Growth hormone deficiency after subarachnoid hemorrhage

Patients who survive subarachnoid hemorrhage (SAH) may also develop hypopituitarism, though it is less common than after traumatic brain injury (TBI).

Growth hormone deficiency is the most prevalent diagnosis.

Epidemiology

Identification of 'true' GHD after SAH requires confirmatory testing with an alternative stimulation test and application of BMI-specific cut-offs. Using such stringent criteria, Gardner et al. found a prevalence of hypopituitarism of 12%¹⁾.

The variation in reported prevalence of growth hormone deficiency (GHD) post subarachnoid hemorrhage (SAH) is mainly due to methodological heterogeneity ²⁾.

Giritharan et al. report on the prevalence of GHD in a large cohort of patients following SAH, when dynamic and confirmatory pituitary hormone testing methods are systematically employed.

In this cross-sectional study, pituitary function was assessed in 100 patients following SAH. Baseline pituitary hormonal profile measurement and glucagon stimulation testing (GST) was carried out in all patients. Isolated GHD was confirmed with an Arginine stimulation test and ACTH deficiency was confirmed with a short synacthen test.

The prevalence of hypopituitarism in this cohort was 19% and the prevalence of GHD was 14%. There was no association between GHD and the clinical or radiological severity of SAH at presentation, treatment modality, age, or occurrence of vasospasm. There were statistically significant differences in terms of Glasgow Outcome Scale (GOS; p = 0.03) between patients diagnosed with GHD and those without. Significant inverse correlations between GH peak on GST with body mass index (BMI) and waist hip ratio (WHR) was also noted (p < 0.0001 and p < 0.0001 respectively).

Using the current testing protocol, the prevalence of GHD detected in this cohort was 14%. It is unclear if the BMI and WHR difference observed is truly due to GHD or confounded by the endocrine tests used in this protocol. There is possibly an association between the development of GHD and worse GOS score. Routine endocrine screening of all SAH survivors with dynamic tests is time consuming and may subject many patients to unnecessary side-effects. Furthermore the degree of clinical benefit derived from growth hormone replacement in this patient group, remains unclear. Increased understanding of the most appropriate testing methodology in this patient group and more importantly which SAH survivors would derive most benefit from GHD screening is required ³⁾.

Fatigue is a common symptom amongst SAH survivors. WFNS is a usable clinical determinant of fatigue in SAH survivors. Neither PD nor GHD has a significant effect on long-term fatigue after SAH ⁴).

Diagnosis

The ghrelin test might be a valuable GH provocative test, especially in the early phase of SAH ⁵).

Treatment

The neurobehavioral effects of GH replacement in patients suffering from head injury or SAH warrant further study ⁶⁾.

Case series

Goto et al. evaluated basal pituitary hormone levels among 59 consecutive aSAH patients with a modified Rankin Scale (mRS) \leq 4 at 3months after aSAH onset. Patients with low insulin-like growth factor 1 (IGF-1) SD score (SDS) or who seemed to develop pituitary dysfunction underwent provocative endocrine testing during a period of 3-36months after SAH onset. The relationship between IGF-1 SDS and clinical factors of the patients such as severity of SAH, aneurysm location, and treatment modalities, were assessed. Six patients (10.2%) demonstrated their IGF-1 SDS less than -2. Multiple logistic regression analyses revealed that patients who underwent surgical clipping had a significantly lower IGF-1 SDS (\leftarrow 1SD) than patients who underwent endovascular embolization with an odds ratio of 5.83 (p=0.032). Thirty-three patients took provocative tests and five (15.6%) patients were identified as having GHD. The mean IGF-1 SDS of these five GHD patients was 0.08 SD. The aneurysms in all GHD patients were located in internal carotid artery (ICA) or anterior cerebral artery (ACA). To the best of our knowledge, this is the first report describing the prevalence of GHD in Japanese patients after aSAH, and it was not as high as that of previous European studies. They recommend that screening pituitary dysfunction for aSAH survivors with their aneurysms located in ICA or ACA ⁷⁰.

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