurred vision or tunnel vision*
  - *Nausea*
  - *Fatigue*
  - *Headache*
- Causes:**
  - *Dehydration*
  - *Medication side effect*
  - *Diabetes*
  - *Nervous system disorder*
  - *Aging*
- Treatment\*** (depends on underlying cause):
  - Lifestyle changes: staying hydrated, standing up slowly, wearing compression socks
  - In some cases, medication adjustments

