Valve opening pressure

A retrospective review demonstrated that the valve opening pressure is an important component of the shunt complication rate [1)]

Neurosurgeons select a valve opening pressure (VOP), whose exceeding causes the shunt to open to drain cerebrospinal fluid (CSF): In most cases a standard pressure is chosen. Whereas some patients fare well with the primary chosen VOP, others require one to several VOP changes.

A study of Müggenburg et al. from the University Hospital Frankfurt aimed to evaluate the prevalence and indication for occurring valve pressure-adjustments.

They obtained information about 343 ventriculoperitoneal shunt implantations in 321 adult patients from 2013 to 2018 in a single center with well-kept electronic health records regarding hydrocephalus types, hydrocephalus etiologies, primary VOP, valve pressure adjustment, time with shunt, time till VOP change, age, sex and shunt type. The data was analyzed using Kaplan-Meier estimator (KME) for the whole patient sample and for subgroups with the primary VOP adjustment defined as event. In the subgroup analysis different types of hydrocephalus, different hydrocephalus etiologies, valve types, both sexes and the patients' age had been compared by applying Peto-Pike's log-rank test and cox regression.

Of the 343 implanted VP shunts in 321 patients, 166 valve pressure adjustments in 101 V P shunts were required during the observed time with a resulting valve pressure-adjustment rate of 0.484 per valve implant. The time till median valve pressure-adjustment was 2.9 years and 38.3% one year after VP shunt placement for the general sample in Kaplan Meier-analysis. The subgroup comparisons between hydrocephalus types, hydrocephalus etiologies, valve types, sexes and the patients' age did not reveal significant differences applying Peto-Pike's log-rank test. But the primary chosen valve-pressure of 5 cmH2O is associated with a lower percentage of valve-pressure adjustments, than other initial valve-pressures (Chi2 = 7.9; df = 1; p = 0.0049).

This study reveals a valve pressure-adjustment rate of 38.3% after one year for the whole patient collective and similar adjustment rates for different types of hydrocephalus. The primary valve pressure of 5 cmH2O is associated with a lower valve pressure-adjustment rate than other initial valve pressures and therefore 5 cmH2O may be the preferred initial valve pressure for all patients receiving programmable VP shunt insertions with gravitational unit [2)].

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