

## CASE REPORT

## COMMUNITY ACQUIRED METHICILLIN SENSITIVE *STAPHYLOCCUS AUREUS* CEREBRAL ABSCESS IN A PREVIOUSLY HEALTHY GENTLEMAN MIMICKING SIGNS OF CAVERNOUS SINUS THROMBOSIS-A UNIQUE PRESENTATION

Ishma Aijazi, Fadhil M Abdulla, Ahmad Elbagir Ibrahim

Department of Medicine, Dubai Hospital, Dubai-United Arab Emirates

Central Nervous System (CNS) infections like meningitis and cerebral abscess caused by *Staphylococcus aureus* are usually seen in patients with neurosurgical interventions or immune compromised patients or patients with cardiac vegetation's. They are extremely rare in healthy patients. We report a case of a 44 year old Indian gentleman who was perfectly healthy with no known co morbidities, which presented with fever, neck stiffness and altered mental status. He had fulminant staph bacteraemia (as evidenced by persistently positive blood cultures) with meningitis and cerebral abscess. Extensive search was made to find the source of infection, but it was inconclusive. Isolated CNS Methicillin Sensitive *Staphylococcus aureus* (MSSA) infection in an apparently healthy patient is very rare. This gentleman presented with altered mental status, asymmetrical exophthalmos and multiple cranial nerve palsies. This case highlights the challenge of making early diagnoses of a brain abscess; since it has symptomology mimicking cavernous sinus thrombosis. This is due to the involvement of the cerebellopontine angle and extensive brain oedema and oedema of the retro bulbar tissues.

**Keywords:** *Staphylococcus aureus*, brain abscess, bacteraemia

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### INTRODUCTION

The word "staphyle" is a Greek word which means "bunch of grapes". This word was coined because of the grape like structures these bacteria forms when it was first isolated from pus in human abscess. Ogston first described its role in abscess formation and sepsis.<sup>1</sup>

*Staphylococcus aureus* is notorious for causing a vast variety of infections namely skin and soft tissue infections (impetigo), scalded skin syndrome (ritter disease), folliculitis, furuncles, carbuncles, osteomyelitis, septic arthritis, endocarditis, necrotizing pneumonias, and toxic shock syndrome. Deep tissue abscesses are quite common. Amongst these the *Staphylococcus aureus* blood stream infections are the most difficult to treat. Life threatening complications of *Staphylococcus aureus* bacteraemia (SAB) include infective endocarditis and other metastatic infections such as osteomyelitis, meningitis, septic emboli to the lungs, extremities and brain.<sup>2</sup> Muscles and organs that can be involved include parotid gland, eyes, liver, spleen, kidneys, and central nervous system. There may or may not be localizing signs. *Staphylococcus aureus* infections are divided into two kinds. Methicillin resistant (MRSA) and methicillin sensitive (MSSA). It is the fifth most common organism causing CNS infections. Isolated staphylococcus meningitis is rare accounting for less than 5% of all meningitis<sup>3</sup> of which MSSA is involved in community acquired

meningitis and MRSA is usually found after neuro surgery or any other neuro intervention.<sup>3</sup>

### CASE REPORT

A 29 year old Indian gentleman, electrician by profession, came with 3 days history of high grade fever, severe headache and altered level of consciousness. He had been perfectly healthy previously with no known co morbidity and no recent history of travel or contact with sick people. On Examination, he was vitally stable, he had a GCS 10/15, neck stiffness was positive. There was proptosis and ecchymosis of left eye, pupil right 2-3 mm (reactive to light), left 2 mm (non-reactive to light), multiple cranial nerve palsies, (left abducent, hypoglossal and facial), there was left sided hemiparesis with left up going plantar.

Initial laboratory examination showed: WBC 17400/microlitre (3600-11000/microlitre), haemoglobin 14g/dl, platelets 200,000/microliter (150,000-400,000/microliter), procalcitonin 17.02 ng/ml, ESR 20 mm/hour, c reactive protein >150 mg/l, malaria parasite not seen, Sodium 128 mmol/l, potassium 3 mmol/l, bicarbonate 23.7 mmol/l, urea 43 mg/dl, creatinine 1.1 mg/dl. Liver function tests: albumin 2.8 g/dl, alkaline phosphatase 87U/L, ALAT 28U/L, Total Bilirubin 1.1 mg/dl, ASAT 33U/L, ANTI ds DNA <10(negative), Anti-nuclear factor negative, T SPOT.TUBERCULOSIS TEST was non-reactive.

Peripheral film showed that the Red blood cells are normocytic and normochromic, white blood cells show neutrophil leukocytosis with mild left shift, platelets are adequate on the smear. Urine routine analysis showed protein 2+, glucose 2+, granular casts+, Urine culture no growth. Blood culture was done 4 times and revealed methicillin sensitive *Staphylococcus aureus*. Chest x-ray showed no active lesions

He was initially admitted in medical intensive care unit. Lumbar puncture was not done because of low platelets and brain oedema (as evidenced by the CT scan at admission). He was initially started on IV antibiotics (ceftriaxone, vancomycin) and acyclovir to cover for meningo encephalitis. After stabilization he was sent to medical ward. CT angiogram ruled out cavernous sinus thrombosis. MRI brain with contrast revealed cereberitis/cerebral abscess. Hence antibiotic coverage was extended to cover for brain abscess. Empirically antifungals were also added. Meanwhile a search for focus of infection was made

which included an endoscopic examination of the sinuses by ENT, CT scan of the orbit and Para nasal sinus, all these investigations were inconclusive. Patient was empirically started on flucloxacillin 2gm iv 4 hourly, meropenem 2 gm iv thrice a day, and iv amphotericin 75mg iv od. Three consecutive blood cultures sent 48 hours apart were found persistently positive for Methicillin sensitive *Staphylococcus aureus*. Patient was extensively investigated for the source of infection, including an echo cardiogram which was normal.

Subsequently patient was shifted to infectious disease unit. Neurosurgical opinion was sought, they decided against decompression. He was treated with maximum dose of IV flucloxacillin (2 gm IV q4h) for 2 weeks. Clinically he became afebrile and repeat CT showed resolution in size of the abscess. He was discharged with partial residual left sided 7<sup>th</sup> and 6<sup>th</sup> nerve palsy. He had diplopia and required walker for support. 4) Repeat MRI brain with contrast (prior to discharge)

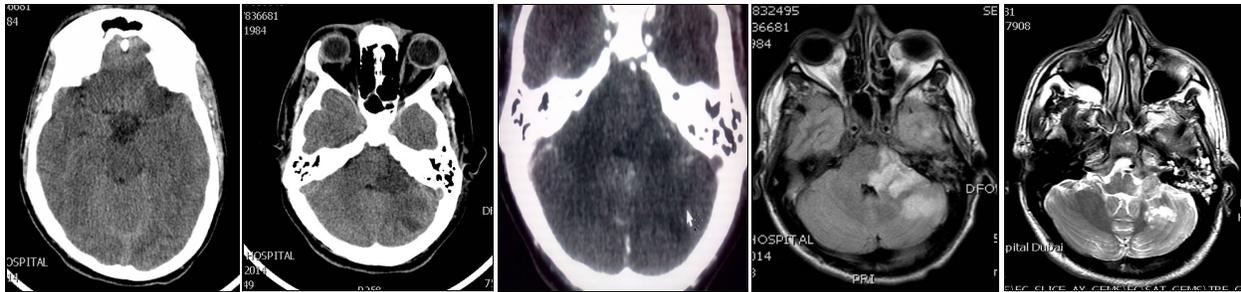


Figure-1

Figure-2

Figure-3

Figure-4

Figure-5

**Figure-1: Unenhanced CT showing generalized brain oedema**

**Figure-2: Unenhanced CT brain (48 hours after admission) showing hypodensity in left cerebellum.**

**Figure-3: CT cerebral angiogram, features are suggestive of poorly enhancing focal lesion in the left cerebellum**

**Figure-3: MRI brain (with contrast)**

**Figure-4: FLAIR Left cerebellar and left sided pontine inflammatory process/cereberites/few small variable size enhancing lesions**

**Figure-5: T2 weighted image, showing resolution in size of the abscess (post treatment)**

## DISCUSSION

*Staphylococcus aureus* is second most common cause of cerebral abscess. *Streptococcus milleri* being the most common, followed by *Staphylococcus aureus* and then anaerobes.<sup>4</sup> Community acquired MSSA infections are rare but they can be very severe and life threatening. Some of the increase virulence shown by community acquired staph has been due to the fact that organisms harbours certain genes which encodes the subunits of Pantone- Valentine leukocidin (PVL) cytotoxin which is one of the beta pore forming toxin.<sup>5</sup>

CNS infection caused by *Staphylococcus aureus* is usually associated with prior neurosurgical intervention or with typical risk factors such as infective endocarditis, soft tissue infection, skin abscesses, AIDS or intravenous drug use.<sup>6</sup> However our patient was a perfectly healthy immune competent gentleman who had no apparent cause of infection. After a lot of questioning it was found that he had a small boil at the tip of the nose which had burst prior to his presentation. A detailed examination was done by the ENT doctors together with endoscopic examination of the sinuses which did not reveal any source of infection. There are few

case reports of CNS infection in patients without any apparent source but most of them are related to Community acquired methicillin resistant staphylococcus aureus (CA\_MRSA).<sup>7</sup> To this date only one case report has been found of confirmed meningitis with brain abscess caused by MSSA in a previously healthy patient with no predisposing infections or risk factors.<sup>8</sup> Mortality rate for *Staphylococcus aureus* bacteraemia is 42% in MRSA versus 28% in MSSA.<sup>9</sup>

Our patient had persistent *Staphylococcus aureus* bacteraemia on four cultures repeated 48 hours apart, despite adequate anti biotic coverage started after the results of the first culture report. As shown in a large prospective cohort study by Fowler *et al*<sup>10</sup> it is seen that the strongest predictor of complications is a positive blood culture taken 48 to 96 hours after an initial positive blood culture. Additional independent risk factors include community acquisition (likely because of prolonged duration of bacteraemia), skin examination suggesting the presence of acute systemic infection, persistent fever of 72 hours after the first positive blood culture. Patients with these afore mentioned risk factors (like ours) can have a very complicated course complicated by meningitis, cereberitis and brain abscess.

Focal cerebritis and cerebral abscess can present in a number of ways. In literature headache is reported as the most common symptom (41–63%) of the cases, fever may not or may be present, reported in 25% of the cases<sup>11</sup> 18–48% cases present with altered mental status. While 25–65% present with focal neurological deficit.<sup>12</sup> In our patient since the cerebellum and Cerebellopontine angles were involved so the patient presented with a multiple cranial nerve palsies and because of extensive brain oedema and retro orbital soft tissue oedema patient presented with asymmetrical proptosis and exophthalmos, hence mimicking signs of cavernous sinus thrombosis, which was however ruled out by normal CT venogram.

After treatment with intra venous anti biotic for 14 days there was complete resolution of eye signs and cranial nerve palsies. Patient went home

with a residual left sided hemiparesis.

## CONCLUSION

Timely recognition and treatment of the brain abscess is very important .Main stay of treatment is IV antibiotics and mechanical neurosurgical drainage. If the abscess is more than 2–2.5 cm then neuro surgical drainage is required. Our patient showed resolution in size of abscess after completion of course of IV antibiotics as evidenced clinically and also by repeat CT scan .The mortality rate and long term disability rate in brain abscess is very high.

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## Address for Correspondence:

**Dr. Ishma Aijazi**, Internal Medicine Unit, Dubai Hospital, Dubai Health Authority, Al Baraha, P.O. Box 113321 Dubai-United Arab Emirates

**Ph:** +971555266140

**Email:** engrjaffar@gmail.com