Time Course of Peri-Cavity Edema After Endoscopic Minimally Invasive Intracerebral Hemorrhage Evacuation

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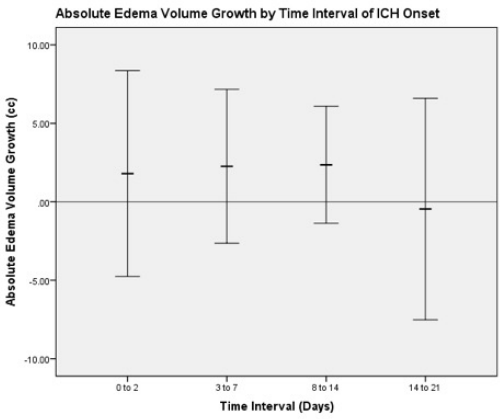
Introduction

Perihematomal edema (PHE) correlates with intracerebral hemorrhage (ICH) volume and impacts functional outcome. Endoscopic ICH evacuation may improve outcomes by decreasing hematoma burden early and altering the edema time course. With the hematoma removed, this edema measurement may have different characteristics and is more appropriately titled pericavity edema (PCE).

Absolute Edema Volume Growth by Time Interval of ICH Onset



Edema growth begins and remains low out to three weeks post ictus.

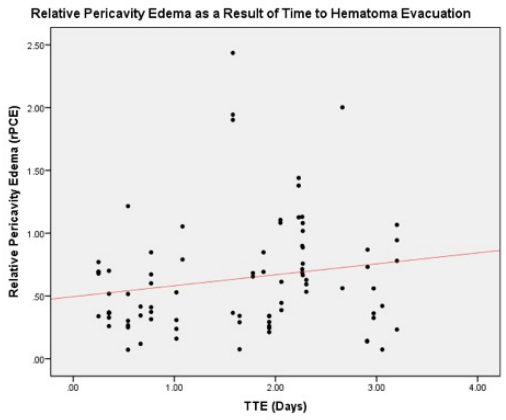
Methods

27 consecutive patients presenting with supratentorial ICH (n=27) who underwent endoscopic ICH evacuation and had delayed CT scans performed were included in this study. Semi-automatic threshold-guided volume assessment was performed using AnalyzePro on all CT scans (n=136) to measure hematoma, edema, and cavity volumes. Two raters analyzed each subject and each rater analyzed half of the scans twice to produce intraclass correlation coefficients (ICC) to assess inter- and intra-rater reliability for PCE. Statistical analysis was performed on the mean results to determine the change in PCE and relative PCE (rPCE, edema/original hematoma volume).

Results

ICC values for all variables were greater than 0.8, indicating good to excellent reliability. PCE on average decreased 12% from pre- to post-evacuation scans. The peak mean PCE occurred at 7.2 days. There was a positive trend between hematoma volume and absolute edema. There was a positive trend between rPCE and time to evacuation (TTE) in which a delay of one day led to a 0.1 increase in rPCE, a 10% increase in PCE.

Relative Pericavity Edema as a Result of Time to Hematoma Evacuation



rPCE is decreased with a shorter time from ICH onset to evacuation.

Conclusions

In conclusion, endoscopic ICH evacuation requires definition of a new term, PCE, which can be accurately measured by semi-automatic threshold-guided volume assessment, peaks at 7.2 days post ictus, and remains low out to three weeks post ictus. rPCE is directly related to time to evacuation.

Learning Objectives

By the conclusion of this session, participants should be able to:
1) Define pericavity edema.
2) Describe the impact of endoscopic ICH evacuation on pericavity edema.
3) Describe the relationship between time to evacuation and pericavity edema.

References

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