

Magalie Cadieux MD; Clare Naomi Gallagher MD, PhD, FRCS(C)
University of Calgary, Canada

BACKGROUND

- There is a wide variation in the reported rates of infection following craniotomy/craniectomy and cranioplasty, likely due to a lack of practice standardization and paucity of reported outcomes in the literature.
- By instituting an infection control protocol, the HCRN (Hydrocephalus Clinical Research Network) has been successful in reducing postoperative infection rates following VP shunts from 8.8% to 5.7% [absolute risk reduction of 3.15%].
- There is growing interest to create a similar infection control protocol for craniotomy/craniectomy and cranioplasty surgical procedures.

OBJECTIVES

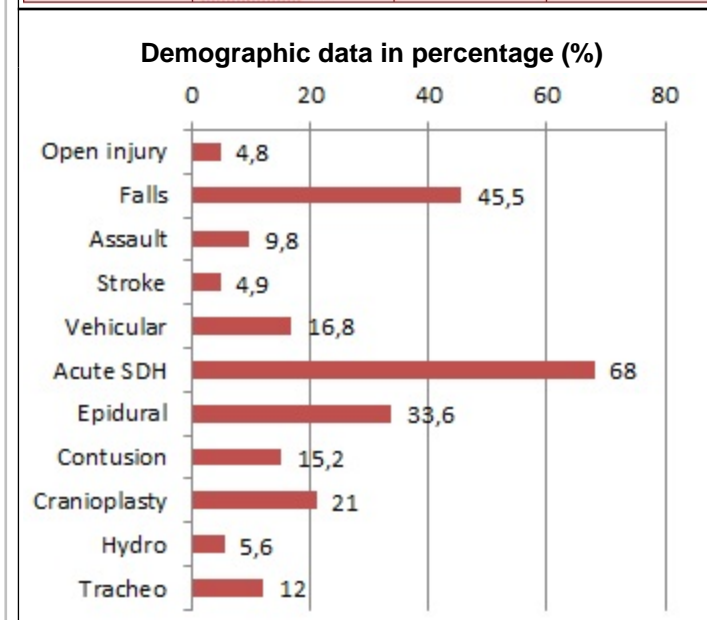
- To determine the risk factors for infection after craniotomy/craniectomy/cranioplasty in brain injury patients
- To determine any modifiable risk factors that can be used in a future protocol for infection reduction
- To compare data with current literature

METHODS

Literature review (30 articles)	
Infection range: 3.3% to 28.6 % (large difference explained by the definition of infection)	
Time to cranioplasty	<3 months (majority of papers)
Risk factors	<ul style="list-style-type: none"> • Time to cranioplasty • Length of surgery • Craniectomy for stroke • Bifrontal craniectomy
Inconsistent factors	<ul style="list-style-type: none"> • Comorbidities • Bone flap material

Retrospective chart review of all patients who underwent craniotomy/craniectomy/cranioplasty following a traumatic brain injury or decompressive craniectomy for stroke at the Foothills Medical Centre from 2010 to 2015.

Data Collected			
DEMOGRAPHICS	SURGERY	INJURY	POST OP
Age	Craniectomy	Type of trauma	Infection
Gender	Craniotomy	Open/closed	Site of infection
Comorbidities	Cranioplasty	EDH	Other infection
	Time of day surgery	SDH	Time to infection
	Time to surgery	Stroke	Antibiotics
	Length of surgery		Hydrocephalus
	Time to cranioplasty		Infarct
	Type of cranioplasty		Seizure
	Storage of bone flap		
	Length of stay in ICU		
	Monitors or drains		
	Tracheostomy		



RESULTS

Preliminary results of 125 severe brain injury patients (93% male, mean age of 45,7)

8% infection rate

- No statistical significance related to age, gender, type of surgery, open injury, hydrocephalus, tracheostomy, intracranial monitors and drains, subdural or epidural hematoma, mortality
- Undergoing decompressive craniectomy for STROKE significantly increased the risk of postoperative infection, when compared to traumatic brain injury (OR 8.3 [1.3,54.4], $p=0.03$)

10 infections overall

- 4 infected cranioplasties, 5 infected craniotomy sites and 1 infected EVD site all leading to cranioplasty

CONCLUSION

The infection rate is in the range of literature values. Cranioplasty infection is similar to the infection rate of VP shunt surgery (8% vs 8.8%). We predict that by establishing a protocol, the same significant decrease in infection could be obtained. Non-modifiable risk factors of stroke have been associated with higher risks of infection. Further analysis is ongoing.

FUTURE DIRECTION

- 1) Development of an infection protocol modelled after the HCRN VP shunt protocol for other neurosurgical procedures at Foothills Medical Centre in Calgary
- 2) Implementation of the protocol and establishment of a prospective study