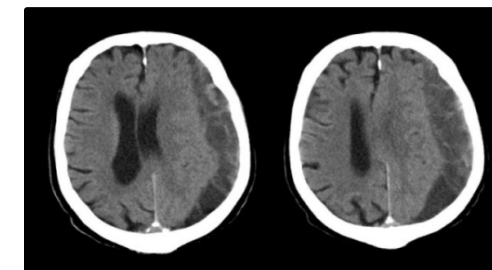


Gaining a Piece of Mind: The Impact of Decompressive Craniectomy on Patient Outcomes with Severe Traumatic Brain Injury

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INTRODUCTION

- ❖ Severe TBI results from different causes: falls, MVC and motorcycle accidents, assault, etc.
- ❖ Bullock et al. reports that TBI affects up to 2% of the population¹ per year and is a leading cause of death and disability among young people
- ❖ Decompressive craniectomy procedures are often tied with higher mortality rates and negative long term outcomes
- ❖ **Purpose:** Identify patient & injury characteristics to predict mortality outcome to decompressive craniectomy in patients with severe TBI

¹Bullock MR, Chestnut R, Ghajar J, et al. Guideline for the surgical management of traumatic brain injury. Neurosurgery. 2006;58 (suppl 3):S2-vi.

Materials & Methods

- ❖ Retrospective review of trauma database on eligible patients between 2011-2017; AIS head score of 4 or 5; GCS score of <8
 - ❖ Divided patients into two cohorts:
 - ❖ **Control group:** patients who did not undergo craniectomy procedure
 - ❖ **Case group:** patients who had undergone a decompressive craniectomy procedure
 - ❖ PowerChart Records & accessANYware used to collect variables measured
 - ❖ Data organized by cohort and compared based on admission status and mortality
- 1) Patient mortality between **craniectomy and non-craniectomy patients**
 - 2) Patient mortality based on differences in admission status within **craniectomy patient population**
- ❖ **Purpose:** Identify patient characteristics to predict mortality outcomes of severe TBI patients with decompressive craniectomy

RESULTS

Focus #1: Without vs. With Craniectomy Procedure

Table 1. Demographics of TBI Patient Population.

	Without Decompressive Craniectomy (N=507)	With Decompressive Craniectomy (N=87)
Age in years, mean (SD)	48.0 (22.4)	45.0 (20.9)
Sex, Female N (%)	150 (29.5%)	18 (20.7%)
Race, N (%)		
White	351 (69.2%)	69 (79.3%)
Black	98 (19.3%)	11 (12.6%)
Other	58 (11.4%)	7 (8.0%)

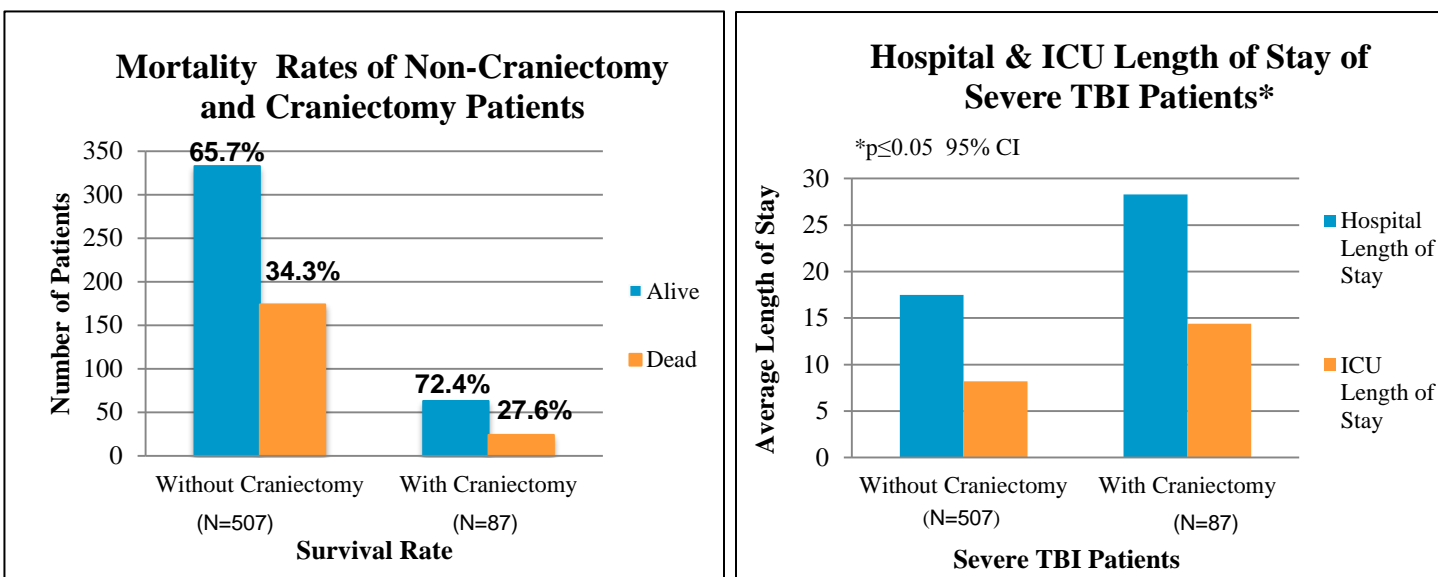


Figure 1. Mortality rates between non-craniectomy and craniectomy patients.

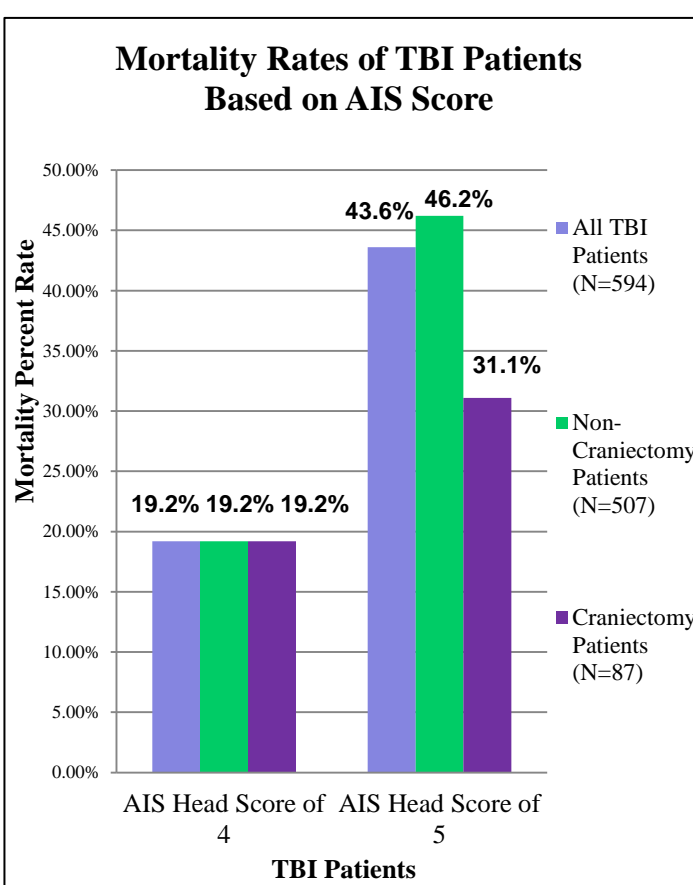


Figure 3. Mortality rates between TBI patients based on AIS head score and craniectomy procedure.

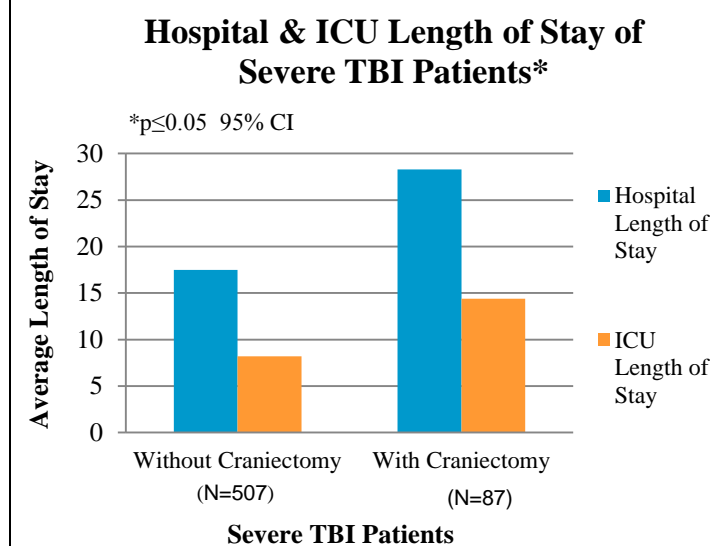


Figure 2. Hospital and ICU length of stay between non-craniectomy and craniectomy patients

Focus #2: Mortality With Craniectomy Procedure

Table 2. Mortality of craniectomy patients.

	Mortality (N=24)	No Mortality (N=63)
Age, mean (SD)	51.9 (19.3)	42.4 (21.1)
Sex, Female N (%)	7 (29.2%)	11 (17.5%)
AIS Head, N (%)		
4	5 (20.8%)	21 (33.3%)
5	19 (79.2%)	42 (66.7%)
GCS, N (%)		
3	14 (58.3%)	45 (71.4%)
>3	10 (41.2%)	18 (28.6%)
Procedure Start Time, mean (SD)	434.1 (1149.4)	313.2 (447.3)
HGB, mean (SD)	12.5 (2.5)	13.5 (2.2)
Platelet, mean (SD)	207.7 (90.7)	224.2 (66.8)
INR, mean (SD)	1.2 (0.3)	1.2 (0.3)
Hospital Length of Stay, mean (SD)*	7.8 (14.9)	36.1 (36.1)
ICU Length of Stay, mean (SD)*	5.7 (4.3)	17.6 (12.0)
Pupil Reactivity, N (%)	N=22	N=55
Reactive	8 (36.4%)	30 (54.5%)
Unreactive	14 (63.6%)	25 (45.5%)

*Significance with p<0.001

LIMITATIONS

- ❖ Decompressive craniectomy sample size of 87 patients
- ❖ No information gathered on patient outcomes post-discharge
- ❖ Control group includes patients who have undergone other procedures: craniotomy, ventriculostomy, etc.

CONCLUSIONS

- ❖ Decompressive craniectomy procedure improves patient mortality rate compared to all other patients
 - Clinically significant difference between patients with AIS head score of 5
- ❖ Statistically significant differences in hospital & ICU length of stay between non-craniectomy vs. craniectomy patients AND craniectomy patients based on mortality
- ❖ Differences in admission status based on mortality of craniectomy patients

CLINICAL IMPLICATIONS

- ❖ Improve **survival rates** of patients with severe TBI: understanding whether to have a craniectomy performed given admission statistics
- ❖ **Cost savings:** significant difference in length of hospital stay & ICU stay for patients who underwent a craniectomy vs. no craniectomy procedure
 - Hospital LOS: ~11 days longer
 - ICU LOS: ~6 days longer; Average ICU cost per patient per day: \$1,230²
- ❖ **Resource Allocation:** time, medication, physical and mental stress & investment; false expectations
 - Future need for care and treatment, continuing medications, appointments, therapy

²Winters, C. (2013, September 9). Critical Care May Not Always Be Right Choice. Retrieved July 24, 2018.

ACKNOWLEDGEMENTS

This project was supported by the Delaware INBRE program, with a grant from the National Institute of General Medical Sciences--NIGMS (P20 GM103446) from the National Institutes of Health, and the state of Delaware

