Endoscopic Third Ventriculostomy (ETV) for Treatment of Adult Hydrocephalus: Long-term Followup With 163 Patients

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INTRODUCTION

- ETV is the treatment of choice for obstructive hydrocephalus and ventriculomegaly secondary to a wide array of etiologies
- Long-term outcomes of ETV in the adult hydrocephalus literature is lacking
- We demonstrate the role of ETV in the management of adult hydrocephalus in a large population with the longest follow up duration to date

METHODS

- Retrospective chart review of adults (age >/= 18) that underwent ETV procedures at the Foothills Medical Center (FMC) from 1994 to 2014
- Subjects were dichotomized into either a Primary ETV group (those who had ETV as initial treatment) or Secondary ETV group (previously shunted patients)
- Ventriculostomy was achieved either by hydrodissection, blunt dissection with Fogarty balloon catheter or perforation and widening with grasping forceps. Pre-existing shunts were completely removed, ligated or unmodified at the time of ETV
- Data analysis and Kaplan-Meier actuarial analysis was done using IBM's SPSS®

RESULTS

- Mean age at 1st ETV procedure was 46 years *(S.E. = 1.2 years)*
- 20 patients (12%) had extra-ventricular drains placed peri-operatively
- Mean duration of follow up = 8.2 years *(S.E. = 5.3 years)*

Table 1: Characteristics of 163 patients who underwent ETV

		Primary ETV	Secondary ETV
Patients			
	Male	65 (58%)	27 (53%)
	Female	47 (42%)	24 (47%)
# Of shunt revisions before 1st ETV			
	0	-	11 (22%)
	1	-	19 (37%)
	2	-	7 (14%)
	≥ 3	-	14 (27%)
Management of shunt at time of 1st ETV			
	Ligated	-	8 (16%)
	Removed	-	16 (31%)
	Unmodified	-	27 (53%)

(X%) - % within cohorts

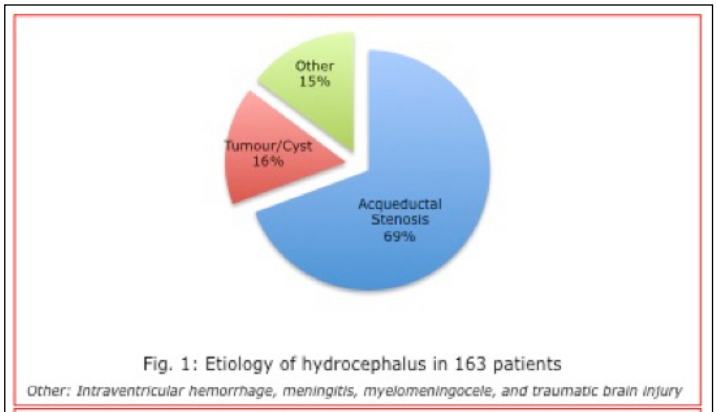


Fig. 1: Etiology of hydrocephalus in 163 patients

Other: Intraventricular hemorrhage, meningitis, myelomeningocele, and traumatic brain injury

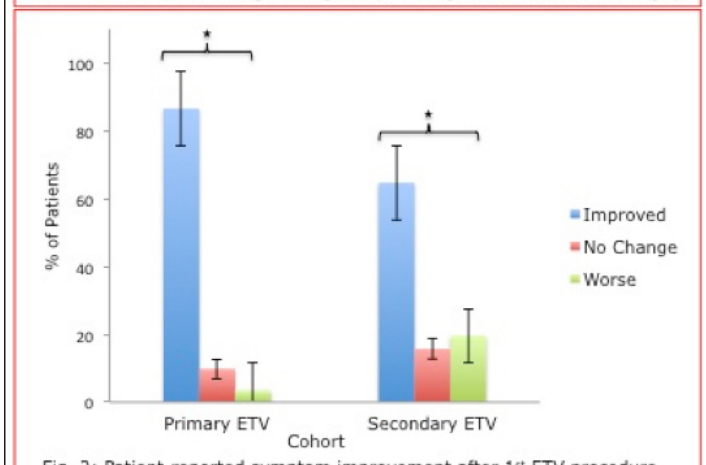


Fig. 2: Patient-reported symptom improvement after 1st ETV procedure

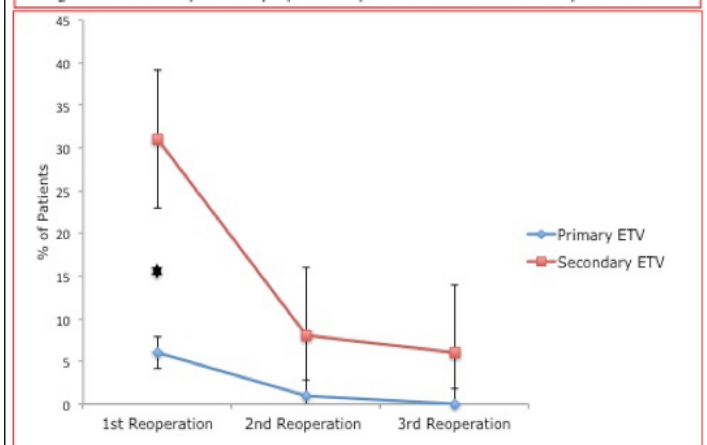
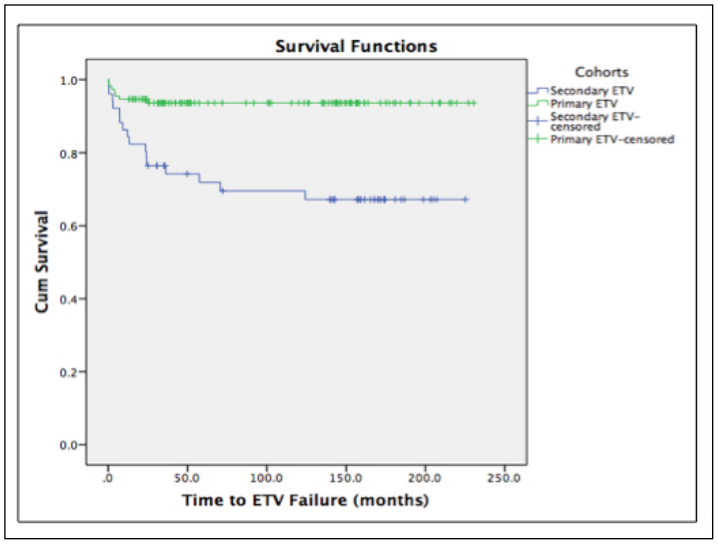


Fig. 3: Reoperations after initial ETV procedure

Table 2: Complications following ETV

	Primary ETV	Secondary ETV	Cumulative Risk
Meningitis	0 (0%)	4 (8%)	2%
Epidural/Subdural Hematoma	1 (1%)	1 (2%)	1%
Weight Gain	1 (1%)	1 (2%)	1%
Memory deficits	0 (0%)	1 (2%)	1%
Cranial nerve palsy	0 (0%)	1 (2%)	1%
Cumulative Risk	2 (2%)	8 (16%)	6%



DISCUSSION

- ETV is an effective long-term treatment for adult patients with hydrocephalus
- The overall success rate of ETV as a primary modality for treating adult hydrocephalus is approximately 87%, with 99% of patients obtaining symptomatic improvement after 2 ETV procedures.
- Having a failed VP shunt prior to undergoing an ETV procedure is associated with a 22% relative risk of failure and a doubled rate of serious complications when compared with patients who undergo primary ETV.
- Most ETV failures occur within the first 6 months postoperatively in primary ETV patients, but the time to failure is prolonged in patients who present with failed previous shunts.

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