Introduction:

Welcome to CUGH's bi-weekly clinical case-series, "Reasoning without Resources," by Prof. Gerald Paccione of the Albert Einstein College of Medicine. These teaching cases are based on Prof. Paccione's decades of teaching experience on the medical wards of Kisoro District Hospital in Uganda. They are designed for those practicing in low resource settings, Medicine and Family Medicine residents, and senior medical students interested in clinical global health. Each case is presented in two parts. First comes a case vignette (presenting symptoms, history, basic lab and physical exam findings) along with 6-10 discussion questions that direct clinical reasoning and/or highlight diagnostic issues. Two weeks later CUGH will post detailed instructors notes for the case along with a new case vignette. For a more detailed overview to this case-series and the teaching philosophy behind it, see Introduction to "Reasoning without Resources". Comments or question may be sent to Prof. Paccione at: gpaccion@montefiore.org

Note: If you would like to be notified when a new case is posted (along with instructor notes for the previous one), send your e-mail to Jillian Morgan at jmorgan@CUGH.org.

About the Author:

Dr. Gerald Paccione is a Professor of Clinical Medicine at the Albert Einstein College of Medicine in the Bronx, New York. His career has centered on medical education for the past 35 years – as a residency Program Director in Primary Care and Social Internal Medicine at Montefiore Hospital, and director of the Global Health Education Alliance at the school. He has served on the Boards of Directors of Doctors for Global Health, Doctors of the World USA, and the Global Health Education Consortium. Dr. Paccione spends about 3 months a year in Uganda working on the Medicine wards of Kisoro District Hospital where he draws examples for the case studies.

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CASE 16 – BACK PAIN III

A 35 year old woman with HIV presents with painful swallowing for 2 weeks and back pain for three months. She was diagnosed with HIV 6 years ago and has been on HAART for the past 2 years with questionable adherence and an unknown CD4 count. Two weeks ago she noticed mild chest pain with swallowing which progressed, and on presentation to Kisoro District Hospital 1 week ago oral thrush was noted. She received fluconazole for 3 days with relief.

Her lower back pain began gradually about 3 months ago, and noticeably worsened over the past month. Her back feels "stiff". The discomfort increases somewhat with walking, is partially relieved by rest but not completely, is independent of position, and sometimes prevents her from sleeping. For 2 days she's noted sharp pains shooting down her legs to her feet bilaterally. She's felt "hot" intermittently for 2 months, and lost 12 kg over 6 months. On review of systems, she notes intermittent headaches, diarrhea, general weakness, and a dry cough for >1 month. There's been no incontinence, focal weakness, dysuria, frequency or flank pain.

PE: Cachectic and chronically ill appearing, in no acute distress
BP 90/70 HR 90 R 20 T 38.5

Eyes: Conjunctiva non-icteric; fundi benign;
Mouth: no thrush visible; breasts normal
Neck: shoddy nodes < 1 cm diffusely;
Lungs: right lower lobe dullness to percussion, increased fremitus and basilar crackles, otherwise clear
Cardiac: PMI in 5th ICS, MCL; S1, S2 normal, without murmurs, rubs or gallups
Abdomen: no hepato-splenomegaly, tenderness or masses
Back: lower thoracic-upper lumbar spinal prominence with posterior protrusion ~ T11-L1, with loss of normal lumbar lordosis;
– point tenderness elicited with percussion over T11 and L1
– pain and ↓ range of motion of back in all directions
Neuro: Mental Status, cranial nerves, cerebellar exams: normal
Motor: 5-/5 all muscle groups, wasting
Sensory: no focal deficits to pin, touch, position, vibration;
Reflexes: diffusely +2-3; (-) Babinski;
Gait: slow, narrow-based;

1. What is the "frame" (i.e. the key clinical features the final diagnosis must be consistent with) of this case?

- *HIV with probable esophageal candidiasis (thus implying a CD4 count <200)*
- *Back pain >3 months, progressive, present both at rest and with movement*
- *Lower thoracic-upper lumber point tenderness over the spine*
- *Shooting pains to feet for days*
- *Fever, weight loss*
- *Dry cough with crackles right base*

2. Osteoarthritis, lower back strain and lumbar disc disease are common in Kisoro where women bear many children, "dig" daily, and carry heavy loads.

What 3-4 clinical features make these UNLIKELY causes of the back pain in this patient (i.e. "muscular-skeletal" back pain, with an unrelated HIV-associated infection causing the fever)?

- *Timing of the pain: the pain in this patient is chronic and progressive. "Benign" muscular-skeletal pain usually resolves over time (most frequently over days, sometimes weeks, rarely lasting a month). It's also not progressive, but rather diminishes or becomes intermittent. The chronic progressive nature of this pain suggests an expanding mass or inflammatory process in the spine.*

- *Nature and precipitants of the pain: Benign muscular-skeletal pain is relieved by rest, is most often positional and doesn't interfere with sleep. This patient's rest pain, which sometimes interferes with sleep, suggests a mass or inflammatory process in the spine.*

- *Spinal point tenderness: indicates bone/spine pathology as opposed to para-spinal pathology as in lumbar strain/sprain.*

3. What is the differential diagnosis of spinal point tenderness in this patient?

- *Osteomyelitis of the spine: potential organisms include tuberculosis, brucella, gram (-) bacteria (from the urinary tract), staphylococcus.*

- *Metastatic cancer to the spine, osteosarcoma (younger patients), myeloma (older patients)*

4. What is the most likely diagnosis and why is it most likely?

What is its pathogenesis?

TB of the spine (Pott's disease) is by far the most probable diagnosis, probably >90% likely both epidemiologically and clinically.

Epidemiologically, TB is the most common cause of osteomyelitis in Africa; our patient is HIV (+); TB is the most common opportunistic infection in HIV (+) patients in Africa, 30-40% of TB in HIV (+) patients is extra-pulmonary; and the skeletal system is a common site (10-15%) of extra-pulmonary disease. The spine is the most common site of musculo-skeletal TB, ~50% of cases.

Clinically, the constitutional symptoms, fever, chronic progressive pain, point tenderness in the lower thoracic-upper lumbar region and now the suggestion of neurologic involvement with shooting pains in the lower extremities fits the diagnosis of vertebral TB very well. Unfortunately, most cases of spinal TB do NOT manifest constitutional symptoms until the disease is advanced. Constitutional symptoms are more common in HIV (+) patients, in which case they sometimes stem from coexisting tubercular disease in other sites such as the lungs.

Skeletal TB is usually reflects reactivation of dormant foci spread hematogenously from the lungs, although the source of spinal TB can also be adjacent nodes draining a pleural-pulmonary infection or hematogenous spread from the genitor-urinary system via Batson's venous plexus.

Usually, the primary source of infection begins in the vertebral metaphysis and erodes into the vertebral end plate with resulting disc space narrowing, but sparing of the disc. Often adjacent vertebrae are involved. The lower thoracic and upper lumbar vertebrae are most commonly involved, each involved about 25-50% of the time, with

the cervical spine involved in 5-25%. Paraspinal abscess formation is common, often to the sides and posterior to the vertebrae.

Associated pulmonary disease is reported in 30-50% of patients with vertebral TB - and is likely in our patient by both history and physical exam.

Spinal TB progresses slowly and symmetrically, with many series reporting delays in diagnosis of 1-2 years.

5. What are clinical and x-ray clues that help differentiate the causes of spinal disease?

- *TB: younger age (<40), strong HIV association; thoracic–upper lumbar location usually; can involve multiple vertebrae; lytic; early narrowing but late destruction of disc space; early anterior vertebral body involvement causes anterior collapse/wedge compression, "gibbus" deformity (posterior vertebral involvement is seen in 20-50%); body morphology lost early; spares vertebral pedicles though paraspinal (Pott's) and Psoas abscesses can erode the transverse process; canal compression is common.*

- *Brucella: commonly involves axial skeleton; older (>40 years old); exposure to cattle/goats, unpasteurized milk; no HIV-association; most often lumbar; single or multiple vertebrae; lytic and blastic; early disc involvement; wedging uncommon; vertebral body intact until late; rare gibbus or neurologic compromise.*

- *Bacterial osteomyelitis with staph or gram (-)'s: in women, urinary gm (-)'s can cause spinal osteomyelitis due to venous drainage of kidneys via para-spinal Batson's plexus. Pyogenic organisms are more likely to present acutely, with fever and early disc destruction, but symptoms can be over months as well and fever absent.*

- *Metastatic cancer: destroys vertebral pedicles and vertebral bodies, spares disc spaces; rapid, asymmetric neurologic compromise.*

6. What are the potential complications of this disease and how frequently are they seen?

The most significant complications of spinal TB are neurologic compromise, structural deformity and paraspinal abscess.

- *Neurologic compromise, the most serious complication, is seen in ~10-40% of patients in endemic areas (usually such regions have poor access to care), is most common in the thoracic region, and is usually due to compression by bony or disc fragments or pus - but can also be due to radiculo-myelitis from local spread of infection from the adjacent osteomyelitis. It can occur "early" (within 2 years of disease onset) or "late" (after 2 years), and be due to either complications of active disease (via infection, thrombosis, compression) or healed disease (transection by bone or constriction by fibrosis).*
- *Deformity is usually due to the collapse of anterior spinal structures (>90% of cases), more common in children and when more than one vertebra is involved. Most of the collapse occurs in the first 18 months of the disease process ("active phase") but can continue after disease eradication by antibiotics, especially in children. Adults usually manifest a kyphotic deformity of less than 30^{o}, but can be much more severely affected and even progress later to paraplegia. Children improve in ~40% of cases, but continue to deteriorate in another 40%, sometimes after a lag period of 3-6 years. A formula relating later progression (the final angle of deformity) to the initial loss of body height was 90% accurate (Clin Orthop Related Res 2002; 398:85-92).*
- *Paraspinal abscesses: Pus can track along fascial planes bordering the spine and emerge in sites distant from the initial site of infection forming paraspinal (Pott's), inguinal, posterior cervical, retropharyngeal and psoas abscesses - with a diverse range of site-specific associated symptoms.*

7. What is the appropriate treatment for the disease and its complications?

All with spinal TB should receive multi-drug therapy with a rifampin-containing regimen (e.g. RIPE) for a minimum of 6 months, but some evidence exists that 9-12 months of therapy may be superior vis-à-vis relapse despite apparent resolution of clinical symptoms after 6 months. Some regard intensive 4 drug therapy for 3-4 months followed by 3 drugs for a 14-15 month continuation phase as the standard of care.

Surgery is an adjunct to medical therapy in some patients – those with severe neurologic deficits at presentation, severe spinal instability, neurologic deterioration on therapy, continued progression of kyphosis especially when 3 or more vertebra are involved, or large abscesses. Significant continued pain or instability are relative indications for operative intervention.

Suggested Reading:

Kotil, K et. al. 2007 J Neurosurg Spine 6:222–228 Medical management of Pott disease in the thoracic and lumbar spine: a prospective clinical study

Freilich, D., Swash, M. Diagnosis and management of tuberculous paraplegia with special reference to tuberculous radiculomyelitis Journal of Neurology, Neurosurgery, and Psychiatry, 1979, 42, 12-18

Cormican, L. et al Current difficulties in the diagnosis and management of

spinal tuberculosis 2006 Postgrad Med J 82:46–51

Storm, M., Vlok, G. Musculoskeletal and Spinal Tuberculosis in Adults and Children in *Tuberculosis: A Comprehensive Clinical Reference* Schaaf H.S., Zumla A. (Eds). Saunders, Elsevier 2009