Invasive Fungal sinusitis

- Acute invasive fungal rhinosinusitis (AIFRS):
- Rapidly progressive fungal sinus infection in immunocompromised patients that involves bone and adjacent soft tissues via vascular spread.
- AIFRS is most common in maxillary and ethmoid sinuses followed by sphenoid sinus
- CT:
  - Sinus opacification with **focal bone erosion**, adjacent soft tissue infiltration
- MR:
  - Superior for evaluating intraorbital and intracranial extension

Fungal sinusitis

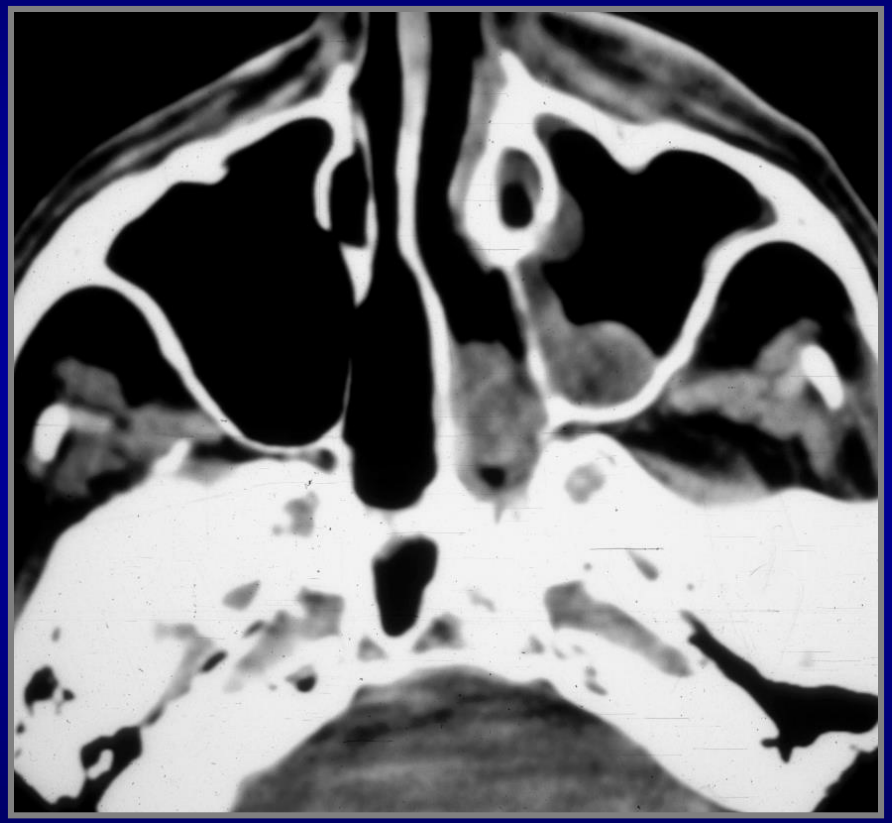
- AIFRS: Vascular and soft tissue invasion by fungi in patients with variety of predisposing conditions
  - **Neutropenia**/neutrophil dysfunction
  - Uncontrolled **DM**
  - Hematologic malignancy, aplastic anemia
  - Hemochromatosis
  - Chronic **immunosuppressive therapy**, post transplantation/chemotherapy
- 80% of diabetic patients with AIFRS caused by organisms in order Zygomycetes (*Rhizopus*, *Absidia*, *Mucor*)
- 80% of neutropenic patients with AIFRS caused by *Aspergillus* species
- Spread from sinuses via vascular invasion

Checklist

- **Consider**
  - AIFRS in diabetic/immunocompromised patients with maxillary disease; "dirty" periantral fat, even if no bone erosion present
- **Image Interpretation Pearls**
  - Do not confuse normal variability in volume of periantral fat or normal musculature with fat infiltration
  - Evaluate orbit, intracranial cavities for involvement (leptomeningeal enhancement)
  - Closely examine cavernous sinus, internal carotid artery in sphenoid AIFRS

Fungal sinusitis - invasive

- Immune deficient
- Early– non-spec. presentation
- CT – early
  - Mucosal disease
  - Nasal cavity soft tissue

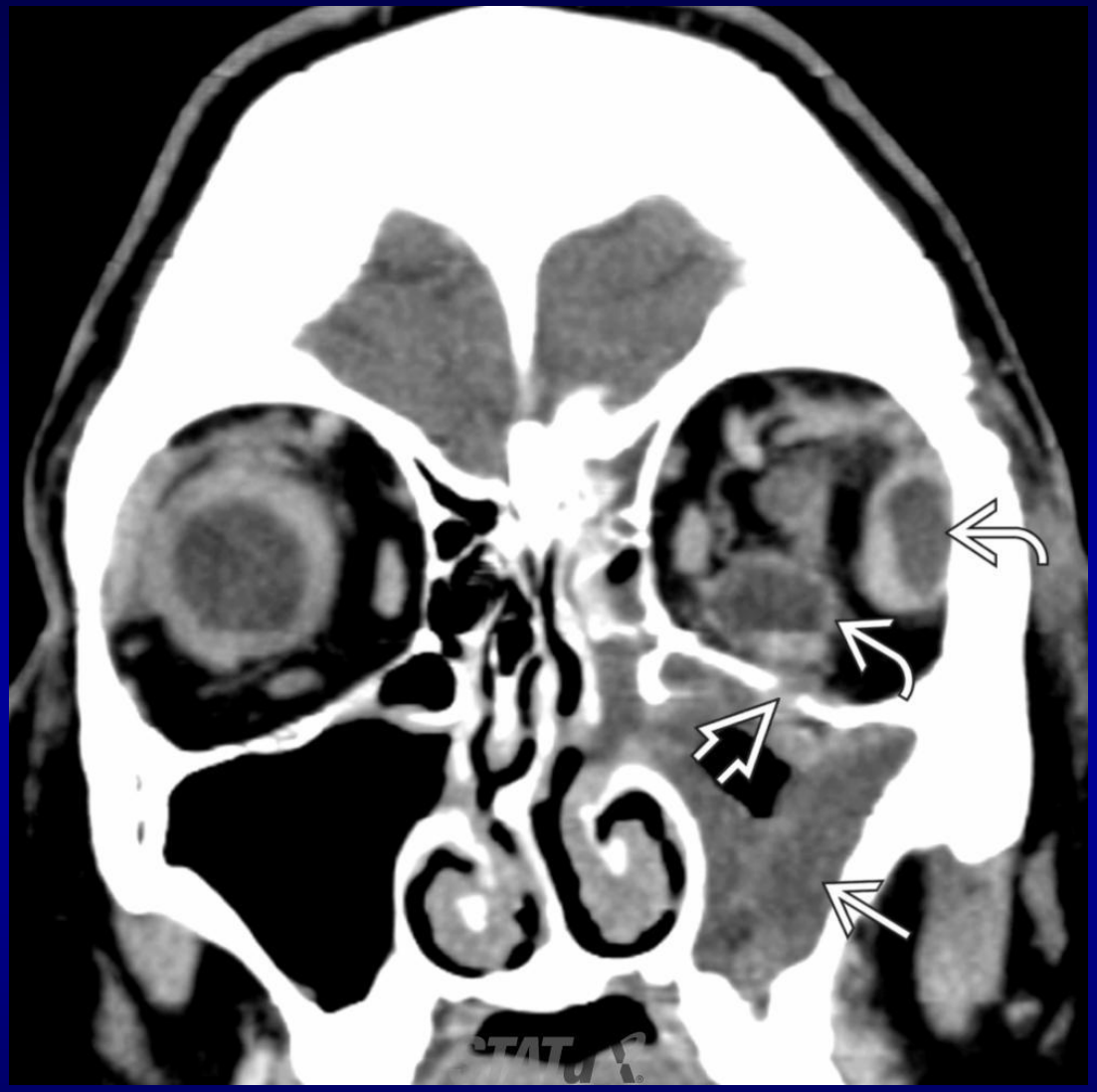


Fungal sinusitis - invasive

- CT/MR late
  - Local invasion
  - Dirty retro-antral space
  - Intracranial/orbital spread
  - Bone destruction

Fungal sinusitis - invasive

- Variable SI
- May have dramatic ↓ SI on T1 & T2
- Heterogeneous enhancement pattern



Coronal NECT in a diabetic patient with mucormycosis infection shows extensive disease in the left maxillary sinus (white solid arrow) with intraorbital extension of infection through a defect (white open arrow) in the infraorbital canal. Low-attenuation abscesses are seen involving the lateral and inferior rectus muscles (white curved arrow).