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Cerebral blood flow and autoregulation in acute TIA patients from a general hospital in Qatar

Adham Musthak*, Darine Darine Dimassi, Naveed Akhtar, Saadat Kamran, Ahmed El Southey, Saleha Abbasi, Ahmed Khattab, Naim haddad, Leopold J Streletz


Weill Cornell Medicine - Qatar
* adm2009@qatar-med.cornell.edu

BACKGROUND The Arabian Gulf region is rapidly developing, with major changes in lifestyle that can increase the risk of cardiovascular diseases, including TIA and stroke. Stroke constitutes a major cause of morbidity and mortality in Qatar. Cerebral auto-regulation is an intrinsic protective mechanism guaranteeing hemodynamic integrity of cerebral circulation. It modulates cerebral blood flow (CBF) in order to meet regional perfusion demands despite variations in arterial blood pressure. Impaired cerebral auto-regulation is associated with poor functional and prognostic outcomes in patients with ischemic stroke. **OBJECTIVE** The study has two arms; one arm is a health improvement project conducted in Qatar with the aim of developing, establishing and maintaining an acute stroke database (registry) in Qatar. The second arm is an applied research project with the aim to correlate CBF and cerebral auto-regulation and microalbuminuria in TIA patients, and to assess the prognostic significance of such a correlation. Thus far, no physiologic or biochemical biomarker has been proven as an effective predictor of poor outcome in TIA patients. **DESIGN / METHODS** Fifty-six patients (35 men, mean age, 53.2 yrs) with acute TIAs or small strokes (TIAs with tissue evidence of infarction) were enrolled last year and evaluated with bilateral, simultaneous TCD studies of their MCAs CBF within 72 hrs of the indexed event. On best medical therapy, the patients were followed up at one year for outcomes measures of death, stroke and recurrent TIAs in an attempt to correlate them with the TCD parameters. **RESULTS** Fifteen healthy volunteers (mean age 30 years) were studied using voluntary breath-holding technique to provide the hypercapnia stimulus

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to effect cerebral auto regulation of CBF in their MCAs. Fifty TIA patients (mean age 53.7 yrs) had complete TCD studies and 48 were followed up to one year. Seven experienced symptoms or signs of a new cerebrovascular event (3 strokes and 3 recurrent TIAs) for an annual rate for cerebrovascular events of 14%. The average BHI for the respective groups were 0.9 ± 0.78 for the controls, 0.62 ± 1.1 for the TIA patients and 0.31 ± 0.85 for those who had cerebrovascular events on follow up. MCA TCD studies with BHIs in the TIA patient group with stroke or recurrent TIA at follow up showed a tendency towards abnormality as compared to healthy controls ($p > 0.05$). CONCLUSION Preliminary results indicate the feasibility of TCD and BHI in acute evaluation of TIA patients for the purpose of prognosis and functional outcome. Further studies are necessary to confirm their clinical value. Calculating BHI has potential of a strong prognostic predictor of future cerebrovascular events. It could be used as an inexpensive non-invasive tool for the acute evaluation of TIA patients. Together with other neuroimaging studies it brings a real time neurophysiologic dimension to the assessment and possible prevention of stroke.