The general aim of this thesis is to scientifically evaluate processes that can be used to improve clinical management of traumatic brain injury in the emergency department.

The specific aims of this thesis include:

- To study attitudes towards computerized tomography of the head among emergency department doctors who manage patients with trauma to the head, and doctors’ adherence to guidelines

- To evaluate the characteristics of adults with head trauma at the emergency room identify clinical features of intracranial hemorrhage and outline present epidemiology

- To compare capillary and serum s100B

- To compare urinary and serum s100B
Abstract

Background: Traumatic brain injury is a common reason for emergency visits world-wide, but also for significant morbidity and mortality. Several clinical guidelines exist but adherence is generally low. Also, guidelines are based on epidemiological 15 year old data and often recommend head-CT even though only 4-8% of patients with minor head trauma have intracranial hemorrhage. Furthermore, biomarker S100B is now employed as a means to find patients at risk for intracranial hemorrhage but is currently measured in serum.

Aim: To study processes that can be improved in order to make management of traumatic brain injury at the emergency department safer and more efficient. This processes include guideline adherence and attitudes towards head CT-scan among physicians, more resent epidemiological data and suggestions for new guidelines derived from these data and lastly biochemical analysis of S100B in urine and capillary sampled serum as opposed to today’s venous sampled serum analysis.

Methods: Quantitative questionnaire study with questionnaires answered by physicians at the emergency room who manage patients with traumatic brain injury. Retrospective review of medical records for epidemiology and multivariate analysis. Methodological studies of comparison between venous serum samples of S100B with capillary samples and urine samples.

Results: Head trauma guideline adherence varies between 40%-60% and was decreased by an effort on our part to increase guideline usage. Patients without medicines or previous medical history who were 58 years or younger and had sustained low energy force (fall from on ground) had no intracranial hemorrhage, regardless of clinical status and treatment with warfarin carried 8% risk of intracranial hemorrhage whereas treatment with acetylic acid carried a 12% risk of intracranial hemorrhage, capillary samples of S100B are not interchangeable with venous samples but the correlation of capillary samples is good enough to merit further studies which aim to establish a clinical cutoff for intracranial hemorrhage. Preliminary data indicate that urine samples of S100B are elevated in the same fashion as serum samples which also merits further clinical studies.

Conclusion: Guideline adherence seems to be low and was not improved by intervention. A large group of patients may need less medical attention after head trauma than current guidelines prescribe. Capillary and Urine S100B may be used instead of serum samples but further studies are needed to demonstrate safety and efficacy of these samples.
References
1. Management of traumatic brain injury in the emergency room: Guideline adherence and patient safety
2. Epidemiology of traumatic brain injury
3. Methodological comparison of Capillary and Venous S100B
4. Properties of Urine S100B compared to Venous S100B