Endoscopic Third Ventriculostomy for Obstructive Hydrocephalus

Treatment options include endoscopic approaches, which should be individualized to the child. The long-term outcome for children that have received treatment for hydrocephalus varies. Advances in the brain imaging, technology, and understanding of the pathophysiology should ultimately lead to improved treatment of the disorder. [1].

Age and etiology play a crucial role in the success of endoscopic third ventriculostomy (ETV) as a treatment of obstructive hydrocephalus. The outcome is worse in infants, and controversies still exist whether ETV is superior to shunt placement.

El Damaty et al. retrospectively analyzed 70 patients below 2 years from 4 different centers treated with ETV and assessed success.

Children < 2 years who received an ETV within 1994-2018 were included. Patients were classified according to age and etiology; < 3, 4-12, and 13-24 months, etiologically; aqueductal stenosis, posthemorrhagic hydrocephalus (PHH), tumor-related, fourth ventricle outlet obstruction, with Chiari type 2 malformation and following cerebrospinal fluid infection. They investigated statistically the predictors for ETV success through computing Kaplan-Meier estimates using the patient's follow-up time and time to ETV failure.

They collected 70 patients. ETV success rate was 41.4%. The highest rate was in tumor-related hydrocephalus and fourth ventricle outlet obstruction (62.5%, 60%) and the lowest rate was in Chiari-type II and following infection (16.7%, 0%). The below 3 months age group showed a relatively lower success rate (33.3%) in comparison to older groups which showed similar results (46.4%, 46.6%). Statistically, a previous VP shunt was a predictor for failure (p-value < 0.05).

Factors suggesting a high possibility of failure were age < 3 months and etiology such as Chiari type 2 malformation or following cerebrospinal fluid infection. Altered CSF dynamics in patients with posthemorrhagic hydrocephalus and under-developed arachnoid villi may play a role in ETV failure. They do not recommend ETV as first-line in children < 3 months of age or in case of Chiari II or following infection [2].

Hydrocephalus/Myelomeningocele

A role for endoscopic third ventriculostomy (ETV) in myelomeningocele (MM) has provoked much debate, principally due to anatomical variants described, which may complicate the procedure.

Perez da Rosa et al. present 7 cases of children with MM and hydrocephalus undergoing a total of 10 ETV procedures. All patients demonstrated clinical improvement (in acute/subacute cases) or stabilization (in chronic cases). Three patients requiring a second ETV have shown clinical stability and renewed radiological evidence of functioning ventriculostomies in follow-up since reintervention. ETV can be used, albeit cautiously, in selected cases of hydrocephalus associated with MM. However, the frequency with which anatomical variation is encountered and the difficulty of the assessment of

success make the procedure more challenging than usual [3].

Idiopathic normal pressure hydrocephalus

The only randomized trial of endoscopic third ventriculostomy (ETV) for idiopathic normal pressure hydrocephalus (iNPH) compares it to an intervention which is not a standard practice (VP shunting using a non-programmable valve). The evidence from this study is inconclusive and of very low quality. Clinicians should be aware of the limitations of the evidence. There is a need for more robust research on this topic to be able to determine the effectiveness of ETV in patients with iNPH [4].

Endoscopic third ventriculostomy (ETV) provides a physiological restoration of cerebrospinal fluid and a shunt-free option for pediatric hydrocephalus. Continuous developments in techniques and instruments have improved ETV as the first-line treatment.

Endoscopic third ventriculostomy with choroid plexus cauterization (ETV/CPC) offers an alternative to shunt treatment for infantile hydrocephalus.

More patients undergo ETV with a better outcome, identifying a new era of hydrocephalus treatment. Deeper understanding of ETV will improve a better shunt-free survival for pediatric hydrocephalus patients [5].

Hydrocephalus from thalamic hemorrhage

ETV is a safe and effective technique for the management of hydrocephalus resulting from an extraventricular obstruction in ETV is a safe and effective technique for the management of hydrocephalus resulting from an extraventricular obstruction in thalamic hemorrhage. It can avoid the need for permanent shunting in this patient population. Larger studies should be conducted to validate and further analyze this intervention.

It can avoid the need for permanent shunting in this patient population. Larger studies should be conducted to validate and further analyze this intervention [6].

References

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