Vertebral Osteomyelitis Associated with VRE Empyema Following Stabilization of Unexplained Compression Fracture

Kaley Tash, HMS3
Gillian Lieberman, MD
Clinical Presentation

• 45yoF c h/o alcoholism, cirrhosis, hepatic encephalopathy, pancreatitis, diabetes mellitus, gastroesophageal reflux, recently admitted to outside hospital for EtOH detoxification.

• Returned from rehab with new acute back pain, bilateral leg spasms. No reported history of recent trauma.

• Transferred to BIDMC following chest CT.
Flattened T4 Vertebral Body on CT

Coronal +C (+Contrast) CT from OSH.

Hospital Day 0
Axial C+ CT from OSH. DDx of mass includes abscess, hematoma, neoplasm. Bone fragments and mass impinge on spinal canal.

Hospital Day 0
Evidence of cirrhosis, prior trauma on CT

Ascites

Chronic L non-united posterior 10th rib fracture

Axial C+ CT from OSH.

Hospital Day 0
Pursued further imaging at BIDMC to guide likely surgical management.

MR uninterpretable due to motion, so CT repeated.
Kyphotic Deformity and Cord Compression on CT

- Destruction of T4 vert. body
- Cord compression from soft tissue mass + bone fragments
- Kyphosis
- Normal mineralization, vertebral height, disc spaces

Sagittal C- CT.

Bone Fragments
What destroyed T4?

- **DDx:** osteomyelitis, neoplasm, occult trauma (e.g., seizure*)
- Blood cultures positive for *Corynebacterium* in 1 of 4 bottles, suggestive of possible osteomyelitis.
- Lack of diffuse spine disease and no recent trauma history raised strong suspicion for osteomyelitis, including Pott’s disease.

*Aboukasm AG and Smith BJ. 1997*
Upright chest PA and Lateral. Note that spine deformity is not clearly seen. Note that CXR is not sensitive for vertebral compression fracture or osteomyelitis.

Hospital Day 15
Anesthesia unable to ventilate pt in prone position with safe pressures, likely due to ascites pushing against diaphragms.

Surgery rescheduled using anterior approach.
R Pneumothorax and Lung Collapse on Intra-Op CXR

Intra-op PA CXR, supine portable.

Hospital Day 19
Post-Op Day 0
Pathology Result from T4 Fragments

- Giant cell reaction consistent with infection or fracture. Infection likely given no known history of recent trauma.
- No evidence of neoplastic process.
- Negative gram stain, acid fast stain, KOH stain.
- Despite withdrawal of antibiotics to increase culture yield, bacterial + mycobacterial + fungal cultures were negative.
R Pleural Effusion and Pneumothorax on Post-Operative CXR

- R pleural fluid marginating mediastinum
- Decreased R lung volume

Supine AP Portable CXR.
Correction of Kyphotic Deformity, Bone Fragments on CT

Hospital Day 1

Bone Fragments

T3
T5

BIDMC PACS

Sagittal C-CT.

Hospital Day 19
Post-Op Day 0

New Hardware
Post-Op Edema of Cord on MRI

Increase T2 intensity of cord at T3-T5. Post-op changes vs. ongoing impingement. Improved neuro exam.

Sagittal MRI, T2-weighted.
Patient experienced hypoxia while recovering from procedure and still required supplemental oxygen at post-operative day 10. Team ordered CXR.
Non-Resolution of R Pleural Effusion on CXR

- Elevated R hemidiaphragm
- RML/RLL collapse
- R apical lateral ptx
- Persistent R pleural effusion despite chest tubes. Small L effusion.

Supine AP Portable CXR.

BIDMC PACS

Hospital Day 29
Post-Op Day 10
Surgical team performed bedside pleurodesis with doxycycline x 2, then ordered CXR to evaluate results.
Official read: “Entire right hemithorax is now filled with fluid.”

Differential includes R lung collapse. Mediastinal scarring prevents shift so difficult to differentiate fluid from collapse. Team ordered CT.

Supine AP Portable CXR.

Hospital Day 31
Post-Op Day 12
Flexible Bronchoscopy Report

“A flexible bronchoscope was inserted into the trachea. There was copious purulent secretions both in the distal trachea and completely occluding the right main stem. These were therapeutically aspirated.”

–David Berkowitz, MD

Secretions spilled into left mainstem bronchus, pt became hypoxic and bradycardic, required emergency intubation and pressors. Pt transferred to MICU.
Intubated post-bronchoscopy. R lung inflation improved with clinical improvement in oxygen requirement.

Continued effusion

Supine AP Portable CXR.
Hospital Day 32-60

- Developed hepatorenal syndrome, HD started
- Bleeding from chest tubes, required repeated transfusions (43 PRBCs), FFP, cryo, DDAVP
- Chest tubes placed on waterseal with goal of tamponade, self-extubated 5/16
- Delirium, BC grew VRE x 2 sets, started linezolid
- Stabilized, transferred to general medicine floor
- Fevers to 100.4 on 6/3-6/7
- LE numbness/weakness worse on 6/7
Axial CT with Contrast. Large R loculated R pleural effusion with heterogeneous density, small pockets of gas. Split pleura sign is concerning for empyema.*

*Kraus GJ. 2007.

Hospital Day 60
Post-Op Day 41
Sagittal C-CT. Destructive process involving T3 with bony fragments impinging on spinal canal.

Hospital Day 60
Post-Op Day 41
Progression of Kyphotic Deformity on CT

Sagittal C- CT.

Post-Op Day 0

Post-Op Day 45
Fever, ↑LE weakness
T3 Destruction Compromising Surgical Repair on CT

T3 Fragments in Spinal Canal.

Hardware Loosening.

Axial C- CT.

Hospital Day 64
Post-Op Day 45
Ultrasound. Fluid grew vancomycin-resistant Enterococcus. Pt already got course of linezolid for VRE bacteremia. Now started on daptomycin for likely T3 osteomyelitis with pleural+spinal empyema.

Hospital Day 66
Post-Op Day 47
Outcome

• Pt deemed not a surgical candidate given severe medical issues, including hepatorenal syndrome.
• Did not meet criteria for liver transplant.
• Discharged to rehab on dialysis with plan to continue daptomycin suppression.
• Expired in Hospice three months after discharge.
• No known autopsy.
Pleural Effusion Can Delay Recognition of Thoracic Vertebral Osteomyelitis

• Bass, et al., 1998 describe 5 cases of vertebral osteomyelitis with pleural effusion.
• None had evidence of osteomyelitis on CXR.
• Effusion culture = bone culture where both known (2/5).
• In 4/5, management directed at effusion, and dx of osteomyelitis delayed up to 6 wks.
• Delay contributed to neurologic complication in 2/5.
Conclusions

• Pleural effusion in our pt was initially expected post-op, but infected effusion became contiguous with likely spinal empyema and T3 osteomyelitis.

• Pleural effusion can be the presenting sign of osteomyelitis and can delay its recognition, as pulmonary issues tend to become the focus of care (Bass, et al, 1998).

• If pt has back pain in the setting of unexplained pleural effusion, investigate the spine!
References


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