

# Characteristics and Outcomes of Patients with Intracranial Hemorrhage Treated with Image-Guided BrainPath-Mediated Parafascicular Hematoma Evacuation by Stroke Volume and Glascow Coma Scale Score

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### Introduction

Several patient case series have documented the safety and effectiveness of minimally-invasive clot evaluation, but little is known about which patient subgroups benefit most from the procedure.1,2 The role of medical comorbidities has also not been investigated. Here we describe the demographic, clinical and functional outcomes of patients grouped by Glascow Coma Scale (GCS) score and stroke volume on admission that underwent minimally invasive intracerebral hemorrhage (ICH) evacuation

#### Methods

A single-center retrospective case series of patients with ICH (n=43) undergoing minimally invasive BrainPath evacuation (MIS) from January 2014 - December 2016 at a comprehensive stroke center located within an urban, public, Level 1 trauma center was reviewed. Demographic, clinical, and outcome measures were compared within subgroups to identify significant differences between them. Improvement on GCS and National Institute of Health Stroke Scale (NIHSS) score from admission to discharge and percent clot evacuation were compared. Predictors of improvement on the three measures were identified though logistic regression.

#### Results

Patients with lower GCS admission scores (GCSADM) (3-8) were significantly more likely to show improvement/remain stable on GCS score from admission to discharge compared to those with higher GCS scores (9-15), 78% to 56% respectively. Patients with lower volumes < 60 ml were more likely to show improvement/remain stable on the NIHSS scale than those with volumes = 60 ml, 76% to 37.5% respectively. In risk-adjusted models, a higher GCSADM significantly decreased the likelihood of GCS improvement by 48%, while having diabetes reduced the likelihood by 97%. Having a lobar stroke or kidney disease significantly reduced the likelihood of NIHSS improvement.

#### Conclusions

Our results here demonstrate that MIS evacuation of ICH can lead to favorable outcomes in a select group of patients after accounting for medical co-morbidities. Further long term data and studies are required for

## Learning Objectives

1) Briefly review current data on minimally invasive evacuation of intracerebral hemorrhages

2) Describe outcomes for patients undergoing minimally invasive clot evacuation by subgroups based on admission characteristics and medical co-morbities

#### References

1.Labib MA, Shah M, Kassam AB, et al. The Safety and Feasibility of Image-Guided BrainPath-Mediated Transsulcul Hematoma Evacuation: A Multicenter Study. Neurosurgery. Jun 17 2016. 2.Bauer AM, Rasmussen PA, Bain MD. Initial Single-Center Technical Experience With the BrainPath System for Acute Intracerebral Hemorrhage Evacuation. Operative Neurosurgery. 2016.



Axial CT without contrast of a 73 year old female with hypertension that presented with left hemibody weakness, failure to protect her airway and GCS of 9 with a right basal ganglia hemorrhage

## Figure 1B



Axial CT images after MIS evacuation with discharge GCS improving to 14



Admission GCS versus discharge GCS for all patients. Patients with GCS 8 were more likely to show GCS improvement even after including deaths

Figure 3A



## Figure 3D



Reexpansion of the clot after evacuation with a moribund patient exam following which care was deescalated

Figure 3B



Dramatic expansion of the hematoma within 3 hours after the first scan. Associated vascular imaging was unremarkable

Figure 4B





Axial CT images after MIS evacuation with 82% clot evacuation

Figure 4A



Axial CT without contrast of a 49 year old female with chronic kidney disease that presented with right hemiplegia and declining mental status with a left basal ganglia and intraventricular hemorrhage

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