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SERRATIA FONTICOLA CAUSING CEREBELLAR ABSCESS: A CASE REPORT

Microbiology

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ABSTRACT

Serratia fonticola is found in a variety of environments. This report describes possibly the first case of a cerebellar abscess caused by Serratia fonticola. When isolated in a mixture of organisms, it may just be a bystander but when found alone in pure culture, especially from a sterile site, its role as the causative pathogen must be recognized. We present here, a case of a cerebellar abscess in a 4 yr old with ear discharge. Both the ear discharge and the abscess pus grew Serratia fonticola. The child was treated with Piperacillin-Tazobactam in accordance with the sensitivity pattern and responded well.

KEYWORDS

Serratia fonticola, Cerebellar Abscess, Otogenic Brain Abscess

INTRODUCTION:

Genus Serratia includes gram negative, motile bacilli that are widely distributed in the environment and constitute an important group of opportunist pathogens in hospital settings. Most of the infections are attributable to Serratia marcescens, though there are reports of infections caused by Serratia liquefaciens, Serratia rubidaea, Serratia plymuthica and Serratia fonticola.[1,2]

Species fonticola was first described by Gavini et al. in 1979 and now forty years later this organism is likely to undergo a change in taxonomic status. According to Koneman's Color Atlas and Textbook of Diagnostic Microbiology 7th edition, Serratia fonticola is not really a species of Serratia and is likely to be reclassified. It is sizably distributed in a variety of environments including water, soil, sewage, molluscs and birds. Isolations from wound & soft tissue infections, respiratory tract and urinary tract have also been reported. It has been suggested that fonticola isolations in a mixture of organisms may not authenticate its role as the causative pathogen but due cognizance be taken if the fonticola species is growing alone in pure culture, more so, from a sterile site. [2] There is evidence of six case reports of fonticola infection in literature. Two isolations have been reported from polymicrobial skin and soft tissue infections. One case had thigh abscess with bacteremia and another had septic arthritis due to foreign body. There is one case report of diarrhea in immunocompromised patient and one of urosepsis in an old male. [2] Isolations from any other site are not evidenced on google search. We report here a case report of otogenic cerebellar abscess in a four year old male child caused by Serratia fonticola and this is possibly the first ever report of fonticola isolation from brain abscess.

Case history:

A 4 yr old male child presented to the neurosurgery OPD of our hospital with complaints of fever and headache for the last 20 days and multiple episodes of vomiting in the last 4-5 days. There was two months history of left ear discharge. There was no history of altered sensorium or seizures but the mother reported decreased oral acceptance in the past week. She also informed about two episodes of abnormal body movements 3 days back. The child was taken for admission.

Before reporting to our institute, the child was admitted in a private hospital for fever, headache and vomiting but was referred to the neurosurgery department of our institute after a non contrast computed tomography (NCCT) head revealed a space occupying lesion (SOL) in the left cerebellar hemisphere with mild compression of the fourth ventricle and mild dilatation of both lateral and third ventricles (Fig 1)

Fig. 1: CT Head image revealing a space occupying lesion (SOL) in the left cerebellar hemisphere with mild compression of the fourth ventricle and mild dilatation of both lateral and third ventricles

At the time of admission, the child was febrile with a pulse rate of 120/min, respiratory rate of 26/min and blood pressure 120/70mm Hg. His Glasgow Coma Scale (GCS) score was E4V5M6. Tone was normal in all 4 limbs while power was 3/5. Deep tendon reflexes (DTR) were preserved and plantars were upgoing. The child exhibited neck rigidity and Kernig sign was present. Fundus examination was normal. Cerebrospinal fluid was sterile. CSF Sugar was 66mg/dl. CSF Protein was 36 mg/dl. He was provisionally diagnosed as a case of acute meningitis with cerebellar abscess. Since there was significant history of profuse, yellow mucoid discharge from the left ear, an ENT consult was sought. There was a perforation in the tympanic membrane and discharge in the auditory canal. There was no pre/post auricular swelling. Hearing was normal. The child was prescribed Amoxyclav and advised to keep the ear dry.

To verify the findings of the NCCT, an MRI Brain (magnetic resonance imaging) was also done on the child. MRI revealed a peripherally well enhancing cystic lesion in the left cerebellar hemisphere abutting adjacent left tentorium with perifocal edema. The lesion was pressing over fourth ventricle and over brainstem causing prominence of both lateral and third ventricles (Fig 2). On the basis of MRI findings, a diagnosis of left sided cerebellar abscess was made..

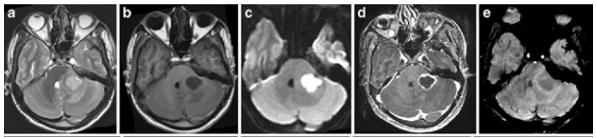

Fig. 2: MRI Brain images

As a part of the protocol, ear swabs charged with discharging pus from

left ear were referred to the Department of Microbiology for investigation of microbial etiology. Gram stain of the aural pus revealed pus cells and gram negative rods. The sample was also inoculated on to blood agar, chocolate agar and MacConkey agar. On blood agar there was growth of grey, non hemolytic colonies and on MacConkey agar, lactose fermenting colonies were obtained. Chocolate agar showed grey circular convex colonies. Anaerobic culture did not yield any growth after one week of incubation. Gram's stain from the colony showed gram negative bacilli. The organism was motile. Biochemical reactions are summarised in Table 1. The organism was identified as Serratia fonticola on the basis of biochemical reactions and colony characters. Identification was verified by VITEK2 also. The isolation of Serratia fonticola was communicated to the treating surgeon.

Table 1: Biochemical reactions of the isolate

Biochemical test	Result
Catalase	Positive
Oxidase	Negative
Hugh Leifson's OF test	Fermentative metabolism
Nitrate	Reduced to nitrite
Methyl red	Positive
Voges-Proskauer	Negative
Indole	Not produced
Citrate	Utilized
Urea	Not hydrolysed
TSI	A/A with gas, no H2S
Lysine decarboxylase	Produced
Ornithine decarboxylase	Produced
Arginine dihydrolase	Not produced
L-Arabinose	Fermented
D-Arabitol	Fermented
D-Sorbitol	Fermented
Raffinose	Fermented
Sucrose	Not fermented

A second sample submitted for reinvestigation of the aural pus also grew Serratia fonticola. Antimicrobial susceptibility testing was performed by the Modified Kirby Bauer method. The isolate was susceptible to Gentamycin, Ciprofloxacin, Amikacin and Piperacillin-Tazobactam.

The child was taken for surgical removal of the abscess. A left retromastoid suboccipital craniotomy with excision of left cerebellar abscess under general anesthesia was performed. Per operatively, cerebellum was found to be edematous and bulging. CSF was drained from the lateral cerebello-medullary cistern. Corticotomy was made over the left cerebellar hemisphere in the most bulging part. Capsule of abscess was reached at a depth of approximately 5 mm. About 40ml of thick yellowish green pus was aspirated from the abscess and sent for microbiological investigation. The pus sample was processed for both aerobic and anaerobic organisms as per standard protocols and as described above. This per operative sample also grew Serratia fonticola. The antimicrobial sensitivity profile matched with the isolates from the aural pus.

The child was started on Inj. Piptaz, Inj.Metrogyl and Inj.Vancomycin. The child responded well to the antibiotics and showed improvement. His GCS recovered to E4V5M6. The running ear also dried up and three ear swabs collected over a period of one week did not yield any growth.

Post operative period was uneventful but the neurosurgeon advised mastoid surgery also to conclusively remove the infective focus from the ear and avoid any future recurrence. The parents refused for another surgery and the child was discharged two weeks after the abscess excision. On follow up at two and four weeks, the child did not have any complaint and his mother informed that the child was playful and had returned to his normal activities. It was again reinforced at the follow up that middle ear surgery was absolutely essential or else the child may land into a complication.

DISCUSSION:

There are very few reports so far of human infections with Serratia fonticola and a thorough literature search did not yield any reports of Serratia fonticola brain abscess.

While there are case reports substantiating S. fonticola as the only isolate in culture from cases of bacteremia, asymptomatic bacteriuria, diarrhoea, skin and soft tissue infection and UTI, this is the only case, to the best of our knowledge where this organism has been isolated from a brain abscess. [2]

A systematic review of otogenic brain abscesses documented Proteus to be the most common organism. Microbiology data was available from 14 studies that specified a total of 16 common isolates from otogenic intracranial abscesses. Eleven of 14 (78.5%) of studies had P. mirabilis as the most common isolate while 1 of 14 (7.1%) specified Streptococcus species as the most common isolate. Two studies had more than one common isolate; one with P. mirabilis and Streptococcus species and the other with Streptococcus and Staphylococcus species. [3]

Since the introduction of antibiotics, the frequency of intracranial complications of otitis media may have come down, but that hardly leaves room for complacence, given their associated morbidity and mortality. Mortality in cases of otogenic brain abscess has been placed at about 18% for cerebral and 20% for cerebellar abscesses. [4] Prompt identification of the causative pathogen and appropriate treatment is absolutely essential for favorable outcomes. In this case of cerebellar abscess, it appears certain that the organism travelled from the middle ear to cause the abscess. Hence, any isolation of S. fonticola from ear swab should alert the treating physician to the life threatening complications like cerebellar abscess.

While human infections described so far have not presented a therapeutic challenge in terms of resistance, S. fonticola has been shown to have the potential of harboring resistance elements, including a chromosomal inducible AmpC beta-lactamase. Van Hoek et al. found an inducible FONA-type extended spectrum beta-lactamase (ESBL)associated with resistance to third generation cephalosporins in isolates from retail vegetables. [2]

A sequence of chromosomal enzyme coding for an ESBL in S. fonticola, has been detected on a self-transferrable plasmid in Enterobacter cloacae also. This phenomenon underscores the theoretical risk that S.fonticola could transmit these resistance elements to other bacteria. The existing antimicrobial susceptibility data from previous reports indicates that extended spectrum cephalosporins, carbapenems and fluoroquinolones are the best options for empiric treatment of true S. fonticola infections.

CONCLUSIONS:

Suppurative otitis media is one of the commonest chronic infections in developing countries. Factors playing a role in the pathogenesis of chronic suppurative otitis media are not fully understood and underscore the urgent need for research in the area of development of novel and effective therapeutic strategies. Intracranial complications by otitis media continue to be a risky situation because of the associated high degree of morbidity and mortality. High degree of suspicion and careful history taking is essential for diagnosis and skillful management of otogenic brain abscesses; because antibiotics may tend to mask the typical clinical presentation. Surgical drainage coupled with culture confirmed antibiotics, remains the treatment of choice. [5] To prevent recurrence of this life-threatening complication, if possible, surgical removal of the abscess should be coupled with tympanomastoidectomy, either at the end of the operation, or at a later date. [4,5]

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