Use of transcranial Christian Johann Doppler in patients with severe traumatic brain injuries.

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Short Communication

Published in the Journal of Neurotrauma 2017;34(1):121-127 [1]. The purpose of the article was to determine the usefulness of transcranial Doppler (TCD) in a severe traumatic brain injury (TBI) defined as a Glasgow Coma Scale of 8 or less on admission. From the study, the TCD is useful for prognosis. Based on previous studies, we divided the patients into 3 groups, hypoperfusion, normal and vasospasm [2-7]. Outcome was determined by the Glasgow outcome score at 6 months [8]. Forty-five percent had normal measurements and of these, 81% had a good outcome, 5% had moderate disability and 14% died. Twenty-eight percent of the patients had hypoperfusion and all died except for one with moderate disability. Twenty-seven percent had vasospasm and of these 45% had a good outcome, 23% had severe disability and 32% died.

Santbrink et al. had an incidence of hypoperfusion of 63% within the first 72 hours of admission, of which 26% died [2]. Using the same criteria as the Santbrink study, in our study mortality was 88%. There is significant mortality in patients who initially have hypoperfusion and then subsequently normalize their measurements. Eight of 18 patients (44%) with initial hypoperfusion that normalized, died in our study. Persistent hypoperfusion is almost invariably fatal.

Vasospasm occurred in 27% of our patients. The onset for vasospasm can occur from hospital day one to day 13, with days 2 and 3 being the most common [4]. Subarachnoid hemorrhage (SAH) can occur in as high as 60% of patients with TBI and is considered a negative prognostic risk factor. In our series 34% had a SAH as a significant component of their TBI, of these 40% died. Developing vasospasm following aneurysmal SAH is considered to be related to blood clot burden. Post-traumatic vasospasm can occur in the absence of SAH. Sixty-four percent of our patients with vasospasm did not have a SAH. This questions whether aneurysmal SAH and post-traumatic SAH share similar pathophysiology [9].

The treatment for vasospasm from a TBI remains a challenge. For aneurysmal SAH, calcium channel blockers reduce morbidity. A Cochrane Review meta-analysis suggested lack of efficacy for calcium channel blockers in the setting of TBI as a whole. When a subgroup analysis was performed, a small benefit in the patients with TBI and traumatic SAH was demonstrated [10]. We agree with Bouzat’s review, TCD is useful in patients with severe TBI [11]. It is helpful in predicting outcome and management. For patients with normal measurements, over 80% can expect a good outcome and low mortality from brain death. Patients with hypoperfusion measurements have a high mortality. Patients with vasospasm measurements have an increased mortality of 32%. They also have a less favorable outcome with 45% having a good outcome. The treatment of vasospasm is uncertain however a calcium channel blocker should be considered.

References


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