

Introduction

Negative and low pressure hydrocephalus, a very rare condition of unknown etiology and optimal treatment, usually present postneurosurgery with clinical and imaging features of hydrocephalus, but with negative or low cerebrospinal fluid pressure.

Methods

9 patients of negative and low pressure hydrocephalus were prospectively collected in this study. The initial intracranial pressure of all patients included in this study was lower than 6 cmH2O. A standard protocol for the treatment of negative and low pressure hydrocephalus is used for the treatment of these patients, including continuous intracranial pressure monitoring with horizontal positioning, head down and legs elevated to 10-15 degrees, neck wrapping, chest and abdomen bandages, infusion of 5% dextrose fluid, daily cerebrospinal fluid drainage and so on. Daily intracranial pressure, CSF drainage volumes and simultaneous CT images variation are collected. The CSF collected from the drainage tube was examined daily to rule out infection secondary to prolonged EVD.

Results

The median of initial intracranial pressure was 2 (interquartile range, -3 to 6) cm H2O. The intracranial pressure was successfully treated to achieve 8 cm H2O (interquartile range, 6 to 14) under continuous intracranial pressure monitoring with horizontal positioning, head down and legs elevated to 10-15 degrees, neck wrapping for controlled venous drainage, chest and abdomen bandages, infusion of 5% dextrose fluid to lower plasma osmolarity (Na+, 130-135 mmol/L), daily cerebrospinal fluid drainage >200 mL, and arterial blood gas partial pressure of carbon dioxide >40 mm Hg.

Conclusions

Negative and low pressure hydrocephalus are a complex condition with an unknown etiology and equally challenging treatment strategy. It illustrates that titration EVD should be combined with other therapies to restore positive pressure under continuous ICP monitoring. Furthermore, mild hyponatremia (130 mmol/L) and supine position should be continued even after titration EVD is suspended.

Learning Objectives

Better diagnosis and treatment of negative and low pressure hydrocephalus.