Rate of Pediatric Ventriculo-peritoneal Shunt Infection After Prophylactic Administration of Intrathecal Vancomycin

Nathan Christopher Rowland MD, PhD; Sue Ditmyer; Peter P. Sun MD
UCSF Department of Neurosurgery

Introduction

Post-operative ventriculo-peritoneal shunt infection rates range from 5-15% and are highest in the 30-day period immediately following implantation. Pediatric patients experience higher rates of infection due to immature immune resistance. Intrathecal antibiotics such as vancomycin have been used to treat post-operative shunt infections resistant to intravenous administration. Although these infections are common in every pediatric practice, no study has addressed whether intraoperative intraventricular antibiotics administered prophylactically impact post-operative shunt infection rates.

Methods

From 2004 to 2011, 652 consecutive pediatric patients at a single institution underwent ventriculo-peritoneal shunt insertion using standard techniques. Prior to connecting the ventricular catheter to the valve, 2.5 milliliters of intrathecal vancomycin were injected through the ventricular catheter and 2.5 milliliters were irrigated topically within the subgaleal pocket surrounding the valve and distal catheter (10mg total).

Results

Seven shunt infections were recorded out of a total of 307 patients undergoing intrathecal vancomycin administration (2.2%) as described in the methods. In contrast, ten shunt infections were recorded over the same time period out of a total of 335 patients who did not receive intraoperative intrathecal vancomycin (2.9%). This result did not reach statistical significance, however, the percentage of cases including intrathecal vancomycin administration increased over this time period from 0 to 94.5% and during the same time period the ventriculo-peritoneal shunt infection rate decreased from 8% to 2%.

Conclusions

Intraventricular vancomycin administration and topical irrigation of the ventriculo-peritoneal shunt apparatus was well tolerated in a population of 307 pediatric patients undergoing shunt insertion. The infection rates between those patients with and without intrathecal vancomycin administration were not statistically different, though a trend toward a significant reduction in ventriculo-peritoneal shunt infection rates has been observed. This trend is underscored by the significant impact that reduction of each shunt infection carries in this population.

Learning Objectives

By the conclusion of this session, participants should be able to: 1) Describe the rate and time course of ventriculo-peritoneal shunt infections 2) Discuss, in small groups, methods by which infections of ventriculo-peritoneal shunts may be prevented during insertion, 3) Identify effective treatment strategies for conservative and operative management of pediatric ventriculo-peritoneal shunt infections.

References

Parker SL, et al. Cerebrospinal shunt infection in patients receiving antibiotic-impregnated versus standard shunts. J Neurosurg Pediatr. 2011; 8(3):259-65.

Wen, DY, et al. Infections in neurologic surgery. The intraventricular use of antibiotics. Neurosurg Clin N Am. 1992; 3(2): 343.