Ventriculoperitoneal shunt for pediatric hydrocephalus

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One of the main concerns for paediatric neurosurgeons since the advent of ventriculoperitoneal shunts as a treatment for hydrocephalus in the second half of the 20th century has been how to improve its survival [1)].

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Case series

A retrospective, case-control study was conducted on 80 pediatric patients with active hydrocephalus in Menoufia University Faculty of Medicine, Shebin El-Kom, Egypt. The control group (a single step of preoperative skin antisepsis using povidone-iodine and isopropyl alcohol) included 40 patients operated on 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 the 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 a povidone-iodine scrub solution may significantly reduce the infection rate in pediatric VP shunt surgery [2].

The medical records of all patients aged 0-18 years who underwent shunt-related surgery for the treatment of hydrocephalus at the present institution between January 1996 and December 2015 were reviewed. For each case, two randomly selected controls with no shunt infection, matched for the year of surgery, were chosen. Demographic clinical and microbiological data were abstracted.

A total of 1,570 shunt-related procedures met the inclusion criteria, yielding 68 infections (in 63 patients). The control group consisted of 132 infection-free patients. The average annual infection rate was 4.2% cases per year. The median time between shunt procedures to infection was 19 days (range, 1-2,181). On multivariate analysis, risk factors associated with increased risk for developing an infection included a history of two or more previous revisions (OR, 4.8; 95%CI: 1.5-15.9); and age <5 years (OR, 4.5; 95%CI 1.5-13.4). A neoplastic etiology for hydrocephalus was found to be a protective factor for shunt infection (P = 0.001).

A history of shunt revision was the most significant risk factor in the development of subsequent shunt infection. Age >5 years was a protective factor. Future efforts should focus on modalities to optimize revision procedures and reduce the risk of subsequent infection [3].

The total number of patients operated on in the Gardi Medical College, Ujjain, Madhya Pradesh, India was 96. They studied 41 operated patients of Ventriculoperitoneal shunt who had various shunt-related complications and analyzed the predisposing risk factors and spectrum of complications.

Results: The mean age was 28 ± 32 months out of which 28 were males and 13 females. The etiology of hydrocephalus was aqueductal stenosis in 18, Arnold Chiari malformation in 10, Dandy-Walker malformation in 2, postmeningitis in 8 (pyogenic in 5 and tubercular in 3), postintraventricular hemorrhage in 2 patients and postencephalocele surgery in 1.

Conclusion: With this retrospective review of complications of VP shunts, age at initial shunt insertion and the interval between the age of initial shunt placement and onset of complications were the most important patient-related predictors of shunt failure. The different predominant etiological factors responsible for early and late shunt failure were infective and mechanical complications, respectively [4]

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