Surgical Management of Acute Subdural Hematoma Patients: Lessons Learned with 643 Consecutive Patients

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Introduction

Optimal surgical management strategy of acute subdural hematoma (ASDH) patients remains challenging and rests mainly on the operating neurosurgeon based on intraoperative findings. We analyzed the association of decompressive craniectomy (DC) and osteoplastic craniotomy (OC) with outcomes in consecutive patients undergoing surgical evacuation of ASDH during a 7-year period, and analyzed prognostic indicators.

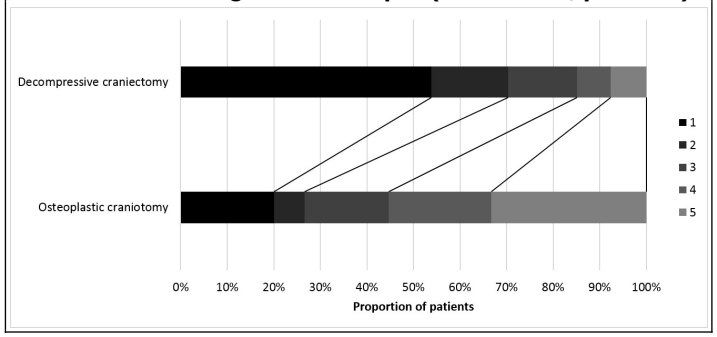
Methods

We reviewed prospective institutional database of all adult ASDH patients operated by craniotomy from January, 2009 until January, 2016. Mortality and discharge outcomes (Glasgow outcomes scale or GOS) were analyzed as a function of surgical method. Information pertaining to age, admission GCS, ASDH thickness and midline shift was also recorded.

Results

During the study period 394 (61%) patients underwent OC and 249 (39%) patients - DC. Patients needing DC were younger, had lower GCS, greater ASDH thickness and greater midline shift (p -values <0.001). Mortality rate (54% vs. 20%, respectively, p<0.001) and proportion of patients with poor discharge outcomes (85% and 45%, respectively, p<0.001) were greater in DC patients, relative to OC patients (Figure 1).

Figure 1. Discharge Glasgow Outcome Scale score as a function of surgical technique (X2=131.21, p<0.001).



In patients with GCS score of 3 and midline shift of more than 2 cm outcomes were similar between the two groups. Adjusting for disease severity, DC remained associated with greater risk for in-hospital mortality and unfavorable discharge outcome (Table 1).

Table 1. The association of surgical technique and other clinical prognostic indicators with in-hospital mortality and poor outcome at hospital discharge.

	Univariate analyses	Multivariate analyses [A]
Predictor: In-hospital mortality		
Decompressive craniectomy [B]	4.646 (3.272-6.597), p<0.001	3.442 (2.196-5.396), p<0.001
Age	1.019 (1.009-1.030), p<0.001	1.041 (1.026-1.056), p<0.001
GCS score	0.768 (.0727-0.812), p<0.001	0.810 (0.754-0.870), p<0.001
ASDH thickness (cm)	1.908 (1.485-2.453), p<0.001	1.080 (0.745-1.565), p=0.684
Midline shift (cm)	2.362 (1.810-3.082), p<0.001	1.133 (0.757-1.693), p=0.514
Predictor: poor discharge outcome [C]		
Decompressive craniectomy [B]	7.097 (4.749-10.61), p<0.001	5.277 (3.030-9.191), p<0.001
Age	1.027 (1.017-21.04), p<0.001	1.061 (1.044-1.078), p<0.001
GCS score	0.735 (0.700-0.772), p<0.001	0.756 (0.705-0.810), p<0.001
ASDH thickness (cm)	2.428 (1.833-3.216), p<0.001	1.526 (0.960-2.425), p=0.074
Midline shift (cm)	3.079 (2.313-4.097), p<0.001	1.134 (0.723-1.778), p=0.584

Conclusions

Decompression was performed more often in younger and more severely injured patients. DC is associated with greater mortality and handicap rates independently of disease severity. In patients presenting with worst clinical status, outcomes are poor irrespective of surgical method.

Learning Objectives

1. Decompressive craniectomy is more commonly performed in younger patients with greater trauma severity.
2. Decompression is associated with greater mortality and handicap rates independently of disease severity.
3. Osteoplastic craniotomy should attempted when possible.