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Case Report

Two years one month old child with meningitis: A case study

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ABSTRACT

Meningitis is the inflammation of meninges, the covering membrane of the brain and spinal cord. It is the cause of major hospitalization of children with high mortality rate. The term meningitis to be considered as a misnomer because it is virtually impossible that inflammation is limited to meninges only. This study was done to detect the risk factors and contributing factors that can lead a child to develop meningitis and whether the child condition improved or not. The child develop one episode of seizure before admission in the hospital.The child had fever,neck rigidity and irritability.With diagnosis it came out as signs of meningitis. The child got treatment of meningitis and with the time the child condition starts improving.The child condition improved day by day with appropriate care and no any other episode of seizure noticed during my duration of care.

1. Meningitis

Meningitis is the inflammation of meninges, the covering membrane of the brain and spinal cord. It is the cause of major hospitalization of children with high mortality rate. The term meningitis to be considered as a misnomer because it is virtually impossible that inflammation is limited to meninges only. Meningoencephalitis is a better nomenclature as brain tissue is also inflamed along with meninges.[1] Depending upon the etiological agent meningitis is of three types that is classified as bacterial ,Aseptic and tubercular meningitis. Acute bacterial meningitis can be caused by variety of bacteria like E.coli, Pseudomonas aeruginosa, Staphylococcus aureus, Haemolytic streptococcus. Aseptic meningitis caused by virus, fungus or protozoa. Tubercular meningitis is the inflammation of the meninges from tubercular infection caused by Mycobacterium tuberculosis. It is a serious complication of childhood tuberculosis. Haemophilus influenzae and Meningococcus together account for 70% of all cases of bacterial meningitis. Common sign and symptoms include fever, irritability, poor feeding, vomiting, high pitch cry, seizures, bulging fontanel, nuchal rigidity, sleepiness. Symptomatic and supportive management are important for better prognosis of these conditions. Initial management should be done promptly to save the life and prevent complications.[2]

2. Patient History

Aadil was delievered by vaginal delievery in Kalyani hospital via normal vaginal delievery and weighed 2.5 kg at birth. Child had no injury during delievery, child cried immediately after birth colour of the child was pink after delievery. Immunization were done upto date. Child passed meconium within 24 hrs. of life. There was no sign of infection seen during the the time of delievery as no eye discharge or infection was seen. No family history of meningitis or seizure was seen.

Recently child admitted to SGT hospital with complaint of Fever since one week, one episode of seizure ,neck rigidity, not taking feed since 3 to 4 days. Child was awake having high grade fever, irritability and headache. Child was diagnosed with meningitis. Child was conscious

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,thin built , not active and irritable during the time of admission. Vital signs were 101.2* f temaprature, pulse rate 144 bpm,respiratory rate 30 bpm,blood pressure 86/63 mmhg , pain scale 6, oxygen saturation was 98% along with child weight was 12kg.

Anthropometric measurement was normal as per the developmental age such as height was 84 cm, weight 12 kg, head circumference 47 cm, chest circumference 56 cm, abdominal girth 40 cm.

2.1. Diagnostic / laboratory test

Aadil had a series of test after getting admitted to hospital to confirm his diagnosis. A series of blood tests and lumbar puncture was done to confirm the diagnosis. Child's hemoglobin level was 11.2 gm/dl, TLC count 5.3 cubic mm of blood, neutrophils 67%,lymphocytes 40%,monocytes 10%,eoisinophill 5%, basophils 1.5%, platelets 3.61 lacs cum ,CRP 20 mg.

Lumbar puncture results shows CSF: 340 cells (P70, L30), numerous RBC, Protein was 570 and Sugar was 36 and shows normal bacterial WBC per ml. Child was kept on ryles tube feeding along with being treated with Inj. Amikacin 23 mg O.D and Inj. Ceftriaxone 141 mg B.D. On third day of care changes occur in haemoglobin was 10.5 gm/dl,16 cubic mm of blood, lymphocytes 57%,monocytes 8%,eosinophil 4%, basophils 1.3%, platelets 3.70 lacs per cumm, CRP 10 mg. After 5 days of treatment CRP comes within normal limit ,neutrophil and basophil count become normal after being treated with antibiotics.Child is being diagnosed with streptococcal bacterial meningitis as found streptococcal growth in blood culture.Child is normal as per developmental stages.

3. Treatment

Aadil was being treated with mostly two medications inj. Amikacin and inj. Ceftriaxone to treat the infection, Ryles tube feeding continued. Third-generation cephalosporin is generally used empirically, as it treats pathogens most likely recovered at this age, including Streptococcus. pneumoniae, Neisseria. meningitidis & Haemophilus influenzae type b.[1]

Amikacin is a semisynthetic derivative of kanamycin to which it resembles in pharmacokinetics dose and toxicity. The outstanding feature of amikacin is its resistance to bacterial aminoglycoside inactivating enzymes. Thus it has a wider spectrum of activity including many organism resistant to other aminoglycosides. However relatively higher doses are needed for the Staphylococcus infections. This drug is used in the treatment of meningitis as aadil was suffering from meningitis so this drug was used for the treatment. This drugs have some side effects such as hearing loss, kidney problems or conditions like paralysis.[3]

Ceftriaxone is the other drug which was used in the treatment of infection. Ceftriaxone is the most reliable and fastest acting bactericidal drug for treatment of fever. All S.typhi isolates including multidrug resistant one are susceptible. Being bactericidal it also prevent relapses and carrier state. Among children it is given 75mg/kg/day and according to disease condition doses are changed. Ceftriaxone should never be used in premature baby or in any newborn baby who has jaundice. This drug have some side effects such as diaarhea, rashes, itching etc.[4]

4. Nutrition Therapy

1. Child was kept on ryles tube feeding .Continous monitoring of intake and output was done. Adequate nutrition and hydration was maintained.
2. Nutritional requirement for child involves:
3. Water requirement- 125ml/kg body wt.
4. Calorie requirement- 100 cal/kg
5. Protein allowance- 22 gm/day
6. Mineral requirements:
7. Iron-12 mg
8. Calcium- 400 mg
9. Iodine- 0.2 mg
10. Sodium- 2 meq/kg
11. Potassium- 1.5 meq/kg
12. Zinc- 0.3 mg/kg
13. Copper-0.005 to 1 mg/kg
14. Flourine- 0.5 to 1 mg[55]

5. Plan of Care[6]

As the child admitted to hospital patient assessment was done ,daily routine care was given, NG tube feeding was given appropriately, proper intake and output chart was maintained, position of the child changed every 2 hrly to avoid any complication. The family members of the child were also involved in plan of care. The cultural influence were also kept in mind while planning care for the child.

5.1. Imbalanced Nutrition related to loss of appetite as manifested by child is on ryles tube.

Determined current activity level/physical condition the child general condition is assessed. mother of child is advised to give small frequent meal according to child's age. Parental therapy is provided to the child as prescribed by physician.

5.2. Activity intolerance related to headache, neck rigidity, fatigue as manifested by child is not looking active.

Assess level of consciousness using pediatric Glasgow coma scale. Observe and notify physician for persistent deterioration. Assessed the child for signs of cerebral edema such as dizziness, headache, irregular breathing, neck pain, nausea or vomiting. Elevated head end of the bed up to

30° to 45° in neutral position. seizure precautions initiated. A quiet environment was maintained by keeping the lights dim. Aadil's mother was encouraged to participate in the child's care.

5.3. Parental anxiety related to baby condition.

Knowledge level of parents about the child condition were assessed. Detailed information about the child condition is provided. Introduced parents with other parents whose child condition is same is done. Emotional and psychological support is Provided to the parents. Health education is provided related to the disease condition of the child.

5.4. Hypothermia related to the inflammation of meninges.

Assessment of child condition was done. Vital sign of the child was checked. Crowd free environment is provided to the child. Cold sponging is provided to the child. Diversional therapy is provided such as toy to play administration of medication as prescribed by physician. eg paracetamol.

5.5. Deficit knowledge related to disease, illness and treatment.

Assessed the level of knowledge regarding disease. baseline data of child condition is provided. Disclosed required treatment plan and care of the client to relatives. Clarified their doubts appropriately and they are satisfied.

6. Prognosis

1. It depends on the age of the patient, the duration of the illness, complications, micro-organism & immune status. Patients with viral meningitis usually have a good prognosis for recovery.
2. The prognosis is worse for patients at the extremes of age (i e, <2 y, >60 y) and those with significant comorbidities and underlying immunodeficiency.
3. Patients presenting with an impaired level of consciousness are at increased risk for developing neurologic sequelae or dying.
4. A seizure during an episode of meningitis also is a risk factor for mortality or neurologic sequelae. Acute bacterial meningitis is a medical emergency and delays in instituting effective antimicrobial therapy result in increased morbidity and mortality
5. The prognosis of meningitis caused by opportunistic pathogens depends on the underlying immune function of the host as may require lifelong suppressive therapy.[3]

7. Prevention

1. The vaccines against Hib, measles, mumps, polio, meningococcus, and pneumococcus can protect against meningitis Hib vaccine: all infants should receive at 2,4,6 months of age & booster 1 year later
2. After 1 year 1 dose is given till the age of 5 years.
3. Pneumococcal vaccine: 0.5 ml is given IM (<2 yrs)
4. High-risk children should also be immunized routinely.
5. Vaccination before travelling to an endemic area
6. Chemoprophylaxis for susceptible individuals or close contacts:
7. H influenzae type b : Rifampin(20 mg/kg/d) for 4 days
8. N meningitidis: Rifampin (600 mg PO q12h) for 2 days upto 10weeks
9. Ceftriaxone (250 mg IM) single dose or Ciprofloxacin(500-750 mg) single a. Dose.[4]

8. Complications

1. Subdural effusion,
2. Intracranial infection (subdural empyema, brain abscess),
3. Cerebral infarction,
4. Hydrocephalus,
5. Diabetes insipidus,
6. Disseminated infection (arthritis, pneumonia).

9. Source of Funding

None.

10. Conflict of Interest

None.

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