



Case Report on Management Hydrocephalus as a Complication of Meningitis in Infant; Nurse Prospective

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Author's contribution

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

Article Information

DOI: 10.9734/JPRI/2021/v33i60B35025

Open Peer Review History:

This journal follows the Advanced Open Peer Review policy. Identity of the Reviewers, Editor(s) and additional Reviewers, peer review comments, different versions of the manuscript, comments of the editors, etc are available here: <https://www.sdiarticle5.com/review-history/78342>

Case Study

Received 20 October 2021

Accepted 26 December 2021

Published 27 December 2021

ABSTRACT

Introduction: Hydrocephalus is one of the commonest complications of meningitis in children with the disease. It is more severe in children than in adults. Fewer cases cause chronic Meningitis. Finding and treating the culprit organism is quite tough. In patients with chronic meningitis, complications such as hyponatremia, hydrocephalus, and neurological impairment should always be identified early and treated with a multidisciplinary team approach. We came across a case of severe brain damage due to Escherichia coli that progressed to meningitis which further also cause hydrocephalus, which she was treated for numerous times before being returned home with some neurological disability.

Clinical Findings: A 1.5 month old female child was brought to A.V.B.R. Hospital Sawangi (meghe) wardha on date 18th November 2021 by her parents with High fever, refusal of feed, seizures like activity, bulging fontanel.

Diagnostic Evaluation: Hb: 10.7, TLC : 21,500 . platelet: 5.1 eqI CBC , elevated WBC count of 23,511/ul KFT and LFT are normal , Brain MRI showed restricted diffusion, Lumbar Puncture was also performed same day E.coli gram negative bacteria are present in CSF collection

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Therapeutic intervention: Injection Ceftriaxone 650 mg 6 hourly intravenous, Injection Pan 15 mg 24 hourly intravenous, Injection Emeset 2 ml 4 hourly intravenous DNS with injection KCL 3.8 ml 8 hourly intravenous.

Outcome: After treatment of 6 days the child show improvement like fever and seizers decreased.

Conclusion: After proper treatment like medication, monitoring vitals and also by continous observation her condition was improved.

Keywords: Meningitis; hydrocephalus; meninges.

1. INTRODUCTION

Meningitis is the inflammation of meninges, the covering membrane of the brain and spinal cord [1]. Inflammation of meninges may occur as a result of primary infection due to bacteria, fungus, viruses [2]. Because of their immature immune systems, neonates and infants are more likely to develop acute bacterial meningitis. E. coli (Escherichia coli), is a type of bacteria that normally lives in intestines [3]. It is gram negative bacillus early detection and treatment give a positive outcome [4].

E Coli is a gram-negative bacterium, these bacteria are usually harmless, but some rare strains can cause serious illness. The vast majority of E. coli meningitis cases are caused by the disease-causing strain E. coli K1 [5]. The majority of E. coli meningitis cases occur in newborns or babies under the age of three months. Pediatrician must closely monitor these children's clinical progress and be aware of any potential complications [6]. Meningitis and hydrocephalus almost necessarily results in neurosurgical interventions. Meningitis is a possible cause of hydrocephalus [7]. It can also occur as a side effect of a shunt implanted to treat hydrocephalus. Bacterial infection of the meningitis can cause swelling of the brain tissues. Swelling in the brain can obstruct the flow of cerebrospinal fluid which leads to hydrocephalus [8]. The abnormal accumulation of cerebrospinal fluid in the intracranial spaces is known as hydrocephalus. Hydrocephalus can be caused by congenital or acquired factors. Hydrocephalus is classified into two types: communicating hydrocephalus and non-communicating hydrocephalus [9].

2. CASE PRESENTATION

2.1 Patient Identification

The 1.5 month old female child admitted in A.V.B.R. Hospital Sawangi Meghe Wardha on

18th November 2021 further investigations she was diagnosed with Meningitis associated Hydrocephalus.

2.2 Present Medical History

The 1.5 month old female child was brought to A.V.B.R. Hospital on 18th November 2021 by her parents with complaints of high fever, refusal of feed, bulging of fontanelle and seizures further investigations she diagnosed as Meningitis associated Hydrocephalus. Currently, her seizures is reduced and the bulging of fontanelle is seen. Fever is also decreased.

2.3 Past Medical History

There is not any of the history of head trauma or birth head injury. Also, there is a history of low birth weight baby and there is a history of 10 days NICU stay after birth.

2.4 Family History

There are 4 members in the family .Child belongs to a middle class family. The type of marriage of the parents of my patient is consanguineous. There is no other family history of convulsions, tuberculosis. There is no family history of meningitis or hydrocephalus.

2.4.1 Past intervention and outcomes

The patient was previously admitted to a private hospital in Buldhana. Patient condition was being complicated and Dr. referred to A.V.B.R.Hospital Sawangi meghe wardha after investigations like MRI, CBC, LFT, KFT and Lumber Puncture and patient diagnosed with Meningitis associated Hydrocephalus and now patient condition is better.

3. CLINICAL FINDINGS

High fever, refusal to feed, bulging of fontanelle and seizures.

3.1 Etiology

Inflammation of meninges may occur due to primary infection due to bacteria, fungus, viruses. *Escherichia coli* (*E. coli*) are Gram-negative, facultative anaerobic, rod-shaped coliform bacteria of the genus *Escherichia* that is commonly found in the lower intestine of warm-blooded organisms [7].

3.2 Physical Examination

Head to foot examination is done. Abnormalities occur in head circumference: 52 cm. Increase the size of head, other measurements is normal such as chest circumference: 50 cm, mid arm circumference: 12 cm, height: 84 cm, weight: 10 kg).check vital signs (temperature: 39.5°C, pulse: 130 beats/minute, respiration: 32 breaths/minute.

3.3 Diagnostic Evaluation

Complete Blood Count, elevated White Blood Count of 23,511/ul Kidney Function Test and Liver Function Test are normal, Brain Magnetic Resonance Imaging showed restricted diffusion, Lumbar puncture was also performed the same day (*E.coli* gram negative bacteria are present) in CSF collection.

3.4 Therapeutic Intervention

Antibiotic, Anticonvulsive drugs and osmotic diuretic therapy are given to the patient. Administration of oxygen therapy, mechanical ventilation care should be given if a patient is needed. Bed making is done, hygiene is maintained, and medication was given as per physician's order with right route, frequency and dose.

3.5 Medical Management

- Injection Ceftriaxone (Intravenous) 650 mg 6 hourly
- Injection Pantaprazole (Intravenous) 15 mg 24 hourly,
- Injection Emeset (Intravenous) 2 ml 4 hourly,
- Fluid DNS with Injection Potassium chloride 3.8 ml 8 hourly.

3.6 Nursing Diagnosis and Intervention

*Altered cerebral tissue perfusion related to increased intracranial pressure.

Intervention:

- Assist the Lumbar puncture procedures to detect the exact pathology.
- Implement a treatment schedule as indicated, like providing medication with the right dose, route and frequency.
- Provide psychological support to the patient's family members.

*Altered nutrition, less body requirement related to reduced oral intake.

Intervention:

- Administer intravenous drugs as per physicians order to maintain electrolyte balance.
- Explain to the child's mother about the importance of exclusive breastfeeding feeding to the Infant.

*Ineffective family coping related to the life threatening problem of infants.

Intervention:

- Reduce parental anxiety by explaining reassurance and encouraging them to express feelings.
- Provide clear and adequate knowledge about treatment plan and disease prognosis.

4. DISCUSSION

Neonatal meningitis is a potentially fatal medical condition. That, if left untreated. It occurs more frequently in the neonatal period (infants less than 44 days old), and it is a major cause of morbidity and mortality worldwide. Mortality in developing countries is roughly half that of developed countries, ranging from 8% to 12.5% [10]. Bacteremia, or bacterial infection of the blood, is the most common cause of neonatal meningitis. The organisms responsible are diverse, with group B streptococci (*Streptococcus agalactiae*), *Escherichia coli*, and *Listeria monocytogenes* being the most common. Despite low mortality rates in developed countries, there is a 50% prevalence of neurodevelopment disabilities after *E. coli* and *Streptococcus agalactiae* meningitis, and 79% prevalence after Gram-negative rods other than *E. coli* meningitis. If neonatal meningitis is not treated promptly, it can result in cerebral palsy,

blindness, deafness, seizure disorders, and learning disabilities [11].

Acquired hydrocephalus after contracting *E. coli* meningitis. The most important clinical details. With six girls, the median age was 3.3 years (range 7 months to 10 years). The duration between the onset of symptoms and the diagnosis of hydrocephalus was typically 8–10 days, with the shortest time being 5 days. The two patients with the smallest intervals (patients 8 and 9) had the worst outcomes (death in both cases). Pleocytosis (range 150–6000 cells/mm³) and a high predominance of polymorph nuclear cells were found in the CSF. Gram staining and culture confirmed their limited role, with the majority of patients (5/7 with available data) being negative at the first lumbar puncture. Almost all of the patients received antibiotics that included ampicillin in combination with an amino glycoside [12]. This is in line with ESCMID guidelines, despite the fact that only one in vitro investigation has proven that this combination is synergistic. In other situations, carbapenems were also used. But were linked to a greater mortality rate in long-term treatment [13]. To avoid amino glycoside-related toxicity, we employed Ampicillin in combination with Gentamicin, switching gentamicin to TPM/SMX after 15 days. TPM/SMX has strong blood-brain barrier penetration in the CNS. It is normally bacteriostatic, but when *Listeria monocytogenes* functions as an intracellular pathogen, it has bactericidal effect [14]. Chen and colleagues found that the majority of patients with hydrocephalus had delayed detection and did not receive targeted antibiotic treatment during the early stages of *E.coli* meningitis care in a recent investigation on adult patients. Indeed, detecting *E. coli* meningitis is difficult, and proper treatment is usually delayed. To begin, it is well understood that *E.coli* meningitis has a clinical presentation comparable to other viral and bacterial CNS infections, and that *E.coli* is resistant to extended-spectrum cephalosporin as a first-line treatment for bacterial meningitis [15].

5. CONCLUSION

The study focused on professional health care and nursing management and treat the meningitis associated with Hydrocephalus in patient 1.5 month old female child admitted in A.V.B.R. Hospital sawangi (Meghe) Wardha with chief Complaint of fever, seizure like activity, refuse to feed and bulging fontanelle. After providing care like medication, oxygen therapy,

the child shows improvements after 8-9 days like episodes of seizures were not seen. The body temperature is maintained to normal. The head circumference is slightly decreased. It is very important to diagnose in early stage so that the child will not develop complications from the disease. My patient show great improvement after getting the treatment and the treatment was still going on till my last day of care.

CONSENT AND ETHICAL APPROVAL

As per university standard guideline, parental consent and ethical approval have been collected and preserved by the authors.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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Peer-review history:

*The peer review history for this paper can be accessed here:
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