Journal of Pharmaceutical Research International

33(47A): 826-830, 2021; Article no.JPRI.74479
ISSN: 2456-9119
(Past name: British Journal of Pharmaceutical Research, Past ISSN: 2231-2919, NLM ID: 101631759)

A 1 Year Child with Hydrocephalus: A Case Report

Deeplata Mendhe[1], Divyani Kanholkar[1], Ranjana Sharma[2], Kavita Gomase[3] and Mayur Wanjari[1*]

[1]Department of Community Health Nursing, Smt. Radhikabai Meghe Memorial College of Nursing, Datta Meghe Institute of Medical Sciences, Sawangi (M), Wardha, Maharashtra, India.
[2]Department of Medical Surgical Nursing, Smt. Radhikabai Meghe Memorial College of Nursing, Datta Meghe Institute of Medical Sciences, Sawangi (M), Wardha, Maharashtra, India.
[3]Department of Obstetrics & Gynaecology Health Nursing, Smt. Radhikabai Meghe Memorial College of Nursing, Datta Meghe Institute of Medical Sciences, Sawangi (M), Wardha, Maharashtra, India.

Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/JPRI/2021/v33i47A33078
Editor(s):
(1) Prof. Mohamed Fawzy Ramadan Hassanien, Zagazig University, Egypt.
Reviewers:
(1) Necati Ucler, Adiyaman University, Turkey.
(2) Chandini, Father Muller Medical College, India.
Complete Peer review History: https://www.sdiarticle4.com/review-history/74479

Case Study

Received 29 August 2021
Accepted 05 October 2021
Published 29 October 2021

ABSTRACT

Introduction: Hydrocephalus is the accumulation of fluid in the cavities deep within the brain. The extra fluids cause the ventricles to expand, putting pressure on the brain. The brain and spinal column are bathed in cerebrospinal fluid, which usually flows into the ventricles. Excessive cerebrospinal fluid pressure caused by hydrocephalus, on the other hand, can harm brain tissues and result in a variety of cognitive impairments.
Case Presentation: Here we have selected a case of hydrocephalus. In this case, when the complete history has been taken it found that patient having a history of NICU admission for prematurity and Low Birth Weight for 40 days. During history collection, it found that the child was all right until 4 months of age after which she started to notice that the child's head circumference was increasing at an abnormal rate and has now been brought to AVBRH for further management. After all investigation in MRI brain reveals extensive dilatation of ventricular system including bilateral lateral ventricle and III and IV ventricles associated with wide-open foramen of Luschka and Magendie with thinning of the adjacent cerebral cortex and cerebellar parenchyma. Features

**Corresponding author: E-mail: wanjari605@gmail.com;*

suggestive of communicating hydrocephalus. In the EEG record, the background record shows rhythmic synchronous > 13 Hz beta activity in the bilateral hemisphere. Abnormal EEG record. Then, the doctor planned for the Endoscopic Third Ventriculostomy with general anesthesia.

Conclusion: In this study, we mainly focus on expert surgical management and excellent nursing care which leads to fast recovery of the patient. After a conversation with the patient, her response was positive and after nursing management and treatment, she was discharged without any postoperative complications and satisfaction of recovery.

Keywords: Hydrocephalus; luschka and magendie; cerebrospinal fluid.

1. INTRODUCTION

Hydrocephalus is the accumulation of cerebrospinal fluid in the brain. As a result, the pressure inside the skull was usually increased. Some of the symptoms that older people may experience include headaches, double vision, impaired coordination, urinary incontinence, personality changes, and mental disability. In infants, it may appear as a sudden increase in head size. Other symptoms include vomiting, sleepiness, seizures, and backward-pointing of the feet. Hydrocephalus can be passed down through the generations or acquired as a result of birth defects. Birth defects resulting in aqueductal stenosis and neural tube defects are both linked. Other conditions include meningitis, brain cancer, traumatic brain injuries, intraventricular hemorrhage, and subarachnoid hemorrhage. Physical testing and diagnostic imaging are frequently used to make diagnoses in communicating, non-communicating, ex vacuo, and natural pressure hydrocephalus. The surgical insertion of a shunt device is the most common treatment for hydrocephalus. Some people may benefit from a treatment knows as a third ventriculostomy. Over drainage, under drainage, mechanical failure, inflammation, and congestion are also potential shunt complications. This will necessitate substitution. The shunt has a wide range of outcomes, but often people live regular lives. Death or permanent disability can result if the condition is not treated. Hydrocephalus affects one or two out of every 1000 newborns. In the developed world, rates could be higher. Normal-pressure hydrocephalus affects about five individuals out of 100,000, with prevalence with age [1,2].

Hydrocephalus is an abnormal expansion of the cerebral ventricles caused by a physiologic disorder of the cerebral spinal fluid (CSF). Children over the age of two are more likely to show signs and symptoms of intracranial hypertension than infants with progressive microcephaly. The traditional understanding of hydrocephalus as a result of obstruction to bulk CSF flow is giving way to models that include dysfunctional cerebral pulsations, brain compliance, and newly characterized water-transport mechanisms. Hydrocephalus can be caused by a variety of factors. Genes that control brain growth and development, most commonly involving aqueduct stenosis, have been linked to congenital hydrocephalus. Hydrocephalus is caused by pathological processes that affect ventricular outflow, subarachnoid space function, or cerebral venous compliance. Two treatment options that should be tailored to the child are shunts and endoscopic approaches. Children who have had hydrocephalus treatment have a variety of long-term outcomes. In the future, advances in brain imaging, technology, and pathophysiology should lead to more effective treatment for the disorder [3,4].

2. CASE PRESENTATION

A case of hydrocephalus was taken, a 1-Year-old female child was admitted to Datta Meghe Institute of Medical Sciences (Deemed to be University) Sawangi (Meghe), Wardha, Acharya Vinoba Bhave Rural Hospital (Maharashtra), India. The hospital with a chief complaint of the child head circumference was increasing at an abnormal rate in the last 8 months. She had been no history of fever, cough, cold, vomiting, seizures, etc. After all primary treatment doctors suggested investigation like Ultrasound sonography, CT-scan, EEG, x-ray, and blood investigation. In MRI, the brain reveals extensive dilatation of ventricular system wide-open foramen of Luschka and Magendie with thinning of the adjacent cerebral cortex and cerebellar parenchyma. Features suggestive of communicating hydrocephalus. In the EEG record, the background record shows rhythmic synchronous > 13 Hz beta activity in the bilateral hemisphere. Abnormal EEG record. Later Endoscopic third ventriculostomy is a technique

that involves placing an endoscope through a burr hole into the ventricular system and forming a gap in the floor of the third ventricles.

Patients belonged to middle-class families. Her family members had no complaints of communicable and non-communicable diseases. After admission, her vital signs were normal, while the child head circumference was increasing because of fluid accumulation in the brain. Other than there were no abnormalities was detected. Overall, this condition was managed by the administration of antibiotic treatment and later surgery was done. After admission treatment is given that is Syp. MVBC 2.5ml, SYP.DEOCAL 2.5ml, Orofer XT was given and finally, there comes a time when surgical management is the only choice for doctors to do so.

2.1 Pathological Finding

Heamoglobin8.5gm/dl(13-15.5gm/dl), and total leukocyte count was 15,000cell/m3cells(5000-11,000cell/cum3), urine analysis result was creatinine 0.2mg/dl (0.6-1.4mg/dl) and urea in the blood nitrogen level was 28mg/dl (8-25mg/dl), sodium level 139 (135-145mEq/l) The serum albumin level was 4.5 mg /dl, and potassium was 5.3 mEq/l (3.5-4.8mEq/l).

2.2 Pre-operative Care

Cheek vital signs, intake and output are strictly maintained, head circumference was recorded every 2 hours, doctors tried to treat this condition with the help of conservative management i.e., Syp. MVBC 2.5ml-orally, Syp. Decol 2.5ml-orally, Orofer XT is given. The only operation was the next choice for the surgeon to handle this case. During preoperative care, it is not just about the care or preparations but also the psychological support is given to the patient's family before sending her to surgery [5,6].

2.3 Post-operative

Patient shifted to pediatric intensive care unit (PICU), to check vital signs, no fever, vomiting, convulsion, maintaining spo2, Inj. Ceftriaxone, Inj. KCL, Inj. Amikacin, Inj. Levera is given as per the doctor's order.

2.4 Nursing Management

The postoperative patient was under strict observation of on-duty staff. Intravenous fluid administered as per calculated. Observed and record the intake and output postoperatively. Blood transfusions were given, care if wound and the daily dressing was done. Head circumference was recorded. Vital signs were recorded strictly. The patient was shifted to the pediatric ward from the PICU unit after recovery. Excellent nursing care was given and the patient's family reported to nursing staff that they were very satisfied with nursing care. Complete nursing staff to the patient's family along with the medication explained discharge procedure prescribed at home as advised by paediatrician. The patient was discharged from the ward after 2 weeks without any complications. The patient visited regularly at pediatric OPD when she had instructed for follow-up [7,8,9].

Fig 1. A case of Hydrocephalus of 1-Year-old female child

3. DISCUSSION

Hydrocephalus is a condition in which there is too much cerebrospinal fluid in the brain. Hydrocephalus can be passed down through the generations or acquired later in life as a result of birth defects. Communicating, non - communicating, ex vacuo, and forms of hydrocephalus. Physical examination and diagnostic imaging are widely used to render a diagnosis. Hydrocephalus affects one or two out of every 1000 newborns. In the developed world, rates could be higher. Normal-pressure hydrocephalus affects five individuals out of 100, 000, with prevalence rising with age [10,11].

In this case, the MRI brain reveals extensive dilatation of the ventricular system including bilateral lateral ventricle and III and IV ventricles associated with wide-open foramen of Luschka and Magendie with thinning of the adjacent cerebral cortex and cerebellar parenchyma. Features suggestive of communicating hydrocephalus. Painkillers and antibiotics were given to reduce the pain. No other signs and symptoms like nausea, vomiting, fever, etc. The hydrocephalus can be treated with the Endoscopic Third Ventriculostomy. Hydrocephalus may cause tiredness, poor appetite, vomiting, slowed development, etc [12].

The most common parasite illness capable of entering the human central nervous system is NCC, which is caused by encysted larvae of T. sodium. When NCC affects the brain parenchyma, intracranial subarachnoid space, or ventricular system, it can cause ventricular dilation. Unless hydrocephalus necessitates surgery, the illness is usually self-limiting. Even in endemic areas, intraspinal involvement in cases of cysticercosis is uncommon, occurring in approximately 1.0-5.8% of patients with NCC. Furthermore, in the vast majority of these cases, intraspinal involvement is accompanied by cerebral involvement [13].

If an AVM ruptures into the ventricular system or the subarachnoid area, hydrocephalus is most likely to occur. Hydrocephalus is a rare neurologic problem in patients with unruptured AVMs [5]. In children, a deep cerebral unruptured AVM presenting with acute obstructive hydrocephalus is unusual. Due to deep venous drainage, hemorrhage is more common in deep-seated AVMs, as well as in unruptured AVMs in children, which are mostly located in the cerebral hemisphere.

The AVM in this case, however, was positioned near the midbrain and did not induce hemorrhage. In children with cerebral AVMs, hemorrhage, seizures, headaches, and although hemorrhage is the most prevalent sign of ruptured AVMs, in unruptured AVMs, other symptoms such as focal neurologic impairment, seizures, and headache are also common. During childhood deterioration, there's a chance you'll come across an AVM chance.

Focused neurologic deficits can occur in patients with ruptured or unruptured AVMs, but severe neurologic deterioration due to hydrocephalus with an unruptured AVM is uncommon. The current case had been suffering from cranial nerve damage for more than two years, but hydrocephalus caused severe neurological deterioration in a matter of hours.

4. THESAURUS

Unless hydrocephalus necessitates surgery, the illness is usually self-limiting.

5. CONCLUSION

Hydrocephalus reveals extensive dilatation of the ventricular system including bilateral lateral ventricle and III and IV ventricles associated with wide-open foramen of Luschka and Magendie with thinning of the adjacent cerebral cortex and cerebellar parenchyma. Features suggestive of communicating hydrocephalus. Advanced MRI and ultrasound are available to diagnose. Hydrocephalus affects one out of every 770 infants, making it as common as Down’s syndrome and more common than spina bifida or brain tumor. People may experience head enlargement in infants. Adult and the older child may experience headaches.

CONSENT

The surgeon's informed consent was taken from her father

ETHICAL APPROVAL

As per international standard or university standard written ethical approval has been collected and preserved by the author(s).

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Kahle KT, Kulkarni AV, Limbrick Jr DD, Warf BC. Hydrocephalus in children. The lancet. 2016;387(10020):788-99.
2. Principles of Neurological Surgery - 3rd Edition [Internet]. [cited 2021 Sep 12]. Available:https://www.elsevier.com/books/principles-of-neurological-surgery/ellenbogen/978-1-4377-0701-4
3. Ferri FF. Ferri's clinical advisor 2013: 5 Books in 1. Elsevier Health Sciences; 2012.
4. Dorland's Illustrated Medical Dictionary - 32nd Edition [Internet]. [cited 2021 Sep 12]. Available:https://www.elsevier.com/books/dorlands-illustrated-medical-dictionary/dorland/978-1-4160-6257-8
5. Satzer D, Guillaume DJ. Hearing loss in hydrocephalus: a review, with focus on mechanisms. Neurosurgical review. 2016;39(1):13-25.
6. Dixon JF, Jones RO. Hydrocephalus-associated hearing loss and resolution after ventriculostomy. Otolaryngology--Head and Neck Surgery. 2012;146(6): 1037-9.
7. Hydrocephalus. In: Wikipedia [Internet]. 2021 [cited 2021 Sep 12]. Available:https://en.wikipedia.org/w/index.php?title=Hydrocephalus&oldid=1041525499
8. Barnes MA, Dennis M. Discourse after early-onset hydrocephalus: Core deficits in children of average intelligence. Brain and Language. 1998;61(3):309-34.
9. Podvin S, Reardon HT, Yin K, Mosier C, Hook V. Multiple clinical features of Huntington's disease correlate with mutant HTT gene CAG repeat lengths and neurodegeneration. J Neurol. 2019;266(3): 551–64.
10. Salmon JH. The collapsed ventricle: management and prevention. Surgical neurology. 1978;9(6):349-52.
11. HYDROCEPHALUS Epawa | PDF | Cerebrospinal Fluid | Neurology [Internet]. Scribd. [cited 2021 Sep 12]. Available:https://www.scribd.com/presentation/471509567/HYDROCEPHALUS-epawa
12. Acquired Hydrocephalus | Conditions | UCSF Benioff Children's Hospitals [Internet]. [cited 2021 Sep 12]. Available:https://www.ucsfbenioffchildrens.org/conditions/acquired-hydrocephalus
13. Kahle KT, Kulkarni AV, Limbrick Jr DD, Warf BC. Hydrocephalus in children. The lancet. 2016;387(10020):788-99.

Peer-review history:
The peer review history for this paper can be accessed here:
https://www.sdiarticle4.com/review-history/74479