

## Quality Improvement in Resource Stewardship: Education and Utilization

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### Introduction

Cerebrospinal (CSF) fluid accumulates in hydrocephalus, and the definitive treatment is diversion by insertion of a shunt. Shunt surgery is the most common operation performed in pediatric neurosurgery, and despite sterile surgical technique, shunt infection and revision occur. Various protocols and techniques are implemented to lower the rate of shunt infections, and the neurosurgeons at Texas Children's Hospital (TCH) participated in a multi-institution trial using a preservative-free Vancomycin and Gentamicin intrathecal shunt injection (IT antibiotics) prior to closing. Production of these medications is time-intensive, expensive, perishable, and its use is of no proven benefit. The trial was discontinued, but TCH pharmacy continued to supply the antibiotics, resulting in inefficient usage of resources. Inventory waste was defined, and a value analysis performed.

### Methods

A single institution, retrospective chart review was performed. After surgeon education regarding resource stewardship in study year 2015, utilization rates were recorded and compared to historical data of the preceding year. IT antibiotic dispensations were tracked by the pharmacy and utilization by operative nurses. Significance was calculated via chi-square test.

### Results

In the 12 months prior to intervention, there were 175 shunt operations for which 112 (64%) had IT antibiotics dispensed. In the subsequent 12 months, there were 127 shunt operations for which 67 (52%) had IT antibiotics dispensed. The dispensation reduction has a chi-squared statistic  $\chi^2=3.85$  ( $p<0.05$ ). During this time, utilization of at least one sample of IT antibiotics occurred in 57 (51%) and 32 (48%) of dispensations, respectively. A chi-squared statistic  $\chi^2=0.16$  ( $p>0.05$ ).

### Conclusions

Surgeon education regarding a wasteful operative practice resulted in a significant reduction in dispensations of a resource-intensive product which lacks proven clinical efficacy. The thoughtful use of IT antibiotics decreased the pharmacy workload burden. The fiscal impact of surgeon education deserves more in-depth prospective study.

### Learning Objectives

By the conclusion of this session, participants should be able to: 1) Describe the importance of communication between all levels of the operative team, 2) Discuss in small groups the potential for quality improvement in their own practice, and 3) Identify the need for continued investigation into resource-preserving strategies within the field.

### References

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Moussa WMM, Mohamed MAA: Efficacy of postoperative antibiotic injection in and around ventriculoperitoneal shunt in reduction of shunt infection: a randomized controlled trial. *Clinical Neurology and Neurosurgery* 143:144-149, 2016.

