Cost-effectiveness of intravenous acetaminophen in pediatric tonsillectomy

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Background:
• Tonsillectomy is the second most common surgery done on children in the U.S. and is associated with considerable pain.

Objectives:
• The goal of this study was to examine the cost-effectiveness of the intraoperative combination of intravenous (IV) acetaminophen and IV opioids (combination strategy) as compared to IV opioids alone in children < 17 years of age undergoing tonsillectomy with or without adenoidectomy with or without adenotonsillectomy with an inhale anesthetic technique.

Methods:
• We used Decision Maker software to construct and analyze a Decision Analytic Model (Figure 1).
• IRB approval was obtained.
• Probabilities of rescue analgesics, incidence and treatment of side effects in post anesthesia care unit (PACU) were collected from 139 patients. (Table 1)

Primary Outcome
• Costs – of facilities, supplies, and labor.
• Effectiveness – how often the need for rescue analgesics was avoided
• Costs were obtained from hospital purchasing contracts and are in 2013 U.S. Dollars (Table 2).
• Medication costs assumed single-dose vials.
• Rare serious adverse medication reactions (< 1%) were not modeled.

Results:
• There were 3.3% fewer rescue events in the combination strategy.
• The combination strategy ($56.38) was $17.12 less costly than IV opioids alone strategy ($73.48) (Table 3).
• This remained the case as long as the need for rescue analgesics in the combination strategy was less than that of opioids alone.
• One way sensitivity analyses of marginal cost-effectiveness ratio of probability and relative risk of rescue analgesic use in opioids only strategy are provided in Figure 2 and Figure 3.
• Although medication costs of the combination strategy were greater, the overall cost of this strategy was less due to reduced time in PACU.

Figure 1: Decision Analytic Model

Figure 2: One-way sensitivity analysis of probability of rescue analgesic use

Figure 3: One-way sensitivity analysis of relative risk of rescue analgesic use

Conclusions:
• The routine use of IV acetaminophen as an adjunct to IV opioids for tonsillectomy with or without adenotonsillectomy in children aged less than 17 years should be considered as a means to reduce the need for rescue analgesia and in turn reduce costs.
• Given 530,000 tonsillectomies done in U.S. per year, this can result in a projected cost-reduction of $5 million per year.

Table 1: Base-Case Probabilities

Table 2: Costs used in the Model

Table 3: Results for Cost-Effectiveness ratios and marginal Cost-Effectiveness ratios