Evaluation of the efficacy of an antibiotic-impregnated ventriculostomy (AIV) for the treatment of an acute rise in the intra-cranial pressure

Ido Paldor

Abstract

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Introduction

Catheter-related infection of the cerebro-spinal fluid (CSF) is a potentially life-threatening complication of external ventricular drainage. Such an infection is a major cause of morbidity and mortality, including long hospitalization periods, costly antibiotic treatment and long intensive-care unit hospitalizations. A major source of infection is bacterial contamination along the external ventricular drain catheter track. We examined the efficacy of a catheter impregnated with clindamycin and rifampin for the prevention of these catheter-related infections.

Methods

We performed a "before and after" clinical trial, in which a historical cohort forms the control group for a intervention group. In this trial, all patients who required insertion of an external ventricular drainage between the years 2001-2003 formed the historical control group. In the intervention group we included all patients requiring external ventricular
drainage between May 2004 and June 2005. These patients were treated with an antibiotic-impregnated ventriculostomy, impregnated with clindamycin and rifampin. We analysed both groups for infection rate, mortality rate, organisms cultured from CSF specimens and hospitalization days.

Infection of the CSF was assessed, based upon clinical documentation of neurological status, fever and peripheral WBC counts. The CSF examination included biochemical analysis (i.e. protein and glucose count), cell count and culture. An infection of the CSF was considered to be an infection of the ventricular system (ventriculitis) in the presence of an external ventricular drainage system.

Of 49 cases reviewed in the historical control, 41 were included in the final analysis. Three were excluded because insufficient information was obtainable from historical case-summaries. Four patients were excluded because the catheter remained installed for a period too short for analysis of infection rate. One was excluded because the ventricular drainage system was installed in a different hospital, prior to transfer to our center. Of 23 cases in the intervention group, 21 were included in the final analysis. Two were excluded because, due to technical reasons, non-impregnated catheters were used.

**Results**

In the historical control group, 11 of the 41 patients (26.8%) developed an infection of the ventricular system. Of these, 4 patients (36% of infected) died. In the intervention group, 1 of the 21 patients (4.8%) developed an infection. This patient did not die (0% mortality). The reduction in infection rate was statistically significant (p=0.037). The difference between two groups regarding mortality did not reach statistical significance (p=0.139). There was no difference between the groups regarding overall hospitalization time (28 days vs. 34 days; p=0.369),
systemic antibiotic treatment (19% vs. 19.5%; p=0.965) or total catheter-use time (10.79 days vs. 9.68 days; p=0.795).

**Conclusion**

The use of external ventricular drainage systems impregnated with clindamycin and rifampin can significantly reduce the risk of catheter-related infections. Further research is required to elucidate whether this advantage pertains to catheter-related mortality as well.

**Bibliography**


