

Efficacy of Endoscopic Third Ventriculostomy (ETV) After Shunt Malfunction in the Pediatric Age Group: A Meta-analysis to Evaluate the Impact of Hydrocephalus Aetiology

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Introduction

- ETV is increasingly used in place of shunt revision for shunt malfunction - secondary ETV.
- Recent studies have shown that the efficacy of ETV differs depending on indication [1,2]
- There is sparse data evaluating the influence of aetiology of hydrocephalus on efficacy of secondary ETV.

Aim

In this meta-analysis, we sought to explore the impact of hydrocephalus aetiology on outcome of secondary versus primary ETV in the pediatric age group.

Methods

- Systematic and independent MEDLINE searches by two authors (MW, JRE)
- Inclusion criteria: (1) studies including a predominance of children and adolescents (=18);
 (2) description of clinical outcomes after secondary ETV.
 ETV success was defined as the lack of need for a shunt.
- Odds and odds ratios were used to compare groups.

Results

- Fifteen studies were included.
- 519 patients underwent a secondary ETV for shunt malfunction (85%) or infection (15%).
- The mean age was 9.8 years (95% CI 7.9-11.8 years).
- Aetiology of hydrocephalus was: chiari malformation (28%), aqueductal stenosis (26%), intraventricular haemorrhage (13%), meningitis (9%) and tumours (8%).
- The overall ETV success rate was 68.2% over a median follow-up period of 45.5 months (range 1- 190 months).

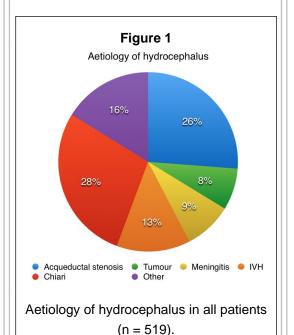


Figure 2

	% patients remaining shunt-free		
	Aqueductal stenosis and tumours	Infection and haemorrhage	Chiari and spina bifida
Primary ETV	71%	38%	37%
Secondary ETV	73%	64%	73%

Primary versus secondary ETV for various indications in paediatric patients

Efficacy by aetiology:

- Secondary ETV had a significantly higher success rate than primary ETV in patients with hydrocephalus due to haemorrhage or infection (OR = 5.79, 95% CI 2.46-13.61; p < 0.001) and chiari malformation (OR = 5.57, 95% CI 2.81-11.00; p < 0.001).
- There was no significant difference in success rate between primary and secondary ETV in patients with acqueductal stenosis and tumours (OR = 1.19, 95% CI 0.46-3.11; p = 0.74).

Conclusions

The efficacy of secondary ETV varies depending on hydrocephalus aetiology. Secondary ETV may be more efficacious than primary ETV in certain disease states due to a state of acquired acqueductal stenosis with chronic CSF diversion.

References

- 1. Cinalli G, Salazar C, Mallucci C, Yada JZ, Zerah M, Sainte-Rose C. The role of endoscopic third ventriculostomy in the management of shunt malfunction. Neurosurgery. 1998;43(6):1323-7; discussion 7-9.
- 2. Kulkarni AV, Drake JM, Mallucci CL, Sgouros S, Roth J, Constantini S, et al. Endoscopic third ventriculostomy in the treatment of childhood hydrocephalus. J Pediatr. 2009;155(2):254-9 e1.

Learning Objectives

By the conclusion of this session, participants should be able to:

- Appreciate the heterogeneity of published studies relating to ETV performed after shunt malfunction
- Appreciate the differences in outcome between secondary versus primary ETV