

Brain Abscess due to *Streptococcus Anginosus* Secondary to Congenital Heart Disease in a Child

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Abstract

Brain abscess in children is a life threatening infection. We are reporting a rare case of brain abscess caused by *Streptococcus anginosus* in an eight-year-old child who presented with fever, headache, vomiting and neurological symptoms. On detailed investigations she was found to have congenital heart disease as predisposing factor. She was treated with surgery and intravenous antibiotics and revealed a good outcome with no neurological deficit.

Key words

Brain abscess; *streptococcus anginosus*; child

Introduction

Brain abscess is uncommon in children but life threatening infection. The causative organisms in children are aerobic and anaerobic Streptococci, *Enterobacteriaceae*, *Staphylococcus aureus* and fungi.¹ *Streptococcus* (*S.*) *anginosus* group, previously known as *S. milleri*, includes three distinct species; *S. anginosus*, *S. intermedius* and *S. constellatus*. Members of *S. anginosus* are found as commensal of oropharyngeal, gastrointestinal and genitourinary normal flora but can become pathogenic and often cause purulent infections.² *S. anginosus* is commonly associated with genitourinary and gastrointestinal abscesses,³ however it has rarely been involved in formation of brain abscess in children. We report a case of brain abscess in 8 years old child caused by *S. anginosus* with underlying congenital heart disease (CHD).

Case report

An eight-year-old female, resident of Saudi Arabia, presented with complaint of fever, headache, vomiting and right arm weakness for 5 days. There was no history of fits or loss of consciousness. Previously she was healthy and studying in class 3. There was no past history of sinusitis, otitis media, recurrent respiratory tract infections or diagnosed congenital heart disease.

On examination she was mildly dehydrated with heart rate of 80/min, respiratory rate 22/min, temperature 37°C, blood pressure 100/60 mmHg and oxygen saturation 96% on room

air. On neurological examination her Glasgow Coma Scale was 15/15 with no neck stiffness. Power was 3/5 in right upper limb while 5/5 in rest of the 3 limbs. Tone and reflexes were normal. Babinski sign was positive on right side. Cranial nerve examination showed right upper motor neuron facial palsy. On cardiovascular examination there was grade 2/6, systolic murmur in pulmonic area. Rest of examination was normal. Her laboratory investigations revealed WBC count of 18,600/L with neutrophils 92% and lymphocytes 6%, hemoglobin 11.6 mg/dl, platelets 414,000/L, CRP 9.0 mg/L, and ESR 18 mm in 1st hour. Serum electrolytes, liver function tests and renal function tests were within normal limits. Brucella and echinococcus antibodies were negative. CT brain showed a large multi lobulated hypodense lesion measuring 3.2x4.1cm in left frontal lobe with thick walls showing post contrast ring enhancement with surrounding edema, mass effect and midline shift towards right (Figure 1). Echocardiography revealed large sinus venosus atrial septal defect (ASD) and partial anomalous pulmonary venous connection. Patient underwent craniotomy and found to have abscess on left frontal area from which greenish grey

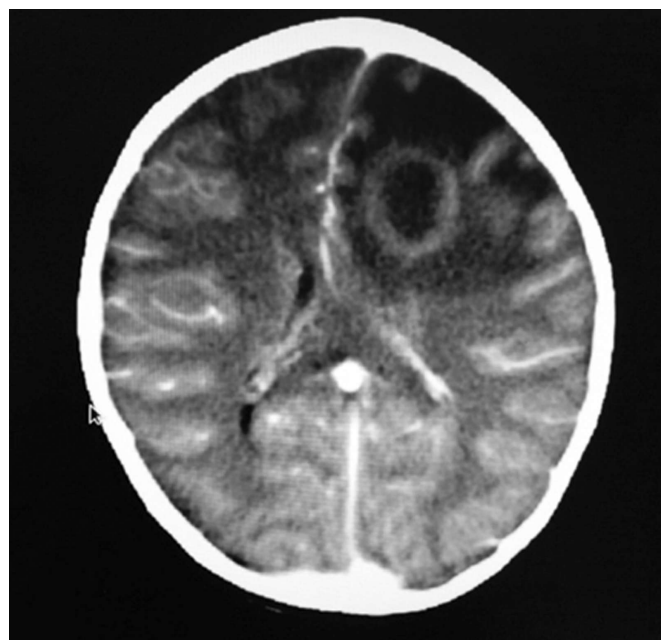


Fig 1. CT brain with contrast showing multi lobulated hypodense lesion in left frontal lobe showing post contrast ring enhancement (arrows) with extensive surrounding edema and mass effect.

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pus came out with pressure. The abscess was drained and pus was sent for bacterial, AFB and fungal culture and sensitivity. On gram stain gram positive cocci were seen. Later *S. anginosus* was isolated, which was susceptible to penicillin, ceftriaxone and vancomycin. Initially patient was started on empirical antibiotics with ceftriaxone, vancomycin and metronidazole.

Vancomycin was discontinued after 7 days, metronidazole was given for 4 weeks and ceftriaxone was given for 6 weeks. Repeat CT scan done after 3 weeks of surgery showed interval decrease in brain abscess (Figure 2). The patient's clinical condition improved with no neurological deficit at 4 weeks follow-up evaluation in out patient department. She was referred to cardiology unit for surgical correction of cardiac lesion.

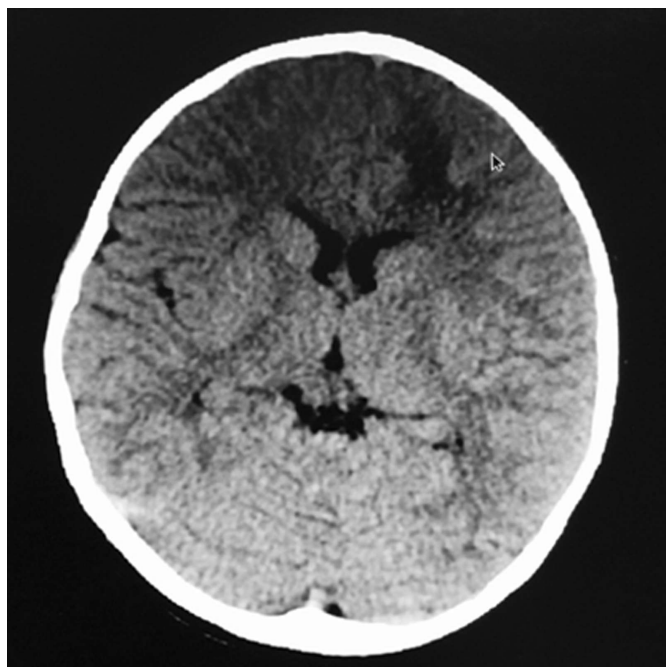


Fig 2. CT brain after 3 weeks showing decrease in size of hypodensity, edema and mass effect.

Discussion

Brain abscess is a purulent collection in the parenchyma of central nervous system. It can result from spread of infection from contagious site, hematogenous route or direct introduction of infection into central nervous system. Predisposing factors of brain abscess include middle ear infections, sinusitis, penetrating skull injury, neurosurgical procedures, congenital heart defects and immunocompromised state.⁴

Brain abscess is usually associated with cyanotic congenital heart diseases or acyanotic heart diseases reaching the stage of right to left shunt as venous blood bypasses the pulmonary filter. Our patient had atrial septal defect with left to right shunt and paradoxical embolism probably occurred by mixing blood around orificial margins.

S. anginosus group comprises three distinct species: *S. anginosus*, *S. intermedius* and *S. constellatus*. *S. anginosus* is a part of normal flora of gastrointestinal, genitourinary and respiratory tract and known to cause invasive pyogenic infections with abscess formation involving mostly gastrointestinal and genitourinary systems.^{2,3} In a review done by Doern and Burnnhan it was concluded that *S. intermedius*, another member of *S. anginosus* group, play a more significant role in pediatric infections than *S. anginosus*.⁹ *S. intermedius* have been associated with pediatric brain abscesses but *S. anginosus* have rarely been reported to cause brain abscess in children.^{5,6,7} In our patient *S. anginosus* was isolated from the brain abscess which is usually susceptible to antibiotics commonly used to treat central nervous system infections. Kirkman *et al.* reported a case of multiple intracranial abscesses due to *S. anginosus* in a previously healthy 39-year-old individual.⁸ In a study done in Children Hospital and Institute of Child Health, Lahore, causative organisms were isolated from 40% of the cases of brain abscess including *Staphylococcus aureus*, *Staphylococcus epidermidis*, *Streptococcal species*, *Klebsiella*, *E. coli* and *Proteus*.⁹

Surgical excision or drainage along with 4 to 8 weeks course of antibiotics is the treatment of choice for brain abscess. Treatment with antibiotics alone can be done in selected cases such as neurologically intact children with brain abscess of <2cm. Empirical antibiotic therapy with third generation cephalosporin, vancomycin and metronidazole is recommended.¹⁰ There are two surgical approaches: stereotactic aspiration and total excision of the abscess. Burr hole aspiration is preferred approach as it is minimally invasive, mass effect is reduced and material is collected to reach microbiological diagnosis to better target antibiotic use.¹¹ Despite the advancement in radiological techniques morbidity and mortality is relatively high with brain abscess. In Pakistan Mehnaz *et al* studied clinical features and outcome in 30 children with brain abscess with congenital heart disease in 1/3 children.¹² She found that the most common organism was *streptococcus milleri* and despite treatment had serious complications in 66% (sequelae in >50% and death in 15%).¹² Prompt diagnosis and effective management is important for good prognosis.

Conclusion

S. anginosus is a rare case of brain abscess in a child. Predisposing factors must be investigated by thorough examination and investigation including echocardiogram. Early diagnosis, identification of microbiological agent and effective antibiotics will lead to optimal outcome.

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