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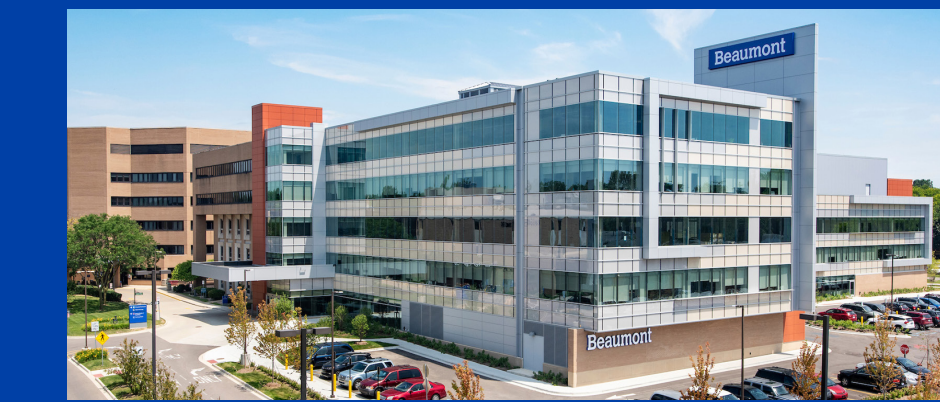
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# Asymptomatic Chronic Sinusitis - Atypical Presentation of Meningitis

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## Introduction

We present a unique case report of asymptomatic acute on chronic pansinusitis with parameningeal involvement as an atypical presentation of meningitis with associated pyrexia, nuchal rigidity, and headaches. Following initial admission, patient clinically deteriorated subsequently requiring emergent surgical debridement with ENT with cultures demonstrating fusobacterium nucleatum. This case presentation is of unique interest given long term neurological sequelae which can manifest as a result of delayed therapy, both medical and surgical, which includes but is not limited to permanent vision loss, ataxia, gait difficulty, and long standing sensorimotor deficits. We hope to provide additional educational resources given the lack of clear standard treatment protocols for meningitis secondary to sinusitis and rare clinical scenario.

## Case Report

64 y/o African American male with PMHx CKD 3b, T2DM, HTN, HLD, BPH presented with complaints of “worst headache of his life” with associated photophobia, phonophobia, chills, nausea, and fever. Initially patient believed his symptoms to be secondary to viral gastroenteritis after eating dinner but symptoms progressively worsened prompting urgent evaluation. Patient denied any sequelae of chronic sinusitis and denied facial pressure, changes to sense of smell, rhinorrhea, or nasal congestion. Given concerns for bacterial/viral meningitis, patient was empirically placed on IV Vancomycin, Ceftriaxone, and ampicillin with 1 dose of IV acyclovir provided, later adjusted to Vancomycin, Ceftriaxone, Flagyl given concerns for para-meningeal involvement. Nasal endoscopy with ENT at bedside completed. Following admission, patient with worsening pyrexia, Tmax 102.7 on day 1 with associated nuchal rigidity and changes in mentation requiring urgent LP at bedside with neurology. Patient required urgent endoscopic sinus surgery with ENT for L acute pansinusitis including L maxillary antrostomy, ethmoidectomy, sphenoidectomy, frontal balloon sinuplasty, polypectomy, stents x2 of nasal cavity with subsequent resolution of pyrexia and no long standing neurologic sequelae noted upon discharge.

### Physical Exam

- Constitutional: warm to touch, no acute distress, A/Ox3
- HEENT examination: + nuchal rigidity. + nasal mucosa erythema. + crusting of L caudal nares. No tenderness to palpation of frontal/maxillary sinuses
- Neurology: Negative brudzinski’s and kerning’s sign
- No other physical exam findings

## Patient Course

- Initial admission CT head and sinus demonstrating sequelae of L-sided chronic sinusitis with complete opacification of L maxillary, frontal, sphenoid sinuses and ethmoid air cells

## Imaging

Figure 1. Leptomeningeal enhancement- MRI brain

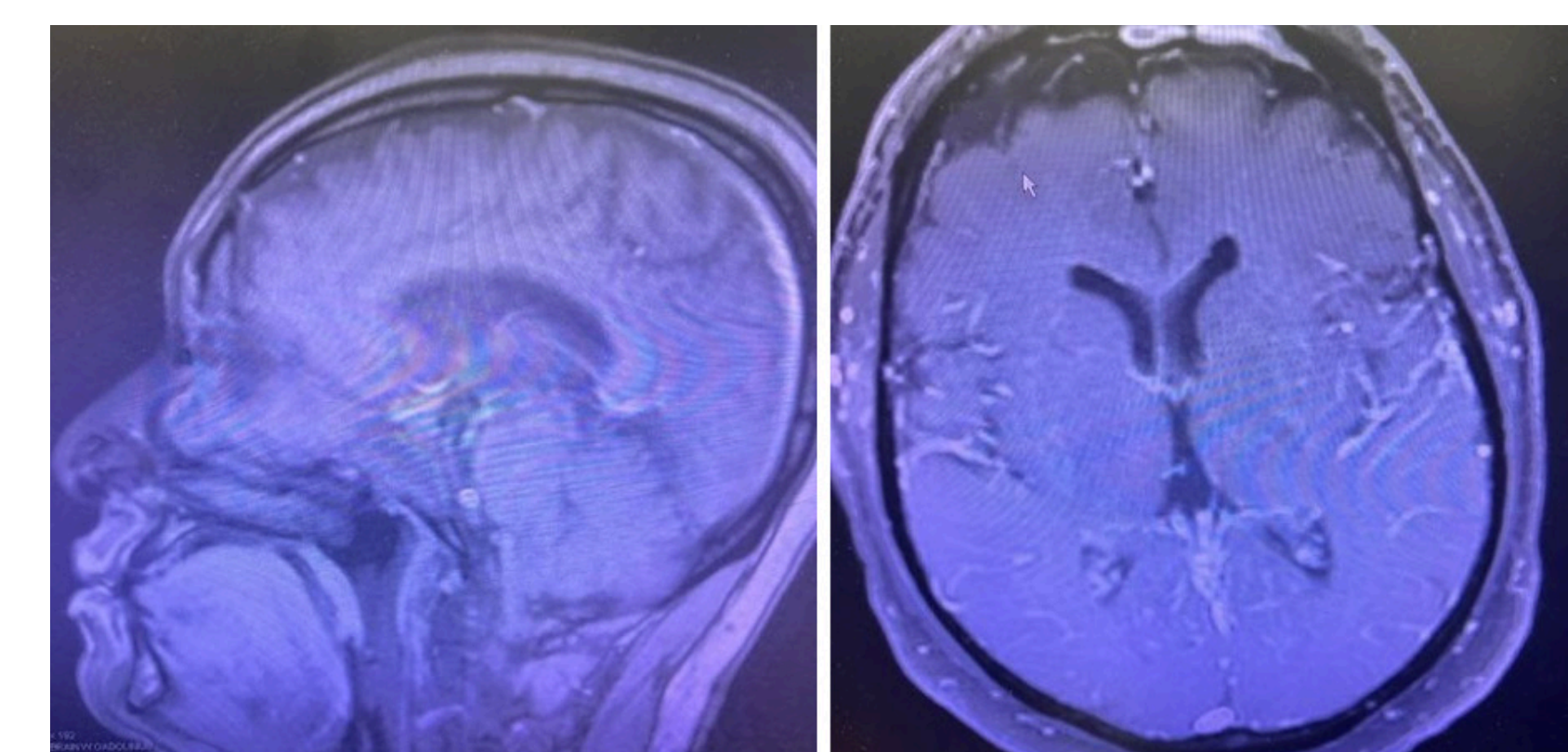


Figure 2. L Ethmoid and Sphenoid sinus opacification- CT sinus



Figure 3. Questionable dehiscence of posterior L sphenoid sinus

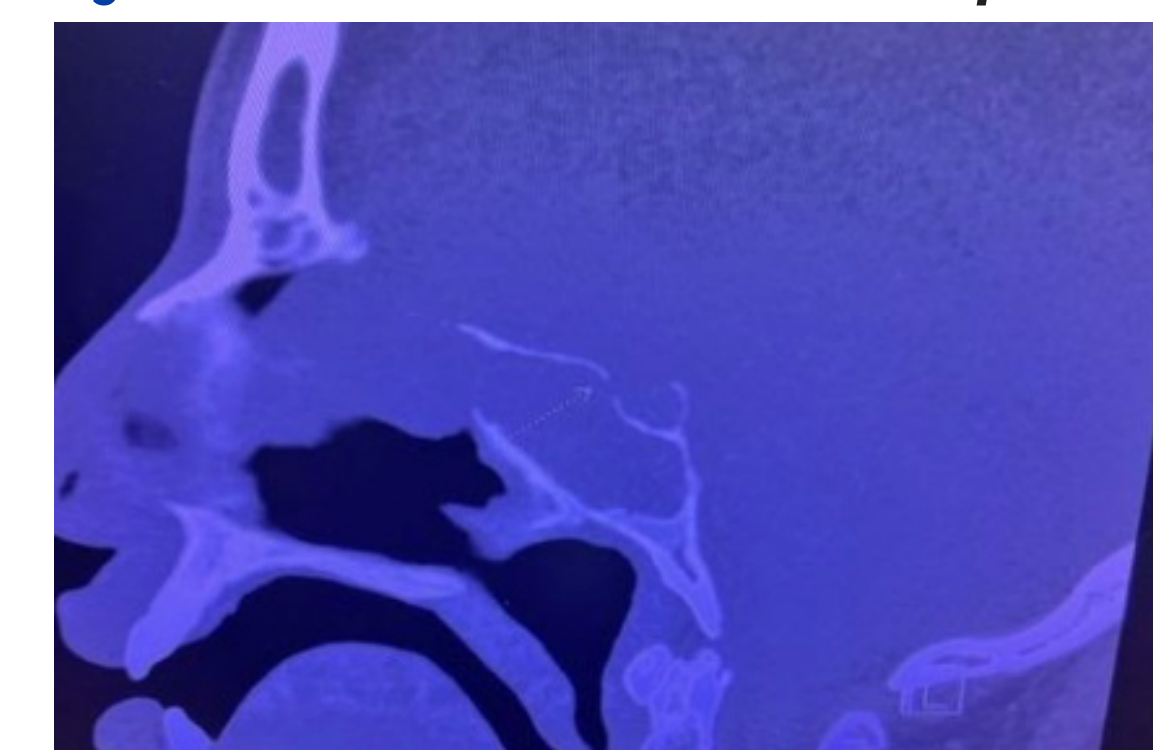
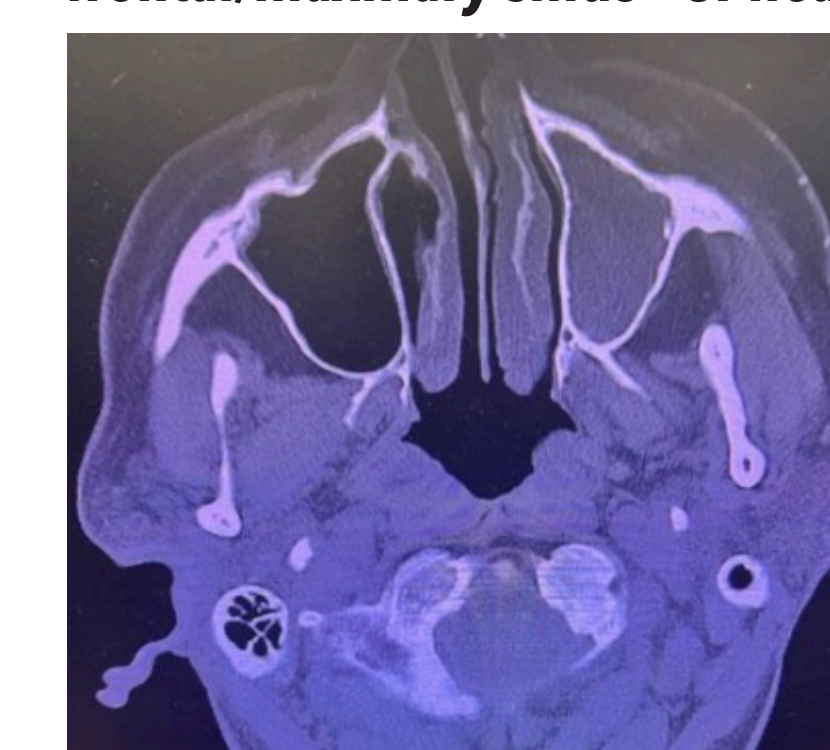


Figure 4. Opacification of L frontal/maxillary sinus - CT head



## Patient Course (cont.)

- LP demonstrating neutrophilic pleocytosis with negative meningitis/encephalitis panel in addition to HSV, VZV, and enterovirus studies. CSF culture demonstrating moderate WBCs with no organisms, WBC 2285 (87% neutrophils). CSF glucose 65, protein 115
- Bedside endoscopy with ENT demonstrating mucopurulence from L middle meatus and crusting of L nare
- Subsequent MRI brain with and without gadolinium demonstrating increased dural enhancement of bilateral Meckel’s caves and medial temporal dura with mild bilateral leptomeningeal enhancement along basilar cistern and sylvian fissures concerning for early component of meningitis
- Blood cultures negative throughout admission
- Surgical culture demonstrating few fusobacterium nucleatum (anaerobic gram negative bacilli). Surgical pathology of L sinus, nares, maxillary sinus c/w suppurative inflammation

Following emergent functional endoscopic sinus surgery with ENT, patient with mild persistent R sinus pressure but with resolution of headache, pyrexia, and nuchal rigidity post-operatively. With non-diagnostic culture data and continued defervescence, IV antibiotics de-escalated to Ceftriaxone and Flagyl POD #3. Culture subsequently demonstrated anaerobic fusobacterium nucleatum and patient offered repeat LP given complaints of residual sinus pressure over R sinus. Patient elected to proceed with - Inconservative management given fears of recurrent headache following LP and was eventually discharged with a 10 day course of Augmentin from the initial day of endoscopic sinus surgery. Patient was discharged with no long standing neurologic sequelae and did not require readmission but the lack of standard treatment protocols for meningitis 2/2 sinusitis were discussed at length and low threshold for repeat LP emphasized prior to discharge.

## Discussion

- Sinusitis is a common disease resulting in approximately 30 million cases in the US every year. With the advent of antibiotics, complications of sinusitis are relatively rare, with some studies reporting a 3.7% incidence of intracranial complications of sinusitis (ICS) in hospitalized patients. This is likely an over representation given that the vast majority of patients with sinusitis do not require hospitalization. ICS include brain abscess, epidural abscess, subdural empyema, meningitis, and cerebral venous sinus thrombosis. Of these complications, epidural abscess and meningitis are the most common complications. There has been a significant drop in mortality and morbidity in patients who develop intracranial complications from sinusitis, with current literature showing mortality to be roughly 3.8% and morbidity 30%. Long term sequelae of ICS include epilepsy, permanent visual changes, and focal paresis.
- The most common bacteria isolated from ICS are streptococcus and staphylococcus species. Anaerobes have been implicated as causative pathogens in bacterial meningitis, however only account for 2.4% of cases. This is possibly underestimated due to anaerobes not routinely cultured for during lumbar puncture. CSF culture did not grow organisms in our patient, however surgical culture from endoscopic sinus surgery demonstrated Fusobacterium nucleatum.
- Infectious spread from the paranasal sinuses to the intracranial cavity can occur via one of 2 ways. The first is thrombus or septic emboli that travel retrograde through the valveless diploic veins of the skull. The second is direct extension of the infection through bone via congenital or traumatic defects, sinus wall erosion or dehiscence, or existing foramina. In our patient, there was some questionable dehiscence in the sphenoid sinus which is the likely method by which he had ICS.
- Treatment of patients with meningitis and sinusitis is done with a teamwork approach consisting of neurologists, infectious disease, ENT, and internists. There is no standard treatment or duration of treatment for meningitis with sinusitis, but requires broad spectrum antibiotics that cross the blood brain barrier. Once causative organism is found, empiric antibiotics are tailored to reduce spectrum of activity. Sinus surgery is commonly required depending on patient response within first 48 hours, with functional endoscopic surgery being most common.

## Conclusion

Meningitis is a rare complication of sinusitis, and meningitis caused by anaerobic bacteria even more rare. Our patient developed meningitis as a complication of acute on chronic sinusitis with Fusobacterium nucleatum. Intracranial complications of sinusitis are uncommon but carry significant mortality and morbidity, and require early diagnosis and treatment to prevent long term sequelae.

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