RED FLAGS, RISK & SPINAL INFECTION

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An evidence informed clinical reasoning framework for clinicians in the face of serious pathology in the spine

Finucane, Selfe, Mercer, Greenhalgh, Downie, Verhagen, Poole, Henschke, Boissonault, Beniuck
Framework example

1. Data from patients history
2. Planning Physical Exam
3. Data Physical Exam
4. Evaluation of patient's presentation
5. Best decision regarding management

Interpret history using evidence informed knowledge
Interpret PE using evidence informed knowledge
Case Study 1

- 43 yr old male (smoker) in UK 4 years-Europe mainly Spain
- Place of birth Somalia. Farm worker
- 1 year h/o high temperature with new onset low back pain and thoracic pain
- Fever at the time of onset
- Not responded to physiotherapy
- Band-like pain 8-9/10 on VAS
- No leg pain or paraesthesia
- Blood tests reassuring
- Stays in bed most of day, fatigue, cough- response positive, weight stable. Treated with bed rest for most of the year
- O/E thoracic kyphosis, thoraco-lumbar band like pain bilat. No active extension positive percussion
- No neuro deficit in lower limbs or thorax
Case Study 2

- 45 yrs old ex drug addict
- Poor social circumstance - previously homeless
- Recent abscess abdomen and right leg
- Only 2-3 hours sleep per night due to pain
- Diabetic
- Band like pain 10/10
- No fevers or chills
- O/E Walked with rollator, refused to disrobe, within limits of Objective examination neurologically intact - legs subjectively felt weak
- CRP 2.5
Case Study 3

43yr old male
MRI;
Severe focal kyphosis centred on C4 vertebral body with moderate fluid signal in C3-4 disc space and end plate destruction centred on C4-5 AND C5-6. Moderate impingement on the cervical cord at this level. Diffuse intermediate intensity marrow oedema at C4,5,6,7, T1. No high signal in cord is seen
Well defined fluid collection posteriorly at the cord extending from C2-3 to C5-6 measuring 42mm in long axis and 5mm in depth representing chronic epidural collection
Appearance in keeping with spinal sepsis
16 back pain guidelines, management in Primary Care setting; most common

- Infection; IV drug abuse, fever, corticosteroids, immunosuppressant, night pain
Spinal Infection (SI) scoping exercise review was commissioned by the Charted Society of Physiotherapy (CSP) as part of an international collaboration.

Rare condition incidence estimated to be 0.2-2.4 per 100 000.
Although infections of the spine such as extra pulmonary Tuberculosis (TB) are uncommon, they are on the rise. The majority of SI are of insidious onset and commonly there is a prolonged period of time between onset and diagnosis. Patients can remain relatively healthy until symptoms manifest themselves in the later stages of the disease. Back pain is the most common presenting symptom which can progress to neurological symptoms and if not treated in a timely manner, lead to serious complications such as paralysis, instability of the spine and can be fatal."
DESCRIPTIVE STATISTICS

- Male 63.9% Female 36.1%
- Mean age 56.93 yrs (SD 7.97)
- World bank classification by income %
  - High income 35%
  - Upper middle income 6%
  - Lower middle and lower income 0%
MORBIDITIES

- Diabetes (immunosuppression)
- Cancer
- CVD
- Liver disease
- Renal failure/CKD
- Hypertension/Hypotension
- RA
- Pulmonary TB
- HIV positive
- Adrenal insufficiency
SOCIAL FACTORS

- Intravenous drug use (immunodeficiency)
- Corticosteroid use
- Alcoholism
- Morbid obesity
- Smoking
TRIGGERS

- Surgery
- Pre-existing infection
- Immunosuppression
- Invasive procedures
- Spinal trauma
- Recurrent cholangitis/UTI
- Tonsillitis
ENVIROMENTAL FACTORS

- Migrant
- Occupational exposure
- Lived in rural area
- Born in TB endemic country
BEHAVIOURAL FACTORS

- Ingestion of unpasteurised dairy product
- Contact with infected animals
- Contact with TB infected patient
PREDISPOSING FACTORS

- History of TB (only mentioned in one paper)
SYSTOMATICALLY UNWELL

- Fever
- Rigors
- Fatigue or weakness
- Sweating
- Active infection
- Sepsis/septic shock
- Night sweats
- Delirium
- Anorexia-low BMI below 19
- Cough
- Psoas abscess-think TB until proven otherwise
PAIN

- Spinal pain
- Tenderness
- Radiculopathy
- Arthralgia
- Myalgia
- Sciatic pain
- Abdominal pain
- Headache
- Testicular pain
NEUROLOGICAL SYMPTOMS

- Neurological dysfunction
- Limb weakness
- Para/quadriplegia
- Para/quadriparetesis
- Paralysis
- Myelopathy
UROLOGICAL SYMPTOMS

- Bladder/bowel dysfunction
- Urinary incontinence
- Urinary retention
ORGAN INVOLVEMENT

- Hepatosplenomegaly
- Encephalopathy
MISCELLANEOUS

- Constitutional symptoms
- Spinal deformity
- Groin/flank mass
- Meningitis
- Other
Most common microorganisms were:
- *Staphylococcus aureus* (27%; n=520),
- *Mycobacterium tuberculosis* (13%; n=264)
- and *Brucella* (10%; n=210)
Recommendations

- Red flags for Spinal Infection evidence remains of low quality and clinical features alone should not be relied upon to identify Spinal Infection.
- Understanding risk factors; immunosuppression due to comorbidities or drug use and environmental factors (surgery and social circumstances).
- The prevalence of these risk factors combined with the presentation of clinical features of spinal pain with possible neurological dysfunction and fever should lead to a heightened index of suspicion suggesting further investigation.

- MRI is the imaging technique of choice when investigating suspected Spinal Infection.
Conclusion

- stratifying red flags into a priori (risk factors) and a posteriori (clinical features)

- Risk factors for Spinal Infection (including intravenous drug use, diabetes and cancer) have high sensitivity (98%) and negative predictive value (99%) making them a better predictor of SI than clinical features such as the ‘classic triad’ (spinal pain, fever and neurological dysfunction)
TB Strategy

- Collaborative TB Strategy for England 2015-2020
- 2016, 5,664 TB cases notified in England,
- following a sustained annual decline of at least 10% in the number of TB cases since 2012, the decline slowed to 1% in 2016
- rate of TB in the UK born population in 2016 remained low at 3.2 per 100,000,
- the rate of TB in the non-UK born population in 2016 was 49.4 per 100,000, and remained 15 times higher than in the UK born population, with 74% of TB cases born abroad
Social Risk Factors

- Current alcohol misuse
- Current or history of homelessness
- Drug misuse
- Imprisonment
Infection in the musculoskeletal system

- Medical history of HIV/AIDS
  (Greenhalgh & Selfe, 2006)

- Medication including DMARDs
  (Bogduk & McGuirk, 2002)
Infection (rare)

- Poor living conditions e.g. overcrowding, refuge/hostel
- Exposure to TB >8 hours
- No TB vaccination

(Greenhalgh & Selfe, 2009)
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WHAT SHALL WE DO NEXT?
MRI report

- T10-12 anterior infiltration and destruction of vertebral bodies.
- T10-11 disc space involvement
- Anterior spread under anterior longitudinal ligament with paravertebral abscess suggestive of TB

- 2/12 later
New posterior epidural abscess impinging on theca
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Recent abscess abdomen and right leg
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CRP 2.5
Changes at L2, L3 most likely in keeping with infective discitis and pre and paravertebral extension
Case 3

- Drug abuse
- H/O sepsis
- Homeless
TB Pathway

NB no blood tests indicated

Patient suspected of active, bone (including spinal) or joint TB
Complete tests on both arms of pathway

Test for respiratory TB
1) PA chest x-ray
2) Sputum sample-3 samples including 1 early morning sample

Test for non-respiratory TB
MRI affected site (CT if MRI contraindicated)

Refer to Royal Bolton Hospital Respiratory team

If spinal, access biopsy and culture via Salford Royal Foundation Trust Spinal team

If non-spinal discuss with RBH radiology team
Thank you for listening

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