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Original Research Paper

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USE OF OMMAYA RESERVOIR TO DELIVER INTRAVENTRICULAR ANTIBIOTICS BESIDES DRAINAGE OF CEREBROSPINAL FLUID IN A PATIENT WITH TUBERCULAR MENINGITIS WITH COMMUNICATING HYDROCEPHALUS WITH SUPER ADDED STAPHYLOCOCCUS AUREUS VENTRICULITIS

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ABSTRACT We describe a 9 month old female child with 2 weeks history of fever, irritability, excessive crying, letharginess, refusal to feed and 2 episodes of generalized tonic clonic seizures. Child had positive history of contact with sibling suffering from pulmonary tuberculosis who was on anti tubercular drugs. Child was evaluated and investigations were suggestive of Central Nervous System tuberculosis. NCCT Brain showed gross communicating hydrocephalus. Child was started on ATT with steroids and antiepileptic drug. Ommaya reservoir was temporarily inserted for CSF drainage. Unfortunately child deteriorated and repeat lumbar puncture showed very high levels of proteins and polymorphs with CSF culture showing growth of staph. aureus. A diagnosis of ventriculitis was made and intravenous vancomycin and colistin started. Simultaneously colistin ,gentamycin ,vancomycin were administered intraventricularly also via Ommaya reservoir.Child had a good response and recovery.

KEYWORDS : Ommaya Reservoir, Tubercular meningitis, Hydrocephalus, Ventriculitis

INTRODUCTION

Tubercular infection of the brain and spinal cord including meninges is a dangerous complication in children. It may lead to death without urgent and specific treatment[1].

Tubercular meningitis oftenly occurs after lymphatic or hematogenous or both routes of dissemination of primary focus of tubercular infection like lungs to brain, meninges or spinal cord[2]. There is formation of tubercles, metastatic caseous and necrotic lesions in cerebral cortex along with inflammation of meninges[1].

Caseous and necrotic lesions increase in size with rapid multiplication of tubercular bacilli and bacilli spread to subarachnoid space[1]. There is inflammation, obstruction and infarction because of the involvement of lumen of small and medium sized blood vessels of cortex and meninges.[2]

The lumen of small blood vessels is obliterated by exudates[2].

Mid brain and Brain stem is affected more commonly with involvement of cranial nerves III, VI, and VII. Communicating hydrocephalus occurs because of CSF flow obstruction at basilar cisterns. Vasculitis, infarctions, cerebral edema also occurs, Cerebral salt wasting or SIADH may also complicate the picture[1].

Tubercular meningitis occurs in less than 1% of untreated tuberculosis infections in children and is most common in infancy and toddler age groups[1]. Three stages may be described The 1st stage may last for upto 2weeks.There is history of prolonged high grade fever with night sweats, generalized weakness, loss of weight and appetite, global headache, irritability and persistent vomiting[2]. Photophobia history may also be present

In **second stage** child develops features of meningitis including neck rigidity, Kernigs sign and Brudzinski leg and neck component signs are present. Other findings in Stage second may be hypertonia, seizures, persistent vomiting, multiple cranial nerve palsies, and other focal neurological deficits[2]. The 3rd stage is characterised by deteriorating consciousness leading to coma. There may be hemi- or paraplegia, hypertension, decerebrate posturing, decorticate posturing, worsening of vital signs, and eventually brain death or complete death[2]. Antitubercular drug treatment should be considered for any child who has basal exudates and hydrocephalus in brain imaging or on clinical examination has cranial nerve palsy, or pediatric stroke usually ischemic with no other apparent etiology[1].

CSF leukocyte count is increased and lymphocytes predominate. CSF glucose is on lower side usually <40 mg/dL but rarely <20 mg/dL. CSF protein level is very high (400-5,000 mg/dL) because of obstructive hydrocephalus[1].

Lumbar CSF has above characteristics and ventricular tap if done may sometimes reveal normal CSF analysis[2]. Basal exudates with leptomeningeal enhancement and communicating hydrocephalus with cerebral edema or early focal ischemia and infarctions are the most definitive findings in CNS imaging[1].

Clinically Ventriculitis may present with high grade fever, seizures, neck rigidity,photophobia, decreased consciousness, persistent vomiting[3]. Child appears very sick. CSF analysis reveals low glucose, very high levels of proteins in thousandsof mgs, increased polymorpholeukocyte count and growth of a suspected organism in culture. There may be history of some intervention like Ommaya reservoir insertion and CSF culture may grow common skin flora, suchascoagulasenegative Staphylococcus, Corynebacterium, Bacillus, Micrococcus, or Propionibacterium species[3].

Ommaya reservoir was initially used in 1963[4]. For patients requiring multiple cerebrospinal fluid (CSF) sampling or intrathecal drug administration, it serves as an important neurosurgical tool.[4]. Ommaya reservoir can be used for a number of conditions, e.g., intraventricular hemorrhages, cystic tumour aspiration, treating meningitis, and central nervous system neoplastic diseases, but are more oftenly used for the administration of intraventricular chemotherapy drugs for the treatment of neoplasia induced meningitis and central nervous system (CNS) lymphoma[4]. Ommaya reservoir facilitates multiple outpatient administration of chemotherapeutic drugs and multiple CSF analysis for knowing treatment responsiveness. Postoperative infection, usually with gram-positive skin organisms may occur in small number of patients and is because of breach of aseptic technique[5].

PATIENT AND OBSERVATION

A 9 month old female child presented with 2 weeks history of

fever, irritability, excessive crying, letharginess, refusal to feed and 2 episodes of generalized tonic clonic seizures. Child had positive history of contact with sibling suffering from pulmonary tuberculosis who was on anti tubercular drugs. Examination revealed a sick looking child with bulging anterior fontanella .Chest ,cardiovascular and abdominal examination was unremarkable.Child was very irritable and was not making eye contact. A provisional diagnosis of tubercular meningitis was made and child investigated. Lumbar puncture done showed proteins of 600mg/dl, sugar 30mg/dl, TLC 110 cells/mm^3 , 80% lymphocytes, however CSF culture and gram /AFB stain were negative. CBNAAT of csf was: MTB detected, RIF resistance not detected. NCCT BRAIN revealed gross communicating hydrocephalus with basilar exudates (FIG. 1). Child was started on ATT intravenous phenytoin, intravenous dexamethasone ,IV mannitol and IV 3% nacl. Nasogastric feeds were slowly initiated and hiked gradually. A neurosurgery opinion was sought and an Ommaya Reservoir was inserted on day 5 of admission(FIG. 2,3,4 &5). Child deteriorated with letharginess, not tolerating NGT feeds, sensorium worsening. CSF sample from Ommaya Reservoir was sent for analysis. CSF revealed very high proteins 1300mg/dl, glucose 10mg/dl, TLC 400cells/mm^3, polymorphs 88% and culture showing growth of staphylococcus aureus sensitive to colistin and vancomycin. Immediately a diagnosis of ventriculitis was suspected and child started on IV vancomycin, IV colistin. Ommaya Reservoir was also used to deliver intraventricular antibiotics vancomycin , colistin and gentamycin as per recommended doses(FIG.4).Child started improving gradually(FIG.5).

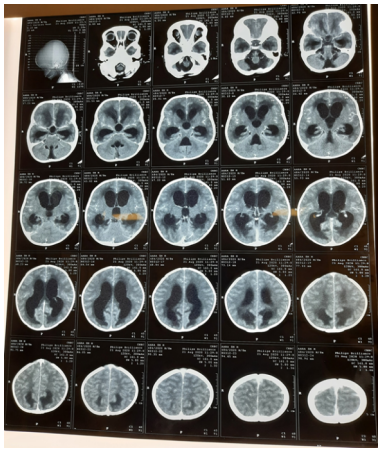

Fig 1. Ncct Head Showing Gross Communicating Hydrocephalus With Periventricular Ooze

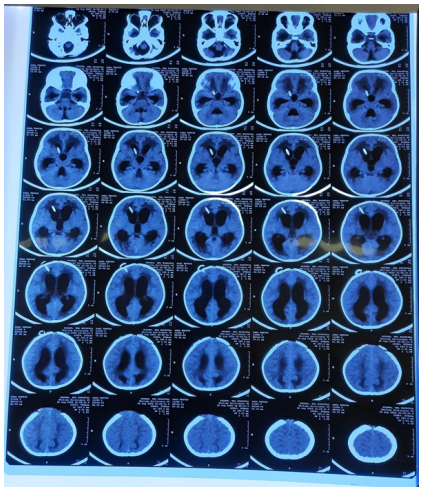

Fig 2. NCCT Head Showing Ommaya Reservoir In Situ With Communicating Hydrocephalus With Periventricular Ooze

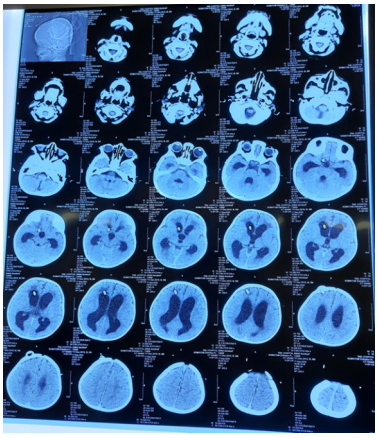

Fig 3. NCCT Head After 2weeks Of Insertion Of Ommaya Reservoir. Hydrocephalus Decreased And Periventricular Ooze Lessened.

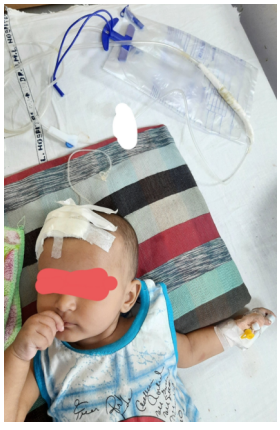

Fig 4. CSF Drainage Via Ommaya Reservoir. Also Used To Deliver Intraventricular Antibiotics.

Fig 5. Active Child After Few Weeks After Initiation Of Treatment.

DISCUSSION

Untreated tuberculosis infection in children may lead to a complication of tubercular meningitis in less than 1% of children and is common in age group of infancy upto 5 years[1]. Antitubercular drugs should be considered for any child who develops meningitis with brain imaging revealing basal exudates and hydrocephalus[1]. Cranial nerve palsy on clinical examination with above findings on brain imaging is a strong factor for diagnosing tubercular meningitis in India[1] .Ommaya reservoir is used temporarily to drain CSF in case of communicating gross hydrocephalus[4]. Ommaya Reservoir related ventriculitis may be suspected if CSF from the reservoir shows growth of particular organism like coagulase negative staphylococcus aureus[5].

In our 9 month old female child a diagnosis of tubercular meningitis was made on history, examination and supportive investigations. ATT along with steroids, anti epileptic drugs and mannitol plus 3% nacl was started initially and an Ommaya Reservoir was inserted. After improving initially, infant started deteriorating. CSF sample analysis from Ommaya Reservoir was suggestive staph aureus ventriculitis sensitive to colistin and vancomycin. Infant was added intravenous colistin and vancomycin and intraventricular colistin ,vancomycin and gentamycin was also administered as per recommended doses via Ommaya reservoir .Child improved gradually .

CONCLUSION

A rare case of 9 month old female child diagnosed with tubercular meningitis and started on ATT with steroids with antiepileptic drugs, worsened after insertion of Ommaya reservoir for hydrocephalus. Infant was diagnosed with super added staph aureus ventriculitis and infant responded well to intravenous and intraventricular colistin and vancomycin added to already started ATT with steroids.

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All authors contributed in realisation of this case study .All authors have read and agreed to the final manuscript.

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