Case Report

Brain and heart go hand in hand: Rare complications of ASD

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Abstract

Background: A running head- Brain abscess is a dynamic focal intra-cranial infection. Pediatric brain abscess contributes to 25-42% of total brain abscesses. Brain is a highly resistant organ to infection, most common routes of infection are attributed to -Contiguous suppurative focus (45-50%), Hematogenous (25%), direct (trauma 10%). Cyanotic heart disease and pulmonary arteriovenous malformation are consistently reported in association with brain abscess. The pulmonary circulation represents a potential filtering apparatus for systemic bacterial pathogens. In patients with right to left cardiac shunt bypass, this mechanism and seeding to the central nervous system (CNS) occurs. A 6-year-old male child presented with h/o pain in the left arm followed by weakness. History of fever preceding the episode was present. On examination power of grade 2/5 in the left arm. An impression of monoparesis for evaluation was made. On further systemic examination a systolic murmur grade 4/5 was heard. MRI done to evaluate cause of monoparesis revealed Right Temporal abscess 5.5cm. Further to see cause of temporal abscess, 2-D echo was done i/v/o strong suspicion of CHD revealed fenestrated ASD. Brain abscess was aspirated and corrective surgery was done for fenestrated ASD. Child was improving symptomatically on follow up.

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INTRODUCTION

Brain abscess is a dynamic focal intra-cranial infection. Pediatric brain abscess contribute to 25-42% of total brain abscesses. Brain is a highly resistant organ to infection, most common routes of infection are attributed to -Contiguous suppurative focus (45-50%), Hematogenous (25%), direct(trauma 10%). Cyanotic heart disease and pulmonary arteriovenous malformation are consistently reported in association with brain abscess.[1] The pulmonary circulation represents a potential filtering apparatus for systemic bacterial pathogens. In patients with right to left cardiac shunt bypass, this mechanism and seeding to the central nervous system (CNS) occurs.

CLINICAL DESCRIPTION: Apparently well child, presents with history of pain in the left arm since 3 days which was acute in onset, severe intensity, non radiating and was unable to move the arm. Child, being left hand dominant, who could earlier write, hold his books and lift his arm above head was currently unable to move the arm. Since the onset of pain, child was in school when he developed pain in his arm and in the first period child was able to write all his notes, however by the second class he was only able to scribble on the pages. By the third class he was unable to hold the pen and by recess time he was unable to move his arm to take his tiffin box out. The other limb: child was able to move, hold the pen etc. No h/o progression the other limbs. The child was able to do all the work with the other hand. No h/o altered sensorium, irrelevant speech, LOC. No h/o suggestive of visual impairment, No h/o squint, No h/o difficulty in chewing food/ sticking food in mouth, No h/o deviation of angle of mouth, No h/o difficulty in responding to oral commands, turning to sounds, No h/o change in voice, no h/o abnormal movements of tongue, No h/o vomiting, abnormal movements, trauma, Rashes, Recent vaccination. A

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provisional diagnosis of stroke in young was considered. Retrospectively the following history was asked – no History of stroke, similar complaints in past, History of facial puffiness, History of recurrent blood transfusions following acute sickness, History of cyanosis spell, fever with chills and petechiae, arthritis sore throat, cardiac surgery. For the above complaints child was taken to a local practioner, and was referred to a cardiologist. However, parents thought of taking the child to a hospital the following day for the same. On examination- child was conscious alert and oriented to time place and person. Vitals recorded were – Blood pressure of 100/70mm Hg recorded in the right arm in supine position and HR 72 bpm, RR 20 cycles per minute and a saturation of 100% on room air. Anthropometry revealed weight of 14kg (<3rd centile: wasted), height 110cm (3-10 centile) and BMI 11.57 (3-10centile) Head to toe examination was normal- no anemia, cyanosis, lymphadenopathy, pedal edema, signs of infective endocarditis were seen. On CNS examination- tone was bilaterally normal, Power examination revealed - UL: Left Shoulder –2/5, Elbow 2/5, wrist 2/5, power on the right side was 5/5 across all joints. Superficial and Deep tendon reflexes were intact. Cardiovascular examination revealed normal shape of precordium, no Visible pulsation, dilated vessels, surgical scars, No bony deformity, in drawing, harrison sulcus. Apical impulse + L 5th ICS. On palpation -Apex beat was seen on 5th intercostal space, hyperkinetic with No epigastric pulsations, thrills or parasternal heave. On Auscultation at the mitral(apex): S1 heard, at Tricuspid area (sternal) -Mid diastolic murmur was heard in lower sternum grade 3/5 on the Pulmonary (sternum) S2 heard. Other systemic examination was normal.

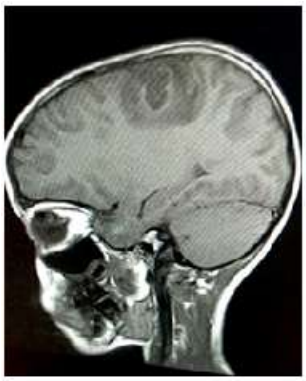

Figure 1

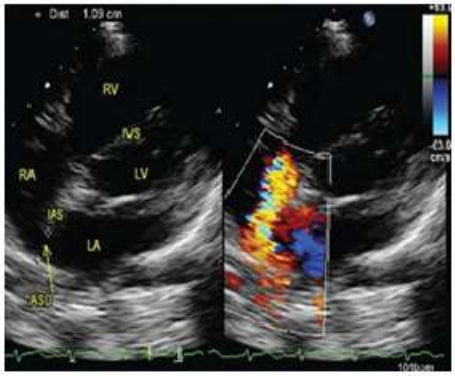

Figure 2

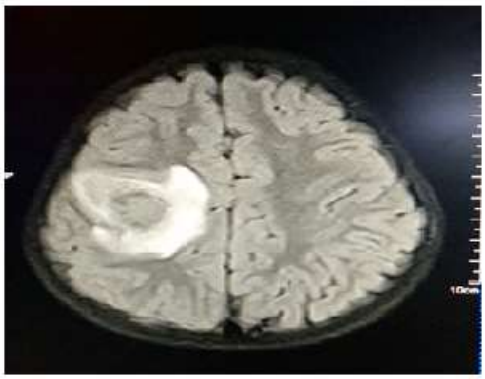

Figure 3

Figure 1: Right temporal abscess (5.8cm x 6.4 cm in size with perilesional inflammation); **Figure 2:** Fenestrated Large ASD of 8mm with Ejection fraction: 65% and Pasp 35mm hg; **Figure 3:** Perilesional inflammation around temporal abscess.

COURSE: For the above stated complaints, child was admitted and evaluated. On admission MRI brain and spine, 2-d Echo were suggested. Relevant investigations were sent. Hematogram was normal (Hemoglobin- 11.3, Total leucocyte count of 13,070 ((Neutrophils of 56, 42 lymphocytes, 6 basophils), platelet of 2.64, PCV 33.1, ESR 38, CRP 1.51, S electrolytes: Sodium 135, potassium 4.03, Chloride 98.8), Coagulation profile was send to rule out intracranial bleeds which was normal with PT 17.9, APTT 31 and INR 1.4. MRI-brain revealed: (fig 1) Right temporal abscess (5.8cm x 6.4 cm in size with perilesional inflammation) and 2-d Echo (fig 2) revealed a fenestrated Large ASD of 8mm with Ejection fraction: 65% and Pasp 35mm hg. A diagnosis of paradoxical embolus was considered. The temporal abscess was aspirated by a right parietal craniotomy, excision and evacuation of abscess were done under general anaesthesia. A thick capsule with yellow pus was seen and drained and sent for culture and after 72 hours the correctional surgery for fenestrated ASD was performed. Cultures were sterile. He was treated with 2 weeks of intravenous crystalline penicillin, chloramphenicol, and metronidazole followed by 4 weeks of oral co-trimoxazole and rifampicin. Child improved by the end of five weeks and neurological deficits began resolving by six weeks. Regular follow up of child was done till 6 months and child remained symptom free.

DISCUSSION

Brain abscess is an intracranial suppurative infection secondary to underlying infection or predisposing factors. Commonly seen in neonates and children between 4-8 years age. Abscess develop through a series of complicated stages- early cerebritis, late cerebritis, early capsulation and late capsulation. In our case the child had a thick capsule which was removed during the surgery. Temporal lobe abscess usually presents with dysphasias and quadranopsia is seen if non dominant hemisphere is involved2. Congenital heart diseases have been well-known to be associated with systemic desaturation,

paradoxical embolization, and brain abscess. The right-to-left shunts allow septic microemboli to pass through the pulmonary circulation by avoiding the normal pulmonary capillary filter hence gaining direct access to cerebral circulation. Similar can occur with pulmonary arteriovenous malformations.[3] It is prudent to assume that the cause of cerebral abscess in cryptogenic brain abscesses is a missed or silent ASD unless proved otherwise. TEE is the most sensitive test to diagnose sinus venosus ASD and should be carried out in situations where no plausible pathology is identified.[4] Optimal therapy of brain abscesses involves a combination of high-dose parenteral antibiotics and neurosurgical drainage. Aspiration and drainage of the abscess under stereotaxic guidance are beneficial for diagnosis and further therapy. Complete excision of a bacterial abscess via craniotomy is reserved for multiloculated abscesses. In our patient, surgery was mandatory because of increasing focal deficits. Our patient presented with brain abscess secondary to a fenestrated ASD, hence acyanotic congenital heart disease should be considered as a hematogenous source.

REFERENCES

1. Kanu OO, Ojo O, Esezobor C, et al. Pediatric brain abscess - etiology, management challenges and outcome in Lagos Nigeria. Surg Neurol Int. 2021;12:592. Published 2021 Dec 8. doi:10.25259/SNI_605_2021.
2. Jauhari P, Sahu JK (2015) Brain Abscess. In: Piyush Gupta (Ed.), PG text book of paediatrics, Vol. 2160-2172.
3. Sung CW, Jung JH, Lee SH, Choi S, Cho JR, Lee N, Kim CH. Brain abscess in an adult with atrial septal defect. Clin Cardiol. 2010 Apr;33(4):E51-3. doi: 10.1002/clc.20552. PMID: 20127903; PMCID: PMC6653164.
4. Lonnebakken MT, Greve G, Leirgul E (2008) Brain abscess caused by paradoxical embolization in Ebstein's anomaly. Eur J Echocardiogr 9(1): 105-106.
5. Mameli C, Genoni T, Madia C, Doneda C, Penagini F, Zuccotti G. Brain abscess in pediatric age: a review. Childs Nerv Syst. 2019 Jul;35(7):1117-1128. doi: 10.1007/s00381-019-04182-4. Epub 2019 May 6. PMID: 31062139.

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