Case report

Streptococcus constellatus Causing Brain Abscess: A Case Report

Pratibha Sharma MD, Padma Das MD, Dr. Lokesh Nehete MS, MCH, Archana B Wankhade MD

ARTICLE INFO

Introduction

Brain abscess is focal suppurative infection within the brain parenchyma surrounded by a vascularised capsule.[1] Most cases occur due to direct spread from a nearby contiguous site like pre-existing chronic suppurative otitis media (CSOM), dental caries, trauma or hematogenous spread of pyogenic infection from an extracranial site.[2] CSOM is the commonest cause of the brain abscess in developing countries like India [3,4] Commensals of oral cavity rarely cause brain abscess. Here we report case of brain abscess caused by Streptococcus constellatus which spread from pre-existing odontofacial infection.

Case:

Day 0: A 55 years old male patient who is known diabetic from past five year and on oral hypoglycemic agents (OHA) with poorly controlled glycaemic status was received at our trauma and emergency (T&E) department in delirious state with history of vomiting on and off for the last five years and altered sensorium for two days. He had history of past illness suggestive of chronic odontofacial infection for six months with an acute worsening for ten days and was taking on and off since four days and altered sensorium for two days. He had history of past illness suggestive of chronic odontofacial infection for six months with an acute worsening for ten days and was taking on and off on a daily basis. He had a history of hypertension, trauma, seizures or any head and neck intervention in the past. On examination his vitals were as pulse rate: 109/minute, blood pressure: 168/98 mm of Hg, SPO2: 84% on room air.

He was immediately intubated, was maintaining saturations on the T piece. But worsened rapidly in sensorium over next few hours (GCS score E3V3M5V11). He was started on empirical treatment with ceftiraxone 1gm IV twice daily, amikacin 750mg IV once daily, metronidazole 400 mg IV thrice daily as per hospital protocol.

Day 1: Initial laboratory finding revealed Arterial blood gas analysis on non-rebreathing oxygen mask at 5l/min as pH:7.347, PCO2: 41.4, P02: 96, HCO3: 22.9. Blood lactate levels were elevated to 2.2mmol/l, haemoglobin: 11.2g/dl, Total leucocyte count: 13,600×10⁹, Differential leucocyte count: polymorphs:88, lymphocytes:10, monocytes:2. Platelet count: 310×10⁹. Random blood glucose: 230mg/dl. Serum sodium: 144mEq/l, potassium: 3.7mEq/l, HbA1C: 11.5. His liver and kidney functions, coagulation profiles were within normal limits and serostatus for HIV, HBsAg, HCV was negative. Contrast enhanced Computed tomography (ECT) head done as part of evaluation of altered sensorium showed focal collection/mass in right temporoparietal, subcortical, periventricular white matter measuring 31×31mm with surrounding edema causing mass effect with midline shift.

Day 2: He underwent right temporo-occipital craniotomy and excision of abscess. Post-operative patient was electively ventilated. Post-operative CT brain showed good decompression of abscess with hydrocephalus. He underwent external ventricular drain placement for hydrocephalus. Perspirated was sent for bacterial, Fungal and liquid mycobacterial (MTB) culture. Biopsy taken from the site was also sent for the histopathology and finding were acute inflammatory granulation tissue with blood clots and increased glial tissue and that was mostly suggestive of brain abscess.

Keywords:

Brain Abscess
dental infection
pyogenic infection
Streptococcus constellatus.
MICROBIOLOGICAL ASPECT: Specimen was received, and processed for Gram stain, Ziehl Neelsen stain, aerobic and anaerobic bacterial and Mycobacterial culture. Pus sample was also inoculated on BacT/ALERT FA plus blood culture bottle for better yield and processed by BacT/ALERT automated system (bioMerieux). Ziehl Neelsen stain shows no Acid fast bacilli but Gram Stain showed plenty of pus cells with small gram positive cocci in chains [figure 1] and the findings were immediately communicated to concerned physician and vancomycin 1gm IV TDS was added to existing treatment.

Day 3: No growth was obtained on 5 % sheep blood agar, MacConkey agar, Chocolate agar after 24 hours of incubation with 10 % CO2 at 37° C, though BacT/ALERT blood culture flagged positive and was immediately subcultured on 5 % sheep blood agar. Patient’s GCS score was (E3VTM4)7T.

Day 4: No growth was obtained on 5 % sheep blood agar, MacConkey agar, Chocolate agar after 48 hour, but Pin point colonies surrounded by wide zone β hemolysis [figure 2] were found on the subcultured Blood Agar plate after 24 hour of incubation with 10 % CO2 at 37° C and was processed in VITEK 2® (bioMerieux).

Day 5: The colonies were identified as Streptococcus constellatus by VITEK 2® (bioMerieux). The organism was found sensitive to Penicillin(10µg), Ampicillin(10µg), ceftriaxone(30µg), vancomycin(30µg), linezolid(30µg) by Kirby Bauer disc diffusion method and VITEK AST system as per current CLSI guideline. Patient condition showed no change and he was continued on vancomycin therapy for 29 days and all other antibiotics were de-escalated.

Day 6: Anaerobic culture on Robertson cooked meat broth revealed no growth after five days of incubation at 37°C. Patient’s GCS score improved to (E4VTM5)9T.

Day 14: Patient’s GCS worsened to (E1M5VT)6T. Repeat CT brain showed increasing front temporoparietal subdural collection with minimal mass effect; possibility due to CSF drainage through EVD. Hence EVD was removed.

Day 15: Subdural collection was sterile on culture.

Day 17: As patient was not improving CT brain was repeated [Figure 3], which showed further increase in subdural collection with increasing mass effect. He underwent frontal burr hole and evacuation of subdural collection.

Day 24: Patient regain consciousness. Weaning was started with intermittent mechanical ventilation and T piece.

Day 52: He improved gradually with appropriate antibiotic, optimal nursing care and rehabilitation. He underwent decannulation after optimisation of chest. Culture reports for Mycobacterium tuberculosis after eight week comes negative.

time between the maximum sensory level reached to its regression to two level below was faster in Group P [68.3± 21.2] as compared to Group S [83.8±21.5],[Table 4]

The number of times ephedrine was given in response to drop in B.P over different phases of the study after spinal block was higher among patient in group S as compared to that in group P [p value 0.009],[Table 5] The development of nausea [P = 0.049] were significantly more common in Group S. Time to reach modified Bromage 3 motor block and time to motor regression to modified Bromage 0 was statistically comparable among both the groups . There were no significant changes in oxygen saturation in either group. There were no significant differences noted in the occurrence of shivering. No patient experienced vomiting or underwent conversion to general anesthesia.

Figure 1: Gram Stain showed plenty of pus cells with small gram positive cocci in chains

Figure 2: Pin point colonies of S. constellatus surrounded by wide zone β hemolysis
DISCUSSION:

Brain abscess is life threatening infection of central nervous system accounting for 8% and 1-2% of intracranial masses in developing and western countries.[5] Commensals of oral cavity can cause brain abscess due to underlying dental infections as seen in our case.[6] Dental infections account for 2% of brain abscesses and many cryptogenic brain abscesses are in fact due to dental infection. Presentation can be varied but common symptoms are high grade fever, headache, convulsions, nausea and projectile vomiting.[7] Clinical diagnosis as well as prognosis is established by computed tomography of head, magnetic resonance imaging (MRI) recognises pyogenic brain abscess quite accurately.[8] Isolation, identification and antibiotic sensitivity report of causative pathogen is the cornerstone for appropriate management and therapeutic optimisation. Value of promptly evaluated microscopy and meticulous culture methods cannot be underestimated. Direct inoculation of pus sample into standard BacT/Alert bottle (bioMerieux) facilitated early and better yield of organism as seen in our case.[9]

Streptococcus constellatus (comes under anginosus group) is a commensal of oropharyngeal flora, gastrointestinal tract, and urogenital microbiota, an established pathogen of brain abscess worldwide. These organisms can be α, β and nonhemolytic but more than half of the S. constellatus are β hemolytic.[10] Small colony size and the matt appearance of the colony distinguish these group from large colony β hemolytic streptococci. In our case it must have spread by direct extension from odontofacial infection to cause unifocal abscess. Immunosuppressed state plays an important role in spread of infection as in this case patient was on OHA agents with uncontrolled diabetes.

CONCLUSION:

Brain abscess is life threatening and rapidly deteriorating infection. Early diagnosis and treatment are necessary to alter the prognosis. Clinical suspicion, appropriate sampling, early Gram stain report and definitive Culture and Sensitivity report can help in determining the treatment protocol. Increasing availability & correct utility of newer technologies like automated systems significantly decrease the turnaround time of routine culture report & provides timely and appropriate diagnosis.

REFERENCES: