Abstract: Cavernous sinus thrombosis (CST) was first described by Bright in 1831 as a complication of epidural and subdural infections in adult. Incidence of cavernous sinus thrombosis (CST) is very low, only a few hundred case reports so far in the medical literature. The majority of these available data are from before the modern antibiotic era. One of the English-language literature reviews found only 88 cases from 1940-1988.

Keyword: Cavernous sinus thrombosis, CST, Children

Introduction:
Cavernous sinus thrombosis (CST) is the formation of a blood clot within the cavernous sinus, a cavity at the base of the brain which drains deoxygenated blood from the brain back to the heart. Because of its complex neurovascular anatomic relationship, it is the most important of any intracranial septic thrombosis (1). It is usually a late complication of an infection of the central face or paranasal sinuses. Other causes include bacteraemia, trauma, and infections of the ear or maxillary teeth. Cavernous sinus thrombosis is generally of a fulminant nature with high rates of morbidity and mortality. Prior to the advent of antibiotics, the case fatality rate of CST was almost 100% and commonly due to sepsis or central nervous system (CNS) infection. But with effective antimicrobial coverage the incidence has significantly decreased with mortality rates being less than 30% at present.(2,3) However, morbidity remains high, and complete recovery is rare. Approximately one sixth of patients are left with some degree of visual impairment, and one half have cranial nerve deficits. Herewith, we present a case of Cavernous sinus thrombosis in a 10 year old child treated in a tertiary care centre at Chennai, for its rarity.

Case report: 10 year old girl presented with a boil on the left side of forehead for 2 week and swelling around the left eye of one week duration. Child also had low grade, intermittent fever with pain and swelling of both eyelids. She had double vision (more on right gaze) associated with headache and painful eye movements. There was no cold, cough, nasal discharge, vomiting, diminished vision, ear pain or head trauma. On examination she was febrile, sick looking. Left eye examination showed edema of both upper and lower lids with increased warmth, tenderness, chemosis of conjunctiva with discharge and mild restriction of adduction. Right eye and both fundi were normal. Rest of central nervous system and other systems were normal. There was a pustule of 0.5 x 0.5 cm seen in left temporal region. While investigating the child, complete blood count revealed polymorphonuclear leucocytosis. Conjunctival smear examination had gram positive cocci. CT scan showed left orbital cellulitis, superior ophthalmic vein thrombosis and thrombosis in cavernous sinus. MRI revealed orbital cellulitis with proptosis and ethmoid sinusitis. MRV showed filling defect in left cavernous sinus. Chest X ray showed multiple cystic lesions in both lungs. X ray of both orbits were normal. Blood sugar, renal function profile and electrolytes were normal. Blood culture and tuberculosis screenings were negative. Child was treated with parental antibiotics, steroids, anticoagulants and antibiotic eye drops. With treatment the swelling and painful eye movements reduced progressively, fever subsided and child was discharged. A month later on follow up, child is doing well with no residual neurological deficits.

Discussion: The cavernous sinuses are centrally located, irregularly shaped, trabeculated cavities on either side of the sella turcica at the base of the skull. It receives venous blood from the facial veins (via the superior and inferior ophthalmic veins) as well as the sphenoid and middle cerebral veins. They, in turn, empty into the inferior petrosal sinuses, then into the internal jugular veins and the sigmoid sinuses via the superior petrosal sinuses. This complex web of veins contains no valves, so infections of the face including the nose, tonsils and orbits can spread easily by this route. The internal carotid artery with its surrounding sympathetic plexus passes through the cavernous sinus. The third, fourth and sixth cranial nerves are attached to the lateral wall and ophthalmic and maxillary divisions of the fifth cranial nerve are embedded in the wall. Cavernous sinus thrombosis occurs in all age groups. Staphylococcus aureus is accounting for approximately 70% of all infections. Streptococcus pneumoniae, gram-negative bacilli and anaerobes (4) have been implicated with fungi (Aspergillus and Rhizopus species) being a less common pathogen. (5-7) The early symptoms and signs of cavernous sinus thrombosis (CST) may not be specific. Any child who presents with headache and cranial nerve deficits with evidence of sinusitis or mid face infection CST is strong possibility. The clinical presentation is usually due to the venous obstruction as well as impairment of the cranial nerves that are near the cavernous sinus. Headache is the most common presenting symptom and usually precedes fever, periorbital oedema and cranial nerve deficits.

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Cavernous sinus thrombosis - A case report
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Swelling of eye initially begins unilaterally and spreads to the opposite eye within 24-48 hours via the intercavernous sinuses. Periorbital oedema and chemosis are the earliest physical findings resulting from occlusion of the ophthalmic veins. Lateral gaze palsy (isolated cranial nerve VI) is usually seen first since CN VI lies freely within the sinus in contrast to CN III and IV, which lie within the lateral walls of the sinus. (8) Diminution of visual acuity with sluggish papillary response is due to increased IOP and traction on the optic nerve and central retinal artery. Hypoesthesia or hyperesthesia will be seen in dermatomes supplied by the V1 and V2 branches of the fifth cranial nerve. Appearance of signs and symptoms in the contralateral eye is pathognomonic of CST. Meningeal signs, such as nuchal rigidity, kemig and brudzinski signs may be noted. Child may rapidly develops altered level of consciousness like confusion, drowsiness, coma and death from sepsis.

Meningeal signs, such as nuchal rigidity, kemig and brudzinski signs may be noted. Child may rapidly develops altered level of consciousness like confusion, drowsiness, coma and death from sepsis. Mortality rate is as high as 30% and survivors may also have permanent sequelae like visual cranial nerve palsies, sepsis and shock. Empiric antibiotic therapy should include penicillinase-resistant penicillin plus third or fourth generation cephalosporin. In suspected MRSA infections of the central nervous system, including cavernous sinus thrombosis, linezolid is a better choice than vancomycin for better outcome. (10) If dental infection or other anaerobic infection is suspected, an anaerobic coverage should also be added. Parenteral antibiotics should be given minimum for 3-4 weeks duration. The use of anticoagulation for cavernous sinus thrombosis is still a controversy. Although Staphylococcus aureus is the usual cause, broad-spectrum coverage for gram-positive, gram-negative, and anaerobic organisms should be instituted pending the outcome of cultures. Anticoagulation for cerebral venous sinus thrombosis. Neurology. Apr 1988;38(4):517-22.

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References:

Picture 1: A boil in left temporal region

Picture 2: Orbital cellulitis

Picture 3: CT showing left orbital cellulitis

Picture 4: CT showing left cavernous sinus thrombosis
Picture 5: MRI showing left cavernous sinus thrombosis