An Analysis Of Intravenous Versus Oral Analgesia On Postoperative Nausea And Vomiting In Children After Cranial Vault Remodeling

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Introduction: Children have a higher incidence of postoperative nausea and vomiting (PONV) compared to adults. NSAIDs and acetaminophen are effective, safe alternatives to narcotics for the treatment of postoperative pain. This study sought to investigate the incidence of PONV after cranial vault remodeling (CVR) using oral ibuprofen and acetaminophen vs. intravenous ketorolac and acetaminophen.

Materials and Methods: 50 consecutive patients (mean age 4.3y; 76% boys, 24% girls) undergoing CVR by the senior author were randomly assigned to either a control group given oral ibuprofen (10mg/kg) and acetaminophen (15mg/kg) or a treatment group given intravenous ketorolac (0.5mg/kg) and acetaminophen (15mg/kg) postoperatively. PONV was blindly assessed every hour for four hours, then every two hours for four hours, then every four hours during the hospital stay. Assessments were performed by reviewing nursing notes and direct patient, parent and nursing interviews. The number of vomiting episodes was recorded, as were episodes of nausea in children whose development permitted verbalization. Data was analyzed using T-Test, Chi-Square and Logistic Regressions analysis using SAS statistical software version 9.4

Results: 28 patients randomized to the control and 22 to the treatment group. There was no statistical difference among the groups with respect to ethnicity, gender, age, history of previous surgery, history of PONV, mean age at the time of surgery, weight, BMI, type of procedure (anterior vs. posterior CVR), EBL, captured cell saver amount, number of other medication doses postoperatively, and length of stay. No patients received narcotics. Although statistically significant differences in length of surgery were noted between groups, there were no differences in total anesthesia time. Statistically significant differences were found in the incidence of POV between the control and treatment groups (71.4% vs. 40.9 % $p < 0.030$), and also with reported postoperative nausea (85.7% vs.30 %, $p < 0.005$). In a multivariate logistic regression, controlling for age, BMI, and type of surgery, the odds ratio for vomiting in the control versus experimental groups was 3.61 (95% CI 1.11-11.76; $p = 0.033$), and for postoperative nausea was 14.0 (95% CI 1.40-71.69, $p = 0.010$). There were no complications in either group.

Conclusion: Intravenous use of ketorolac and acetaminophen postoperatively effectively reduces PONV in children after CVR when compared to oral ibuprofen and acetaminophen.