RADY 404: Radiographic Findings of Acute Invasive Fungal Sinusitis

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Faculty Advisor: Dr. Valerie Jewells

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Patient is a 50 y.o. male with poorly controlled insulin dependent DMII (recent A1C 16.4), coronary artery disease (s/p CABG and >20 stents per patient’s report), myocardial infarction, HTN.

Chief Complaint: Worsening left sided facial edema and facial numbness
Focused patient history and workup

History of Present Illness

• Patient initially presented to a dentist with left facial swelling/pain and was diagnosed with a dental abscess.

• He had 3 left maxillary molars extracted at an outside hospital (OHS) and was prescribed an oral antibiotic and chlorhexidine.

• His symptoms became progressively worse, with increased pain. The swelling extended toward the left eye causing difficulty with opening the eye. It also extended to the lower jaw and neck and he began to experience odynophagia.

• He remained afebrile and the rest of his pertinent review of systems was negative. He denied any difficulty with breathing.
Focused patient history and workup

Diagnostic Workup:

• Cultures were taken from the surgical specimen which demonstrated scant fungal growth without aerobic or anaerobic bacteria.

• Blood cultures at this time were negative for fungal or bacterial infections.

• The patient subsequently underwent radiographic imaging including computed topography (CT) and magnetic resonance imaging (MRI).

Patient presented as a transfer to UNC due to concerns for urgent surgical management.
List of imaging studies

• CT Sinus without Contrast
• MRI Brain with and without Contrast
CT Sinus Axial Image

- Ethmoid extension is noted with bony destruction.
- There is posterior left maxillary sinus wall destruction (blue arrow).
- The retro-antral fat is preserved on the right and obliterated on the left (white arrows).
• Evidence of asymmetric soft tissue involving the floor of the left orbit consistent with extraconal extension.

• Destruction of the medial wall of the maxilla and ethmoid septa is also visible.

• Probable involvement of the left inferior rectus muscle (red arrow).

• Normal, air-filled, right maxillary sinus.

• Normal appearing, right middle turbinate (white asterisk).
MR Brain T2 Weighted Axial Image

- Heterogeneous intensity material opacifying the left maxillary sinus which demonstrates low T2 signal and restricted diffusion with involvement of the pterygopalatine fossa.

- Osseous involvement and destruction of the lateral and medial maxillary sinus walls. Normal right maxillary sinus walls (white arrows).

- Circumferential bright T2 mucosal signal surrounds the fungal components- seen in non-fungal sinus disease also (blue arrow).
• Hyperintense material within the left maxillary sinus, possibly representing a hemorrhagic component or metallic components (blue arrow).

• Involvement of pterygopalatine fossa.

• Normal air-filled right maxillary sinus (white asterisk).
MR Brain T1 Weighted Post Contrast Image

- Enhancement of the left pre-septal orbital soft tissues (blue arrow).
- Enhancement of left ethmoid (red asterisk).

MR Image, T1 Axial contrast
Patient treatment or outcome

- Patient surgically managed in the operating room with a left maxillectomy, infratemporal fossa resection, pterygopalatine fossa resection, and left functional endoscopic sinus surgery (FESS) upon admission.
- He was subsequently admitted to the medical intensive care unite (MICU) in the immediate postoperative period.
- He was placed on IV Amphotericin, IV Micafungin, IV Vancomycin, IV Cefepime, and IV Flagyl for appropriate antimicrobial coverage.
- Cultures returned positive for zygomycetes.
- Blood sugars were tightly controlled with insulin while inpatient with plans to follow up with endocrinology in the outpatient setting.
Differential Diagnosis

• Non-Invasive Fungal Sinusitis
• Sinonasal Lymphoma
• Squamous Cell Carcinoma
• Wegner’s Granulomatosis
• Acute Rhinosinusitis Complication
Discussion | Acute Invasive Fungal Sinusitis

**Pathogenesis:** Infection typically originates in the nasal cavity (usually at of the middle turbinate). It then spreads to the paranasal sinuses and then invades the mucosal barrier spreading to soft tissue, bone, orbit, and blood vessels. The typical fungal organisms seen include the following:

- **Aspergillus spp:** typically in neutropenic patients
- **Zygomycetes:** usually in diabetic patients
  - Rhizopus spp
  - Mucor spp
  - Rhizomucor spp
  - Absidia spp

**Clinical Course:** Rapidly progressive sinusitis, cranial nerve palsy, or facial discomfort are common presenting symptoms. It can occur over hours or days.
Discussion | Acute Invasive Fungal Sinusitis

• **Prognosis**: Reported mortality is estimated to be approximately 18%.³

• **Treatment**³:
  • Early and aggressive medical and surgical treatment.
  • Correction of neutropenia and diabetes (if appropriate).
  • Usually multiple surgical debridement
Wrap Up | Acute Invasive Fungal Sinusitis

• Definition
  • Rapidly progressive fungal infection of sinuses in which the infection crosses mucosa to involve blood vessels, bone, adjacent soft tissues, orbit, and intracranial cavities.\(^2\)

• Clinical Findings
  • Diabetic or immunocompromised patient with acute onset fever, sinus pain/pressure, and headache.\(^2\)
  • Rapidly progressive and can be fatal without appropriate therapy; mortality is reported up to 18\%.\(^3\)

• Imaging Findings
  • Contrast enhanced computed topography (CECT) with soft tissue and bone windows is ideal to evaluate bone erosion infiltration of soft tissue.\(^2\)
  • Best diagnostic clue: Complete or partial opacification of sinus with areas of bony erosion and infiltration of adjacent soft tissue structures.\(^4\)
References


