Background

- The duration of post-traumatic amnesia (PTA) is commonly used to estimate the severity of brain injury.
- Lesions in temporal lobes, especially hippocampal regions, are thought to be connected to the memory loss. However, conventional neuroimaging has not revealed neuropathological correlates of PTA in MTBI.
- Texture analysis (TA) is an image analysis technique that quantifies the minor MRI signal changes among image pixels and thus the variations in intensity patterns within the image.

Objectives

- The objective was to apply the TA technique to MR images of MTBI patients and control subjects and to assess the microstructural damage in medial temporal lobes of patients with MTBI with definite PTA.

Patients and Methods

- TA was performed for Flair images of 50 MTBI patients and 50 age- and gender-matched controls in the regions of amygdala, hippocampus, and thalamus (Figure 1, ROI=region of interest).
- It was hypothesized that:
  1) there would be statistically significant differences in TA parameters between patients with MTBI and controls, and
  2) the duration of PTA would be related to TA parameters in patients with MTBI.

Results

- No significant textural differences were observed between patients and controls in the regions of interest (Table 1).
- No textural features were observed to correlate with the duration of PTA.
- Subgroup analyses were conducted on patients with PTA >1h (n=33) and compared the four TA parameters to the controls (n=33). The findings were similar.

Table 1. The number of significantly differing texture features between MTBI patients and controls. Only the right thalamus showed significant difference in four out of 65 calculated texture features. In further analysis, these features did not prove to be efficient enough for the classification of the region.

<table>
<thead>
<tr>
<th>Region</th>
<th>Histogram-based (n=11)</th>
<th>Co-occurrence (COM)-based (n=33)</th>
<th>Run-length matrix (RLM)-based (n=16)</th>
<th>Autoregressive model-based (n=5)</th>
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</thead>
<tbody>
<tr>
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</table>

Conclusion

- This study did not reveal significant textural changes in medial temporal structures that could be related to the duration of PTA.