

# Computed Tomography Hounsfield Units as an Imaging Marker for Brain Compression from Extra-axial Hematoma Ha Nguyen MD; Luyuan Li; Mohit Patel; Wade M Mueller MD

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### Introduction

Extra-axial hematoma can cause significant brain compression. Guidelines for surgical evacuation include imaging findings (midline shift and hematoma thickness / volume) in conjunction with Glasgow coma scale (GCS) scores and/or intracranial pressure (ICP) monitoring. Physiologically, overall brain density should also change with compression. In our observational study, we explored whether overall brain density, defined using computed tomography Hounsfield Units (CT HU), changes after surgical evacuation of extra-axial hematoma.

### **Methods**

Only patients with a surgical acute epidural hematoma or subacute / chronic subdural hematoma were considered. Other exclusion criteria were concurrent intraparenchymal pathology, bilateral pathology, or incomplete follow-up imaging. Between Fall 2012 to Spring 2015, 22 patients were included in the study. CT head imaging (preoperative, postoperative, and at ~1 to 2 months clinic visit) were loaded into OsiriX (Pixmeo, Switzerland). All the intracranial regions were selected and all extra-axial features were removed; subsequently, software was used to calculate a global CT HU value.

## **Learning Objectives**

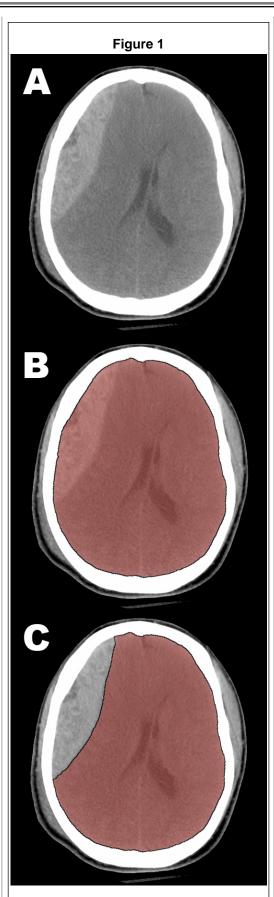
1) Evaluate the potential utility of CT HU values as an imaging marker for brain compression in selected population with extra axial pathology

### Results

Interobserver and intraobserver correlation coefficients were 0.935 (CI 95% 0.826, 0.978) and 0.977 (CI 95% 0.93, 0.992) respectively. A repeated measures ANOVA found significant time effect, p < 0.01, with significance between preoperative versus postoperative CT (p = 0.03) and preoperative versus clinic visit CT (p < 0.01).

### Conclusions

The results from this study suggests that extra-axial hematomas, which deform the brain, can cause an elevation in global CT HU value; moreover, surgical decompression is associated with lower global CT HU values. The use of global CT HU values in selected populations may serve as an adjunct for the evaluation of surgical lesions.



Selecting Region of Interest

### References

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