

Neuroimaging

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Disclosures

- None



Objectives

- In a variety of clinical scenarios...
 - Discuss the most appropriate **first** imaging test for **headache**
 - Discuss the most appropriate **first** imaging test for **neck pain**
 - Discuss the most appropriate **first** imaging test for **back pain**

Waittimes.novascotia.ca (May 25, 2023)

- CT → 90% of people served within 178 days
- MRI → 90% of people served within 316 days
- Neck surgery consult → 90% of people served within 442 days
- Back surgery consult → 90% of people served within 666 days

How long does it take to...

- Walk across Canada → 10 months*
- Circumnavigate the world → 137 days**
- Neck surgery consult → 137 days***
- Back surgery consult → 90% of people served within 666 days***

*walkcanada.com

**Guo Chuan, 2013

***waittimes.novascotia.ca



Guidelines

- Choosing Wisely Canada
- Canadian Association of Radiologists Referral Guidelines
- American College of Radiology Appropriateness Criteria

My patient has a headache...

- It's probably migraine or tension headache
- But it hasn't responded to the usual interventions
- But I'm not really convinced it's a primary headache
- But my patient is worried it might be a brain tumour
- But my patient is worried it might be an aneurysm

First imaging for intracranial mass effect:

- CT or MRI?
- CT is great for...
 - Mass
 - Hydrocephalus
 - Hemorrhage
 - Edema
- **Screening** for these with MRI is impractical!



First imaging for brain aneurysms:

- CTA or MRA?
- Dealer's choice
- Remember the incidence of brain aneurysm in the general population!



My patient has neck pain...

- It's probably disc/facet degeneration
- But there are signs/symptoms of radiculopathy
- But there are signs/symptoms of myelopathy
- But there are red flags for fracture, infection, inflammation, cancer

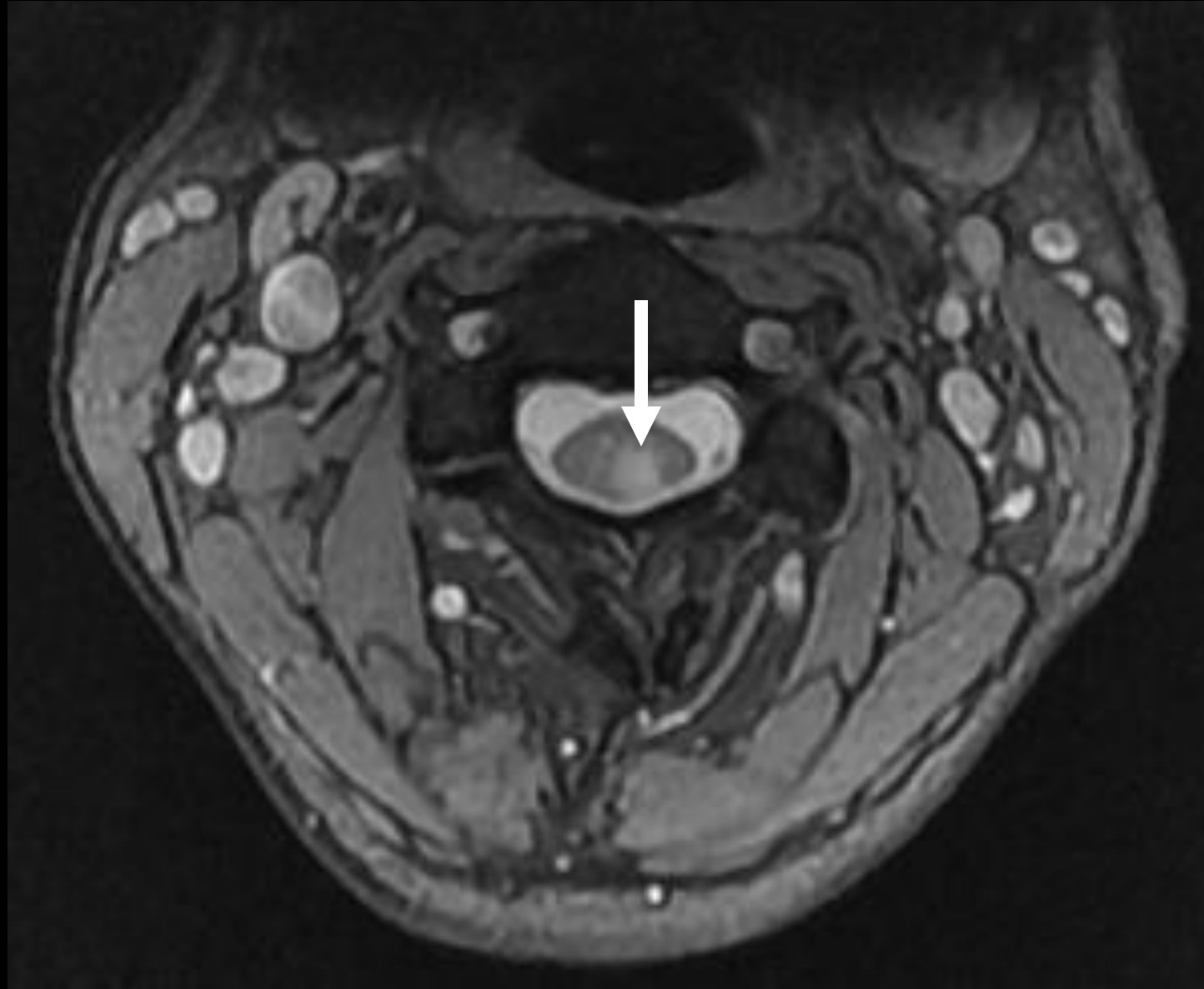
First imaging for uncomplicated neck pain:

- X-ray, CT or MRI?
- Plain x-rays are most efficient to confirm DDD
- CT adds nothing in this scenario
- CT has a role in acute trauma, because of its relatively high sensitivity for fractures
- MRI is overkill in the absence of radiculopathy, myelopathy or red flags



First imaging for cervical radiculopathy or myelopathy:

- CT or MRI?
- CT has limited soft tissue resolution, especially in the lower cervical spine
- CT does not show nerve roots or cord



Imaging for red flags in the cervical spine:

- X-ray, CT or MRI?
- Plain films lack the sensitivity to rule out the snake in the grass
- Best choice between CT and MRI is a balance between speed and diagnostic performance



A word about imaging the thoracic spine...

- Plain x-rays are most efficient to rule in DDD
- CT does not add precision to the above assessment
- CT still has a role in acute trauma because of greater sensitivity for subtle fractures
- CT or MRI would be appropriate for red flags
- CT is useless for radiculopathy or myelopathy → these require MRI

My patient has back pain...

- It's probably disc/facet/sacroiliac joint degeneration
- But there is also sciatica
- But there are signs/symptoms of spinal stenosis
- But there are signs/symptoms of cauda equina compression
- But there are red flags for fracture, infection, inflammation, cancer

Imaging for uncomplicated back pain:

- Nothing vs. x-rays vs. CT/MRI
- Nothing if duration < 6 weeks and no red flags
- X-rays are efficient to confirm DDD

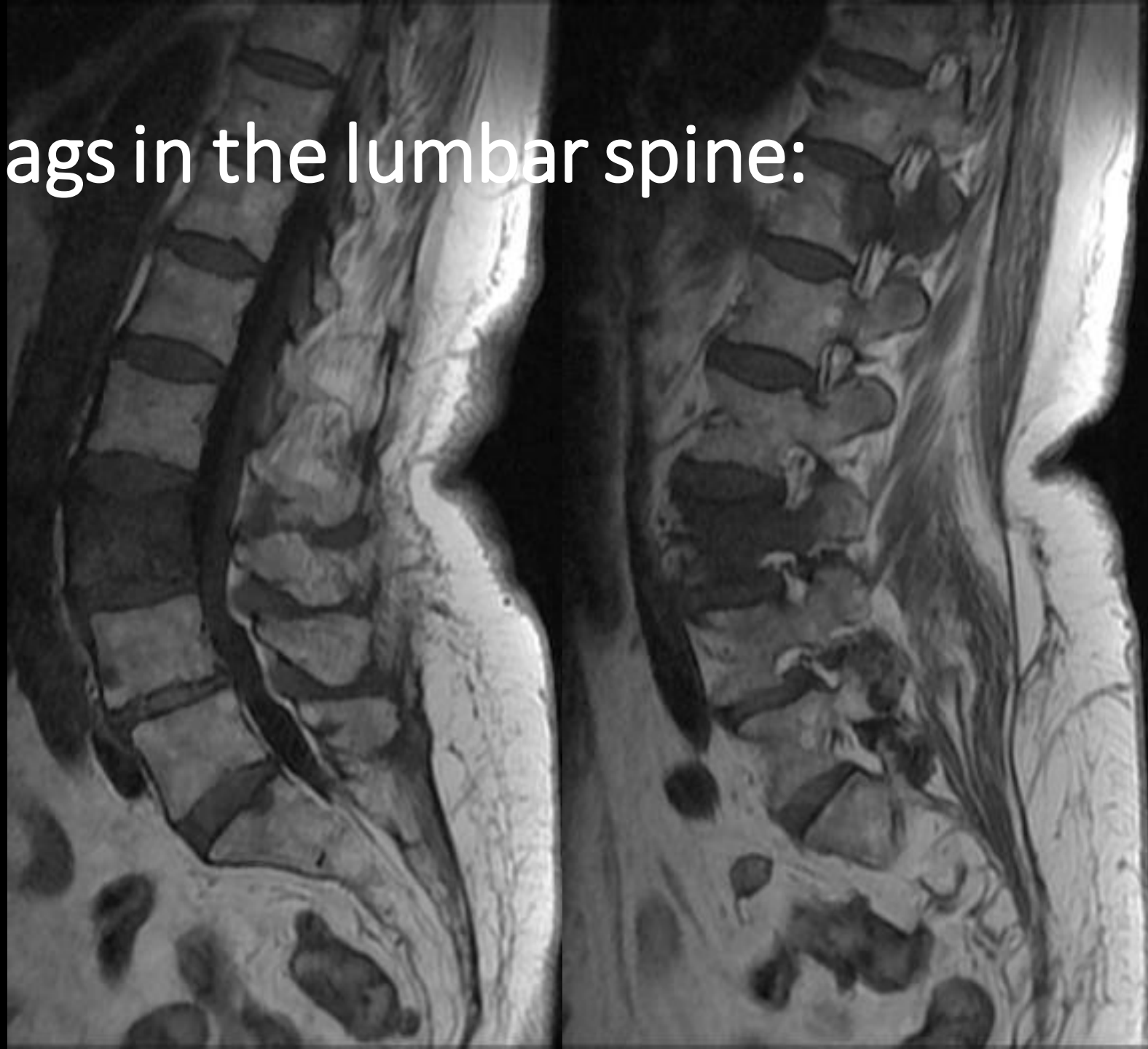
Imaging for sciatica or lumbar spinal stenosis:

- CT or MRI?
- But CT can show the disc
- Do you need the scan to make the diagnosis or to guide treatment?



Imaging for red flags in the lumbar spine:

- CT or MRI?
- Best choice balances speed and diagnostic performance



Imaging for cauda equina compression:

- CT or MRI?
- But surgical assessment should occur concurrently!



A word about imaging the whole spine...

Please ~~Don't~~ don't :)

In summary...

- Focus is on First Test:
 - Rule out intracranial mass, hydro, hemorrhage or edema → CT
 - Screen for cerebral aneurysm → CTA or MRA
 - Rule in DDD → X-ray (may also be good enough to confirm simple osteoporotic compression fracture)
 - Cervical/thoracic myelopathy or radiculopathy → MRI
 - Red flags in the cervical/thoracic spine → CT or MRI
 - Uncomplicated back pain < 6 weeks → Nothing
 - Sciatica, spinal stenosis, red flags in lumbar spine → CT or MRI
 - Rule out cauda equina compression → MRI + surgical consult

Thank you!

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Free Hot Breakfast