

## Case Report

### Pansinusitis with subdural empyema in an adult: A rare entity

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#### ABSTRACT

We report a case of an elderly diabetic woman who presented to emergency department with sudden right sided body weakness. On imaging she had subdural empyema complicating acute rhinosinusitis. Evacuation of emphyema and endoscopic sinus surgery resulted in full neurological recovery. Clinician must have a high

index of suspicion of possible intracranial suppurative complication as its often manifest as nonspecific clinical presentation in elderly diabetic patients with acute rhinosinusitis, despite improvements in antibiotic therapies. (Rawal Med J 2013;38: 200-203).

**Keywords:** Sinusitis, subdural empyema, intracranial abscess, diabetes.

#### INTRODUCTION

Acute rhinosinusitis, viral or bacterial, is a very common illness in primary care practice. It is defined as 'symptomatic inflammation of the mucosa of the nasal and paranasal sinuses lasting less than 4 weeks in duration.<sup>1</sup> Suppurative intracranial infections secondary to acute rhinosinusitis like orbital cellulitis, osteitis, intracranial abscess, subdural empyema or cavernous sinus thrombosis are infrequent.<sup>1</sup> Subdural empyemas (SDE) accounts for approximately 13-23% of all intracranial suppurative complications and is a surgical emergency and was a fatal condition before the advent of antibiotic era.<sup>2</sup> Middle age and diabetes account for most of patients complicated with SDE. With the availability of imaging studies, mortality of SDE complicating sinusitis has dropped from 66% to 7%.<sup>1</sup> Bannister et al<sup>3</sup> stated that prompt diagnosis and early treatment of complications of acute rhinosinusitis should bring down the mortality rate from 40% to 10%.

#### CASE PRESENTATION

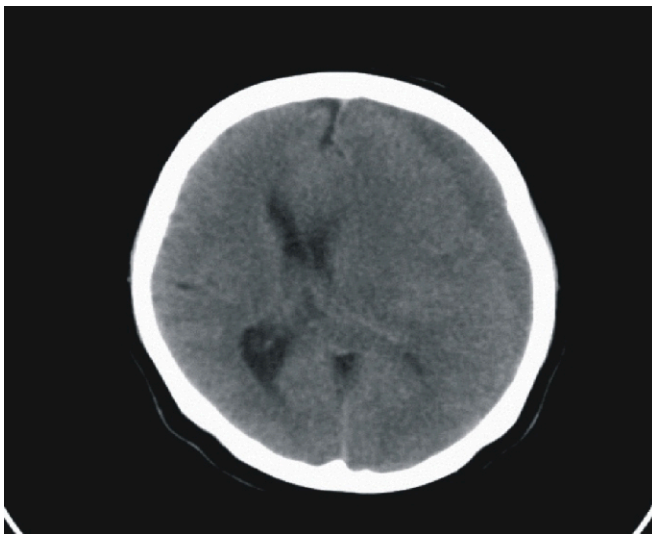
A 60 years old Indian lady, with hypertension and diabetes mellitus presented with sudden right sided body weakness of one day duration. It was associated with right facial asymmetry, slurred speech and altered consciousness. On further questioning, there was also history of high grade fever of one week duration, associated with left

severe headache, which was deep, dull and throbbing in nature. Patient also complained of having runny nose, nasal blockage with whitish nasal discharge of 2 weeks duration. However, she did not seek any medical treatment for this. She denied any history of trauma, frequent rhinitis symptoms, facial pain or any foul smelling nasal or ear discharge, neck pain or photophobia. There was no history of alcohol consumption, smoking or tobacco/betel nut chewing.

On physical examination, vital signs were: blood pressure 154/77 mm Hg, pulse rate 98 beats/minute, respiration 26 breaths/minute and temperature 38.9°C. Patient appeared moderately dehydrated, semiconscious with GCS 12/15. No facial tenderness was noted. Pupils were equal and reactive with no papilledema. Nose and ear examination was normal. The lips and oral cavity appeared dry. The throat was mildly congested. There was no cervical lymphadenopathy or meningeal signs. The heart, lungs and abdominal examination were unremarkable. Neurologic examination revealed slight decrease in the muscle power over right upper and lower extremities and bilateral positive plantar reflexes. Intravenous hydration was commenced after routine blood investigations. ABG showed metabolic acidosis with positive urine ketone. A complete blood count revealed hemoglobin of 14.0 gm/ L, hematocrit of 40.0 %, white blood cell count of 21, 300 cells/mm with neutrophils 86%, and lymphocyte 8.1 %.

Serum electrolytes included sodium 134 mmol/L, potassium 4.6 mmol/L, BUN 5.3 mmol/L, creatinine 75 mmol/L, and glucose 25.2 mmol/L. She was admitted and treated as diabetic ketoacidosis. Intravenous ceftriaxone and metronidazole were started. She developed generalized tonic-clonic convulsion in the ward and was given anticonvulsant drugs. A non-contrast head CT scan revealed left frontotemporoparietal subdural collection with left cerebral edema and midline shift (Figure 1). There was opacity involving the frontal, maxillary and ethmoidal sinuses with calcification of right maxillary sinus. Patient was referred to neurosurgical team, and underwent surgical intervention and a high pressure subdural empyema was irrigated thoroughly, followed by drain insertion. Postoperatively, nasoendoscopy revealed congested nose, with high DNS to the left. Left nasal cavity showed pus trickling down from left frontal sinus and left sphenoidal recess. Right nasal cavity showed right uncinate process abutting to the middle turbinate with fullness of right lateral nasal wall overlying maxillary ostium. CT scan of paranasal sinus revealed mucosal thickening with pansinusitis. Complete opacification of right maxillary sinus with calcification which was suggestive of fungal colonization.

Figure 1. Axial CT cut showing Left subdural effusion at the left frontoparietal region measuring 0.4cm in thickness.

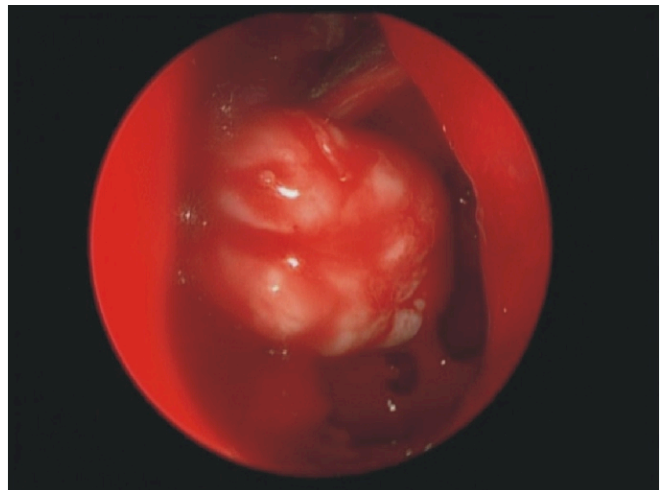


During Endoscopic Sinus Surgery, uncinate process was found to be pushed against the middle turbinate. Fungal ball with pus was noted within right maxillary sinus (Figure 2). The frontal recess was patent on the right side. The maxillary ostium on the left with frontal recess was obliterated by inflamed mucosa. Her general condition improved and eventually she regained full neurological recovery. Intravenous antibiotics were continued for 4 weeks, then changed to oral for 2 weeks and discharged home.

## DISCUSSION

Acute rhinosinusitis accounts for 5-10% of all upper respiratory tract infection in childhood complicated by sinusitis<sup>4</sup> and 21% of all pediatric antibiotic prescription.<sup>5</sup> Majority of the cases of intracranial complications occur in the second decade of life in patients who are otherwise healthy.<sup>5</sup> Sinusitis is the most common source of infection in patient with intracranial complications, after middle ear and mastoid disease.<sup>6</sup> The spread of infection from the paranasal sinuses to the intracranial cavity occur in one of two ways. First, retrograde thrombophlebitis and second by direct extension of disease.<sup>7</sup>

Figure 2. A 30 degree endoscopic view showing a fungal ball with pus from within right maxillary sinus.



Intracranial complications of sinusitis includes meningitis, intracranial abscess, subdural empyema and cavernous sinus thrombosis, with majority of

complications being intracranial collections (abscess and empyema).<sup>8</sup> As in our patient who was in older age group, the risk of developing intracranial complication of sinusitis was due to poor control of diabetes mellitus that leads to immunosuppressed state and prone for spread of infections.

SDE is a life-threatening complication of sinusitis, and if not treated immediately, it can be associated with high risk of status epilepticus, venous sinus thrombosis, cerebritis, cerebral edema, cerebral coning and ultimately leads to death. In paranasal sinusitis, the frontal sinus is the most common sinus associated with intracranial infections, followed by ethmoid, sphenoid and maxillary sinuses.<sup>9</sup> SDE has been reported following cranial surgery, trauma after secondary infection of subdural effusion, hematoma or meningitis.<sup>2</sup>

The commonest clinical presentations of SDE with sinusitis are fever, purulent rhinorrhea and headache. Patient may present with headache (70%), altered mental status (65%), focal neurological deficit (65%), seizures (25-35%), papilledema (25%), nausea and vomiting (40%) and nuchal rigidity (25%).<sup>10</sup> Male, middle-aged and diabetics accounted for 8.9% of patients complicated with SDE and about 50% of them presented with altered sensorium.<sup>11</sup> It is difficult to clinically differentiate between SDE and meningitis where the diagnosis of former is usually based on strong clinical suspicion.

When SDE is suspected, imaging studies are required and with them, mortality of SDE complicating sinusitis has dropped from 66% to 7%.<sup>12</sup> The classic appearance of SDE on a CT scan is a thin low-density collection over the cerebral convexity or in the interhemispheric fissure that has a rim of contrast enhancement.<sup>13</sup> In cases where the clinical condition suggests SDE, and CT scan is negative, an MRI should be obtained.

In children, SDE is commonly secondary to *H. Influenzae* or *S. Pneumoniae*. The cultures from frontal sinusitis with complications frequently reveal polymicrobial involvement with *Streptococci*, *Staphylococci*, and anaerobic bacteria as the predominant pathogens. Anaerobic streptococci have been shown to be the most

common microorganisms isolated in SDE,<sup>14</sup> however, a recent report stated that *Streptococcus milleri* was the most common organism cultured.<sup>15</sup>

Treatment of complications of frontal sinusitis consists of medical and surgical control of the underlying sinusitis and hyperglycemia with surgical drainage of abscess collections as indicated by the clinical situation. Despite intravenous antibiotic treatment, these infections may progress rapidly, and often necessitate surgical drainage. Our patient had rapid progression of neurological symptoms, and the outcome would have been unfavorable if she had not received close monitoring and aggressive neurosurgical intervention with antibiotic treatment.

In summary, despite improvements in antibiotic therapies, sinusitis still carries a rare risk of serious and potentially fatal intracranial complications in uncontrolled diabetic patients. Clinician must have a high index of suspicion of possible intracranial suppurative complication as its often manifest as nonspecific clinical presentation.

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Collection and assembly of data: Shashi Gopalan  
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 Critical revision of the article for important intellectual content:  
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**Conflict of Interest:** None declared

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