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EMERGENCY RADIOLOGY

Point of Care Transcranial Ultrasonography to Detect Midline Shift in Neuro-Emergencies in the Emergency Department

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Introduction: Midline shift (MLS) in the brain is a life-threatening emergency, which requires immediate surgical intervention following diagnosis. Currently, CT Brain is accepted as the gold standard in detection of MLS. Unfortunately, the diagnosis may be delayed when the patient is unable to undergo a CT Brain immediately due to several reasons. This has led to a constant endeavor to identify and develop other methods for detection of MLS, among which Transcranial Sonography (TCS) is included.

Aim: To validate point-of-care TCS for detection of MLS in neuro-emergency patients in the Emergency Department, and compare it to CT values of MLS.

Methods: This double-blinded prospective study was conducted from March 2018 to August 2018 in the Emergency Department of VIMS Hospital, Salem. All patients above

the age of 18 who required a CT Brain were included, and a TCS was performed. MLS on TCS was calculated by measuring the distance between the outer table of the skull and the third ventricle on both sides, through the temporal window using a 2.8 MHz Sector Probe. MLS on CT was defined as the difference between ideal midline and septum pellucidum.

Results: A total of 87 patients were included in this study. The MLS (mean \pm SD) was 0.21cm \pm 0.31cm using TCS, and 0.20cm \pm 0.34cm using CT. The Pearson's correlation coefficient between CT and TCS was 0.97 ($p < 0.01$). The area under the ROC curve for detection of a significant MLS using TCS was 83.7%. Using 0.5cm as a cut-off, the sensitivity, specificity, and positive likelihood ratio were 86.7%, 98.6%, and 61.92, respectively.

Discussion: This study concludes that Transcranial Sonography could detect Midline Shift with reasonable accuracy, and can be used as a point-of-care tool in the Emergency Department to facilitate early diagnosis of MLS and intervene accordingly in neuro-emergencies.

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