

INFLUENCE OF GROWTH HORMONE DEFICIENCY ON FUNCTIONAL RECOVERY FOLLOWING BRAIN INJURY

Patients with growth hormone (GH) deficiency secondary to brain injury have more severe deficits in attention, memory and executive functioning than patients with brain injury alone (Leon-Carrion et al, 2007). This indicates recovery from brain injury may be negatively influenced by concomitant GH deficiency. Insulin-like growth factor-1 (IGF-1) is considered the best marker of GH activity currently available (Frieda et al, 1998). Low levels of IGF-1 increase the likelihood that GH levels are also deficient. However, total IGF-1 levels in isolation do not reliably predict GH status in patients who have sustained a brain injury (Aimaretti et al, 2005). Approximately 50% of adults with GH deficiency have IGF-1 levels within the normal reference range (Lissett et al, 2003). The objective of this study was to investigate the relationship between GH and IGF-1 levels to determine if patient demographics and/or injury characteristics could reliably predict GH deficiency after brain injury. Additionally, the influence of GH/IGF-1 status on functional outcome was assessed. Patients admitted to a post-acute brain injury rehabilitation facility were screened for neuroendocrine dysfunction. Blood levels of thyroid, follicle stimulating hormone (FSH), luteinizing hormone (LH), cortisol (AM and PM levels), prolactin, testosterone, and insulin-like growth factor-1 (IGF-1) were measured. Patients whose IGF-1 level fell two standard deviations below the mean reference range for age and gender underwent provocative testing. GH levels were considered deficient if the peak GH level during a glucagon stimulation test was less than 3 ug/L. Functional outcome measures including the Disability Rating Scale (DRS), CNS Ability Scale (CNS), Living Status Scale (LSS) and Occupational Status Scale (OSS) were completed at admission and discharge from the facility. Preliminary results revealed that of the 30 patients with IGF-1 levels requiring a glucagon stimulation test, 16 were GH deficient. There was no relationship between patients who were GH deficient and patients with normal GH levels on length of stay in the program, chronicity, age, IGF-1 level or number of other hormonal deficiencies present. Although, there were no significant differences between patients who were GH deficient and patients with normal GH levels on any of the functional outcome measures at admission, patients with GH deficiency did not actualize as much change on the DRS ($p=0.005$), CNS ($p=0.038$), LSS ($p=0.001$) and OSS ($p=0.071$) as the patients who had low levels of IGF-1 but were not GH deficient. These results support the finding by Bondanelli et al (2007) indicating that untreated GH deficiency can negatively influence functional outcome following brain injury even if the patient is undergoing intensive brain injury rehabilitation.