CLINICAL VIGNETTE

Complications of Acute Bacterial Sinusitis

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Introduction

Acute rhinosinusitis (ARS) is a common problem that annually affects about 12% of people in the United States per year.[1] Risk factors for ARS include air travel, exposure to changes in atmospheric pressure, and swimming.[2] The diagnostic criteria for ARS include < 4 weeks of purulent nasal drainage and severe nasal obstruction, facial pain/pressure/fullness. Other supporting features include anosmia, ear fullness, cough, and headache. Distinguishing between viral and bacterial ARS can be challenging. The Infectious Diseases Society of America uses the following criteria to diagnose acute bacterial rhinosinusitis: persistent symptoms or signs that last ten or more days without improvement, onset with severe symptoms or high fever (>/= 39 degrees C) and purulent nasal discharge or facial pain that last at least 3-4 consecutive days at the beginning of illness, or onset with worsening symptoms or signs with new onset of fever, headache, or increase in nasal discharge 5 days following a typical viral URI which was initially improving.[3] It is important to recognize signs or symptoms of acute bacterial rhinosinusitis given the potential complications including spread beyond the paranasal sinuses and nasal cavity, including meningitis, brain abscess, orbital cellulitis, or orbital abscess.[4] Indications of spread include severe and persistent headache, periorbital edema/inflammation/erythema, vision changes, abnormal extraocular movements, proptosis, pain with eye movement, cranial nerve palsies, altered mental status, neck stiffness, or the presence of papilledema. These should prompt urgent evaluation with advanced imaging and subspecialty consultation.

Presentation

A 37-year-old previously healthy male presented to his primary care physician's office with a one-week history of pain affecting his left eye and forehead, sinus congestion and pressure. He denied vision changes, presence of aura, sensitivity to lights or loud noises, or fever. Vital signs were normal. Physical exam revealed left eye ptosis and lacrimation. MRI Brain with and without contrast showed massive paranasal sinus opacification without infarct, hemorrhage, hydrocephalus, mass effect, or abnormal enhancement. The patient was started on amoxicillin-clavulanate and a methylprednisolone dose pack. The next day he developed worsening headache with photophobia and aphasia and presented to an outside Emergency Room for evaluation. Workup revealed pansinusitis and right upper lobe pneumonia. He was started on broad-spectrum antimicrobial therapy with vancomycin, ceftriaxone, metronidazole, azithromycin, and acyclovir, and transferred to our hospital for continued management. On arrival, vital signs were normal. Physical exam was notable for mild nuchal rigidity and word-finding difficulty with intermittent staccato speech. Labs were remarkable for WBC 17.95, Hb 11.8, MCV 69.9, Na 133. CT Brain revealed a faint peripheral enhancing lesion in the left inferior frontal lobe with surrounding vasogenic edema, concerning for a developing parenchymal abscess with several peripheral enhancing subdural collections along the left frontal convexity consistent with subdural empyemas. Patient was continued on broad-spectrum antimicrobial coverage with vancomycin and meropenem, with consultations from Infectious Disease, Neurosurgery, and Neurology. Repeat MRI Brain showed parenchymal abscess in the left anterior-inferior frontal lobe measuring 2.7 x 1.6 cm with surrounding vasogenic edema, interval increase in size of the multiloculated subdural collections along the left frontal convexity consistent with subdural empyemas, and diffuse paranasal sinus opacification representing acute sinusitis. The patient was taken to the operating by Neurosurgery and underwent decompression of frontal abscess, with image guided drainage of a large volume of pus and irrigation of the subdural space. Postoperative MRI revealed residual subdural empyema over the left superior frontal gyrus and residual infected material within the left inferior frontal lobe abscess cavity. He was continued on broad-spectrum antimicrobial therapy while awaiting culture data. Operating room cultures grew Streptococcus constellatus and his sinus culture grew Staphylococcus epidermidis. Antimicrobial therapy was narrowed to IV Cefazolin and his aphasia, headaches, and eye pain completely resolved. After completion of 6-weeks of IV Cefazolin MR Brain revealed significant interval improvement in the left frontal lobe with resolution of epidural empyema.

Discussion

The most common complication of paranasal sinusitis is orbital cellulitis followed by intra-cranial complications, including meningitis, subdural empyema, intracerebral abscess, epidural abscess, and cavernous or superior sagittal sinus thrombosis. One review evaluated the charts of all patients admitted to the University of Minnesota and University of Michigan Medical Centers from 1975 to 1988. They reported the incidence of intracranial complications of 3.7%, with the most frequent complication of frontal lobe abscess and the third most common complication, subdural empyema.[5] Other series reported com-

plications were seen more commonly in males in their second and third decades of life, consistent with our patient. The most common presenting sign or symptom was fever. Neurologic deficits such as cranial nerve palsies, hemiparesis, or obtundation correlated with long-term morbidity. One third of patients had long-term morbidity from complications. These correlated with delay in surgical consultation, and length of hospitalization, highlighting the importance of early recognition of signs and symptoms. Obtaining timely imaging with CT or MRI and timely surgical drainage and source control. Systemic intravenous antibiotic therapy should be initiated immediately; however, medical therapy alone is not sufficient. The mortality rate for intracranial abscesses treated with antibiotic therapy alone was about 40% into the late 1960s.[6] CT imaging has led to earlier diagnosis, and surgical intervention, along with aggressive medical therapy which has lowered the mortality rate.

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