

The effect of epsilon amino-caproic acid on the development of obstructive hydrocephalus following aneurysmal subarachnoid hemorrhage: A case control study

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Introduction

Epsilon amino-caproic acid (EACA) and other antifibrinolytic agents are used to prevent rehemorrhage following aneurysmal subarachnoid hemorrhage (SAH). Increased rates of hydrocephalus (HCP) due to EACA administration has been reported. We present a case control study investigating the relationship between EACA administration and the development of shunt-dependent HCP.

Methods

A power analysis was performed to determine sample size. All of the patients in this study were managed by a single neurosurgeon who treated all SAH patients with EACA prior to February, 2012 and then discontinued the use of EACA after that time. From a cohort of 129 consecutive patients diagnosed with SAH who met inclusion criteria, 57 patients who required placement of a ventriculoperitoneal shunt (VPS) were identified as cases. The remaining 72 patients, who did not get a VPS, were designated as controls. Demographic data, clinical and radiographic grading scales and details of the clinical course and treatment were extracted from a retrospective review of medical charts of both groups. Cases and controls were compared to identify factors that contributed to the

Table 1

Patient Characteristics	
Variables	All patients (N = 129)
Age, mean ± SD	54.1 ± 13.3
Sex, n (%)	
Male	40 (31.0)
Female	89 (69.0)
Race, n (%)	
White	73 (56.5)
Black	46 (35.7)
Asian/Hispanic/Other	6 (4.7)
Smoker, n (%)	51 (41.5)
Hypertension, n (%)	55 (42.6)
Fisher CT, n (%)	
1	5 (3.9)
2	20 (15.5)
3	36 (27.9)
4	68 (52.7)
Hunt/Hess scale, n (%)	
I	8 (6.2)
II	57 (44.1)
III	38 (29.5)
IV	18 (14.0)
V	8 (6.2)
Amicar, n (%)	65 (50.4)
PreOP drainage, n (%)	44 (34.1)
PostOP drainage, n (%)	67 (51.9)

Patient Characteristics

Learning Objectives

By the conclusion of this session, participants should be able to: 1) Discuss the controversy surrounding anti-fibrinolytic agents in the treatment of SAH, 2) Describe clinical factors contributing to the development of shunt-dependent hydrocephalus following SAH.

Results

The overall rate of VPS placement was 44%. The rate of EACA treatment was in the cases was 43.9%, and 55.6% among the controls which gives an odds ratio of 0.63 for EACA administration (p=0.2). Patients presenting with intraventricular hemorrhage (odds ratio 13.89) were more likely to require a VPS. The clinical exam upon presentation was the most strongly associated with the eventual need for VPS. Patients presenting with Hunt & Hess III exams were 17 times more likely to recieve a VPS than those who presented with a Hunt & Hess I exam (p=0.01) Those patients presenting with HH IV exams were 11 times more likely to require VPS (p=0.04).

Table 2

Odds ratios of variables related to development of shunt-dependent HCP		
Variable	Univariate OR (95% CI)	P value
Fisher CT		
1	Reference	
2	4.93 (0.18, 135.16)	0.34
3	6.32 (0.25, 162.01)	0.27
4	13.89 (0.56, 343.44)	0.11
Hunt/Hess scale		
I	Reference	
II	2.98 (0.34, 26.08)	0.32
III	17.18 (1.89, 156.54)	0.01
IV	11.00 (1.01, 109.67)	0.04
V	1.00 (0.05, 19.36)	1.00
EACA	0.63 (0.31, 1.26)	0.19

OR = odds ratio

95% CI = 95% confidence interval

Conclusions

The administration of EACA does not appear to increase the incidence of shunt-dependent HCP following SAH. The Fisher CT score, specifically the presence of intraventricular hemorrhage, and the clinical exam upon presentation as documented by the Hunt & Hess scale were predictive of the need for VPS.

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