The potential cost impact of using a PEG hydrogel sealant compared with fibrin sealant to prevent cerebral spinal fluid leaks after spinal surgery.

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Abstract:

BACKGROUND CONTEXT: The establishment of a watertight closure of the dura mater following spinal surgery is critical as post operative cerebral spinal fluid (CSF) leaks may cause medical complications, increased length of hospital stay, reduced quality of life, and added costs. PURPOSE: Our study assessed the added cost of CSF leaks following spinal surgery through Premier's PerspectiveTM Database (PPD), and applied the potential cost offsets of using a polyethylene glycol (PEG) hydrogel sealant (Covidien, Waltham, MA) compared with fibrin sealant. STUDY DESIGN/SETTING: We assumed post-operative CSF leak rates of 6.8% and 11.1%, respectively, based on results from a randomized, controlled, multi-center clinical trial (RCT) of a PEG hydrogel sealant compared with methods of dural sealing including fibrin sealants. METHODS: The PPD was used to establish the costs of CSF leaks following spinal surgery using ICD-9 codes for spinal procedures discharged between Q4 2006 and Q3 2008. PPD is the largest clinical and economic database developed for quality and utilization benchmarking. We then performed a hypothetical analysis for a hospital that performed 100 spinal procedures using a PEG hydrogel sealant ($580/treatment, Company List Price) on all 100 patients compared with fibrin sealant ($236/treatment, Company List Price) on all 100 patients. Our analysis then multiplied the post-operative CSF leak rates from the RCT for 100 hypothetical spinal procedures resulting in expected numbers of CSF leaks of 7 and 11 for PEG hydrogel sealant and fibrin sealant, respectively. The expected number of CSF leaks for each group was then multiplied by the cost for

CSF leaks in spinal procedures from the PPD analysis. The expected cost of CSF leaks in each group was then added to the total treatment costs for 100 spinal procedures in each group. RESULTS: We found the average cost of spinal surgeries with CSF leaks to be significantly higher at $25,812 (+/-35,977) compared with $19,333 (plusmn;22,772) for spinal surgeries without CSF leaks (p<0.0001) corresponding to an incremental additional cost of $6,479 per CSF leak. The cost difference was largely due to increased length of hospital (2.6 days), intensive care unit (ICU, 0.8 days), and pharmacy costs for CSF leaks. The total costs (eg, expected cost of CSF leaks in each group + treatment costs) for PEG hydrogel sealant and fibrin sealant for 100 hypothetical spinal procedures were $103,353 and $94,869, respectively. Therefore, the use of a PEG hydrogel sealant would cost an additional $85 per patient ($8,484 over 100 patients) for a hospital that performed 100 spinal procedures using a PEG hydrogel sealant compared with fibrin sealant on all 100 procedures. CONCLUSIONS: For a small incremental additional cost per patient, the use of a PEG hydrogel sealant may provide improved outcomes with respect to post-operative CSF leaks compared to fibrin sealant.