Tonsillectomy, a common surgery in children, often results in significant morbidity, including pain, nausea and difficulty tolerating oral intake for a few days after the procedure. Opioid analgesic medications have limited efficacy, can worsen nausea and have undesirable side effects such as respiratory depression, sedation and pruritus. Peri-operative acupuncture has been shown to decrease post-operative pain and opioid use in adults. In this randomized blinded controlled trial, we tested if acupuncture performed under general anesthesia could decrease pain and facilitated recovery in children undergoing tonsillectomy.

**Study Design**

59 children, ages 3-12, were randomized to receive verum or sham acupuncture under general anesthesia for tonsillectomy (+/- adenoidectomy and PE tubes). After mask induction, patients were given propofol, 3 mcg/kg of hydromorphone and 0.5 mg/kg of dexmethylasone prior to tracheal intubation. The subjects then received verum or sham acupuncture for 20 minutes. The operating room staff and surgeons were blinded to the acupuncture treatment. Tonsillectomy was performed with bovie cautery at 15 W. General anesthesia was maintained with 50% nitrous oxide and sevoflurane to 1 MAC.

**Hydromorphone boluses** were given intra-operatively to maintain MAPs within 20% of baseline and respiratory rates less than 30. The patients were extubated when awake and additional hydromorphone and ondansetron boluses were administered as needed in the PACU until the patients met criteria for discharge. Adequacy of blinding, post-operative pain scores, opioid medication use, nausea and emesis, side effects such as over-sedation and pruritus, and times to oral intake and meeting criteria for discharge to home were recorded by PACU nurses who were blinded to the acupuncture treatment. A questionnaire (see below) in either English or Spanish was sent home with the patients and families. These questionnaires were completed by the parent or caregiver and returned at the clinic visit on post-operative day 3.

**Results**

There were no significant differences in subject demographics between the two groups. Time in the PACU and narcotic use were not significantly different between the sham and acupuncture groups. There was a statistical difference in pain scores on Day 1 and Day 2 (P=0.01) postoperatively, both by patient as well as parent report. Positive trends were noted in nausea and oral intake in the acupuncture group; however, these did not reach significance. No adverse events were recorded. Blinding of PACU nurses and families was confirmed by questionnaire results.

**Conclusions**

This is a pilot study investigating the feasibility and efficacy of peri-operative acupuncture in pediatric patients undergoing tonsillectomy. This study demonstrates that acupuncture is feasible, well tolerated and results in improved pain scores postoperatively. A major indication for tonsillectomy in pediatric patients is obstructive sleep apnea (OSA). Patients with OSA have a higher risk of respiratory depression with opioid analgesic medications. For this reason, the home analgesic regimen for young children at our institution consists of scheduled doses of ibuprofen and acetaminophen. Intra-operative acupuncture (which is tolerated by even the most needle-phobic children) may be a useful and safe adjunct for reducing pain and nausea, and improving oral intake for the first 2 days after tonsillectomy. Larger studies are needed to confirm these findings.

**References**