Is acute or chronic hydrocephalus associated with neurocognitive impairment after aneurysmal subarachnoid hemorrhage?

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Objective: Many patients surviving aSAH are left with severe persisting neurologic and cognitive impairments. While some patients present with acute hydrocephalus at admission, others develop chronic hydrocephalus at a later time, sometimes even after discharge to a rehabilitation facility. Hydrocephalus may be a potential cause for reduced cognitive progress during rehabilitation. The association between hydrocephalus and poor cognitive function has been demonstrated in other diseases (Mataro et al., 2000). We assessed whether acute or chronic hydrocephalus is associated with neuropsychological deficits (NPD) in aSAH patients.

Methods: Files of patients treated for aSAH between 01-2009 and 08-2012 at two neurovascular centres were reviewed and relevant data concerning the clinical course were extracted. Acute hydrocephalus was usually treated by ventriculostomy. Patients with chronic hydrocephalus underwent shunt surgery. Neuropsychological outcome was assessed after a mean of 70.4 ± 67.3 days after aneurysm occlusion and graded as regular, minimal, moderate or severe by an experienced neuropsychologist. Furthermore, the affected neuropsychological domains were recorded in each patient (alertness, executive function, memory, visuoconstruction, language/calculation, behaviour).

Results: A total of 92 patients (35 male and 57 female) with a mean age of 51.4 ± 11.6 years were analyzed. In 53/92 patients an external ventricular drainage (EVD) was placed for acute hydrocephalus. Of those, 39 (73.6%) had moderate to severe NPD as compared to 16/39 without EVD (41%; p=0.002). Presence of chronic hydrocephalus requiring permanent CSF diversion dictated presence of NPD and was associated with poorer cognitive function: Of 38/92 patients with chronic hydrocephalus, 7 had minimal NPD and 31 had moderate to severe NPD. In contrast, the cohort of 54/92 patients without chronic hydrocephalus revealed no NPD in eight, minimal NPD in 22 and moderate to severe NPD in 24 patients, indicating that the likelihood of occurrence of severe NPD was higher in the presence of chronic hydrocephalus (p=0.0003). The following cognitive domains were mostly affected in patients with chronic
hydrocephalus: Alertness (32/38; 84%), executive (28/38; 73%), memory (29/38; 76%), visuoconstructive (14/38; 37%), language (15/38; 39%) and behaviour (11/38; 29%).

Conclusion: On the basis of our data we conclude that patients with chronic hydrocephalus after aSAH are very likely to display NPD in the assessment and are at higher risk for worse cognitive function as compared to patients without chronic hydrocephalus. The likelihood of having a poor cognitive outcome is also higher in patients with acute hydrocephalus. In aSAH patients without shunt-placement at discharge and poor cognitive performance during the rehabilitation, presence of chronic hydrocephalus should be ruled out as significant improvement is possible after shunt-placement.

keywords
hydrocephalus; subarachnoid haemorrhage; outcome; neuropsychological deficit; aneurysm presentation (English)

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