

Transorbital Sonography for Early Prognostication of Hypoxic-Ischemic Encephalopathy After Cardiac Arrest.

A Prospective Study

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in Critical Care Medicine**

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Abstract

BACKGROUND AND PURPOSE: Early prognostication of the outcome in resuscitated post cardiac arrest (CA) patients remains challenging especially if treated with therapeutic hypothermia. Brain edema caused by hypoxic-ischemic encephalopathy (HIE) can indirectly be estimated by transorbital sonography (TOS) taking in account the optic nerve sheath diameter (ONSD).

The prognostic value of this easy, safe, and reproducible technique was investigated in this study.

METHODS: A total of 55 patients, initially unconscious (Glasgow Coma Scale < 6) after successful resuscitation, were enrolled into this prospective observational study. Sonographic ONSD measurements were performed twice on day of admission (initially and post 6 hours) and once post 24 hours after CA. Beyond ONSD, established prognostic parameters like CT brain and Fundus examination for papilledema . Cerebral Performance Category (CPC) score served as outcome parameter.

RESULTS: The patient subdivided into 3 groups according the neurological outcome in Group A : good outcome (CPC score 1-2) 19 patients (34.5%), Group B : Severe Disability (CPC score 3-4) 5 patients (9.1%) , Group C : Bad outcome (CPC score 5) 31 patients (56.4%).

Already in the first measurement on day 0, nonsurvivors showed significantly higher ONSD values ($P < .001$). For predicting mortality, a threshold of 5.8 mm was calculated with a specificity of 81% and sensitivity of 94.1% ONSD did not differ significantly depending on hypothermia.

CONCLUSION: Early and reliable prognostication of outcomes in patients with HIE can be simplified by ONSD values gathered with the use of TOS. Main advantages compared to other established markers are

prognostication within the first 24 hours and independence from therapy with hypothermia. A higher level of accuracy can be reached by combining computed tomography) and ONSD values.

Keywords: Ultrasound, sonography, cardiac arrest, resuscitation, optic nerve.