Case Report

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Huge hydrocephalus in an infant: Intraoperative challenges

Address for correspondence:
Dr. Girija Prasad Rath
Department of Neuroanaesthesiology and Critical Care AIIMS, New Delhi - 110029, India
Email: girijarath@yahoo.co.in

Sandeep Kumar[1], Varun Jain[1], Keshav Goyal[1], Shweta Kedia[2], Ashish Bindra[1], Girija Prasad Rath[1]

[1]Department of Neuroanaesthesiology and Critical Care, AIIMS, New Delhi, India
[2]Department of Neurosurgery, AIIMS, New Delhi, India

ABSTRACT

Huge hydrocephalus (head circumference greater than infant's height) is a rare entity. Intraoperative management in children is challenging for both surgery and anaesthesia owing to the altered anatomy and underlying pathophysiology. Increase in Intracranial Pressure (ICP) in these children may lead to herniation, respiratory and cardiac arrest, and possibly, death. Here, we report the largest reported case of hydrocephalus and associated intraoperative challenges.

Key words: Anaesthesia, Congenital Hydrocephalus, Huge Hydrocephalus, Infant, Management

Huge hydrocephalus defined as the head circumference greater than infant's height, is a very less reported entity[1]. The intraoperative management of these children becomes challenging for the surgery and anaesthesia because of the anatomy and underlying pathophysiology. Increase in Intracranial Pressure (ICP) in these patients may lead to herniation, respiratory and cardiac arrest, and possibly, death[2]. Here, we report a case of the largest reported hydrocephalus, and the intraoperative challenges in this regard have been described.

CASE REPORT

A 5-month old male child with congenital hydrocephalus due to aqueductal stenosis attended our neurosurgery out-patients department. He was lost to follow up until 5 months later when he was readmitted at the age of 10 month with huge hydrocephalus (Figure 1). The child was conscious, haemodynamically stable, however his weight was 17 kg as against an expected weight of 8-11kg. On examination, he had a grossly enlarged head with dilated veins all over the scalp with sunset sign. He had developed pressure abrasions on the right side of the scalp. The head circumference was 93cm and the length of the child was 78cm. with grossly delayed milestones. Child had anticipated difficult airway due to large head, small mouth, and no neck movement. Preoperative laboratory

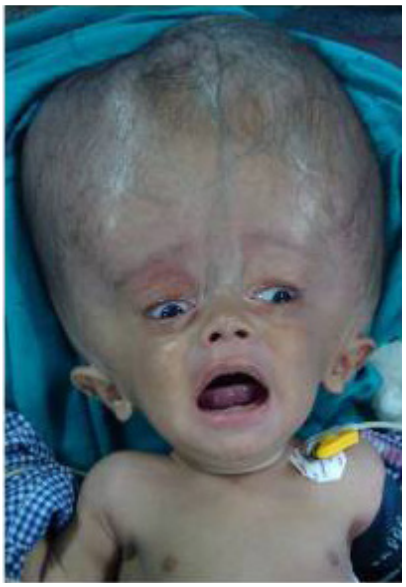

Figure 1. Infant with Huge Hydrocephalus.

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investigations were within normal limits. A Computed Tomographic (CT) scan head revealed a thin rim of cerebral cortex with grossly enlarged ventricles (Lorber Grade III)[3].

Oral atropine 40µg/kg was used as premedicant, half an hour before surgery. Standard monitors were connected. The anaesthetic drugs according to the expected weight for a 10 mo old (approximately 8 kg) were prepared. In order to optimize the patient's position during laryngoscopy and intubation, a large ring was placed below the patient's head. Child's body was aligned to the head by using multiple folded OT sheets below it and a difficult airway cart was kept ready. Intravenous (IV) access with a 24G cannula was secured before induction. Sevoflurane was used for induction with 100% oxygen. After confirmation of mask ventilation, fentanyl and atracurium was administered. Direct laryngoscopy was performed with No.0 Macintosch laryngoscope blade. The Cormack Lehane airway grade IV was observed which was reduced to grade II after application of BURP. Trachea was intubated with uncuffed portex endotracheal tube (ID 4.0). Maintenance of anaesthesia was done with nitrous oxide, sevoflurane and intermittent doses of fentanyl and atracurium. Additional analgesia was achieved with paracetamol suppository. The ringer lactate was transfused for replacement fluid. Difficulty was encountered in providing optimal position for tunnelling during shunt insertion due to acute angle at neck. It was carried out in two stages from head to neck and then from neck to abdomen. It was difficult for the neurosurgeons to plan the appropriate trajectory because of the large and wide head in comparison to the torso. Rest of the surgical course was uneventful. At the end of the surgery, neuromuscular blockade was reversed with neostigmine and glycopyrrolate. Child was extubated after he became fully awake and had spontaneous regular respiration.

Postoperative respiratory distress due to possible drainage of large amount of CSF into abdominal cavity was closely monitored by measuring abdominal girth every 2 hrs. Risk of subdural effusion owing to over drainage of CSF was ruled out after obtaining a normal CT scan of head at day 3 and was discharged on day 5 of admission.

DISCUSSION

This case probably is the largest hydrocephalus reported in the literature[1] and anaesthetic considerations in this regard has not been described before. Although CSF shunts are the standard means for treatment of hydrocephalus, they are prone to complications with 16% of shunts undergo revision within one month of insertion[4]. The operative procedures involving shunt insertion may have a mortality rate of 31%. Management of huge hydrocephalus differs from other children with hydrocephalus because it is complicated not only by size but also for different anaesthetic implications[1]. There may be associated congenital, difficult airway due to large head, hypognathia, and stabilization of head during intubation and appropriate alignment of body with the head in order to prevent further difficulties to intubation by provision of multiple folded sheets of cloth below it. There is also a difficulty in the assessment of fluid deficits and drug doses which was managed by titration based on lean body weight. It is important to maintain of operating room temperature at 28°C along with warm IV fluids and warming blankets as increased surface area of head may lead to hypothermia. The surgical positioning may also be complicated. Electrolyte disturbance and subdural collections are other well known complication in such cases. Although programmable shunt is recommended, a medium pressure ventriculoperitonial shunt was used, in this case owing to technical reasons which may at times lead to over-drainage of CSF and hence, subsequent subdural collections. That is the reason why the child was observed for the clinical signs and was discharged on third postoperative day, after the computed tomography of the head showed a normal scan. Despite the above anaesthetic concerns, this child had an uneventful perioperative course.

To conclude, huge hydrocephalus remains an anaesthetic as well as neurosurgical challenge. However, it can be managed uncomplicated by a thorough preoperative evaluation, appropriate planning of anaesthetic drugs doses, fluid infusion, and ventilation based on the actual body weight of the child, and also with close watch on possible postoperative complications.

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