Pediatric hydrocephalus case series

2024

A retrospective, case control study conducted on 80 pediatric patients with active hydrocephalus. The control group (a single step of preoperative skin antisepsis using povidone-iodine and isopropyl alcohol) included 40 patients operated from January 2019 to June 2020 and the study group (two steps of preoperative skin antisepsis using 2% chlorhexidine gluconate in 70% isopropyl alcohol as a first step followed by povidone-iodine as a second step) included 40 patients operated from July 2020 to January 2022.

For the entire sample, shunt infections were encountered in 11 cases (13.7%). Shunt infection was significantly higher in preterm babies (P = 0.010), patients with previous shunt revision (P < 0.001) and those with previous shunt infection (P < 0.001). The incidence of infection in the control group was 22.5% versus 5% in study group, with a statistically significant difference (P = 0.023).

Two steps of preoperative skin antisepsis using chlorhexidine/alcohol as a first step followed by povidone-iodine scrub solution may significantly reduce the infection rate in pediatric VP shunts surgery ¹⁾

2022

Between 2013 and 2018, a retrospective analysis of 131 children, who were suffering from hydrocephalus, was conducted. Medical records, operative reports and clinical follow-up visits were reviewed. Statistical analysis was performed using t-test/ANOVA and Kruskal-Wallis test/Mann-Whitney U test.

Results: The most common pathogeneses of hydrocephalus among our patients were Myelomeningocele-associated hydrocephalus and posthemorrhagic hydrocephalus. The majority of patients received a programmable differential pressure valve (PPV, 77.8%) or a fixed differential pressure valve with a gravitational unit (FPgV, 14.8%). Among 333 shunt-associated surgeries, 66% of surgeries were revision surgeries and were performed because of mechanical shunt dysfunction (61%), infection (12%), or other reasons (27%). The median rate of revisions within one year for each patient was 0.15 (IQR25-75: 0.00-0.68) and was influenced by aetiology (p = 0.045) and valve type (p = 0.029). The highest rates were seen in patients with posthaemorrhagic hydrocephalus and in those with FPgVs; the lowest rates were seen in patients with meningomyelocele-associated hydrocephalus and PPVs. The occurrence of mechanical dysfunctions was correlated with FPgV patients (p = 0.014). Furthermore, the median time interval between initial shunt surgery and onset of infection was shorter than that between initial surgery and mechanical dysfunction (p = 0.033).

Conclusions: Based on this research, we can state several factors that influence revision surgeries in paediatric shunt patients. With the assessment of patients' risk profiles, physicians can classify paediatric shunt patients and thus avoid unnecessary examinations or invasive procedures. Furthermore, medical providers can prevent revision surgeries if they choose shunt material in accordance with a patient's associated shunt complications²⁾

2013

The Hydrocephalus Clinical Research Network (HCRN), which comprises 7 pediatric neurosurgical centers in North America, provides a unique multicenter assessment of the current outcomes of CSF shunting in nonselected patients. The authors present the initial results for this cohort and compare them with results from prospective multicenter trials performed in the 1990s.

Methods: Analysis was restricted to patients with newly diagnosed hydrocephalus undergoing shunting for the first time. Detailed perioperative data from 2008 through 2012 for all HCRN centers were prospectively collected and centrally stored by trained research coordinators. Historical control data were obtained from the Shunt Design Trial (1993-1995) and the Endoscopic Shunt Insertion Trial (1996-1999). The primary outcome was time to first shunt failure, which was determined by using Cox regression survival analysis.

Results: Mean age of the 1184 patients in the HCRN cohort was older than mean age of the 720 patients in the historical cohort (2.51 years vs 1.60 years, p < 0.0001). The distribution of etiologies differed (p < 0.0001, chi-square test); more tumors and fewer myelomeningoceles caused the hydrocephalus in the HCRN cohort patients. The hazard ratio for first shunt failure significantly favored the HCRN cohort, even after the model was adjusted for the prognostic effects of age and etiology (adjusted HR 0.82, 95% CI 0.69-0.96).

Conclusions: Current outcomes of shunting in general pediatric neurosurgery practice have improved over those from the 1990s, although the reasons remain unclear $^{3)}$

1995

Sgouros et al. have continued the supervision in an adult institution of 70 children originally treated in the Birmingham Children's Hospital between 1974 and 1978. In these patients, 33 (16.4%) of a total of 201 shunt revision procedures and 5 of the 8 subtemporal decompressions for slit ventricle syndrome were performed after the age of 16 years. Similarly, 7 shunt infections occurred in this age group. Two patients died from a blocked shunt. Other late complications included blindness (n = 1), endocarditis (n = 1), and renal and heart failure requiring consideration of organ transplantation (n = 1). Also 2 patients developed clinical features of arachnoiditis following earlier lumboperitoneal shunting. An overall good long-term outcome was observed. The majority of children graduated from a normal school (63%) or a school for physically handicapped children (21%). 67% of the patients are socially independent, but live at home with their partners (6%). It is clear that although a good social and educational outcome is expected, significant clinical problems do arise during adulthood for patients shunted in infancy, even after a long period of apparent stability. Regular follow-up by surgeons familiar with these problems is essential ⁴.

1)

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