

ANESTHESIA ABSTRACTS

PROVIDING THE CLINICAL ANESTHETIST WITH UP-TO-DATE RESOURCES FOR EVIDENCE BASED PRACTICE.



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CE ACUPUNCTURE FOR REDUCING PRURITUS INDUCED BY INTRATHECAL MORPHINE AT ELECTIVE CESAREAN DELIVERY: A PLACEBO-CONTROLLED, RANDOMIZED, DOUBLE-BLIND TRIAL

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Mazda Y, Kikuchi T, Yoshimatsu A, Kato A, Nagashima S, Terui K

Abstract

Purpose The purpose of this study was to determine the effectiveness of acupuncture with press needles at Hegu (LI4), Neiguan (PC6), Quchi (LI11), and Zhigou (SJ6) on both arms in preventing postoperative pruritus after administration of 150 µg intrathecal morphine in patients undergoing elective cesarean delivery.

Background Intrathecal morphine is the most common analgesic administered for postoperative analgesia after cesarean delivery. Unfortunately, it is associated with a dose dependent rate of adverse effects including pruritus, and nausea and vomiting. Pruritus after intrathecal morphine is hypothesized to be caused by activation of 5-HT₃ receptors in the spinal nucleus of the trigeminal nerve and through activation of mu-opioid receptors in itch-specific neurons in the spinothalamic tract of the dorsal horn. Acupuncture at the at Hegu (LI4), Neiguan (PC6), Quchi (LI11), and Zhigou (SJ6) points on both arms has been shown to reduce intrathecal morphine-induced pruritus in elderly patients. It may, therefore, be an effective treatment to prevent pruritus in cesarean section patients. Acupuncture with press needles has a high level of acceptability and may be preferable to traditional acupuncture needles in

pregnant patients. Therefore, the authors hypothesized that acupuncture with press needles would reduce the incidence of intrathecal morphine-induced pruritus in patients undergoing elective cesarean delivery.

Methodology This was a prospective, randomized, double-blind study of 30 parturients undergoing elective cesarean delivery at a single medical center in Japan. Patients were randomized to receive either press needling acupuncture or sham press needles in a control group. Patients had no prior experience with acupuncture. Acupuncture was performed the day prior to surgery by trained acupuncturists who placed press needles or sham needles at the Hegu (LI4), Neiguan (PC6), Quchi (LI11), and Zhigou (SJ6) points on both arms. **[Editor's Note:** "Press needles" are small adhesive patches with a < 2 mm needle protruding from the adhesive side. The adhesive patch is "pressed" onto the skin, inserting the needle, which remains in place until the adhesive patch is removed.]

All patients received either spinal or combined spinal-epidural anesthesia with 12 mg hyperbaric bupivacaine, 10 µg fentanyl, and 150 µg preservative-free morphine. Intraoperatively, patients received droperidol 1.25 mg for nausea, and supplemental

analgesia and sedation as needed. Intravenous acetaminophen 1 g was administered prior to closure. Acetaminophen was repeated every 6 hours for 24 hours. Postoperatively, patients were evaluated at 2, 12, and 24 hours for pruritus and nausea using a standardized questionnaire. Patients received hydroxyzine 25 mg for pruritus and metoclopramide 10 mg for nausea.

The primary outcome was the incidence of pruritus. Secondary outcomes were the incidence of nausea and the severity of pruritus and nausea. The investigators hypothesized that press needle acupuncture would result in a 50% reduction in the incidence of pruritus. Sample size and statistical analysis were appropriate.

Result Thirty patients completed the study, $n = 15$ in each group. Groups were similar on demographic and surgical characteristics. Body mass index was significantly higher in the control group ($P = 0.038$).

No significant differences were found in the rate of postoperative pruritus in the acupuncture vs. control groups. Both groups had a pruritus rate of 67%. Likewise, no differences were found in the severity of pruritus between the groups. The administration of hydroxyzine for itching differed between groups, but was not statistically significant (acupuncture 7% vs. control 20%, $P=0.28$). Likewise, the incidence of postoperative nausea differed between the groups but was not statistically significant (acupuncture 40% vs. control 13%, $P=0.1$). The incidence and severity of

vomiting and the administration of metoclopramide were similar between groups.

Conclusion Acupuncture with press needles at Hegu (LI4), Neiguan (PC6), Quchi (LI11), and Zhigou (SJ6) points on both arms did not reduce the rate of intrathecal morphine-induced pruritus in patients undergoing elective cesarean delivery.

Comment

Pruritus after intrathecal morphine is hypothesized to be caused by activation of 5-hydroxytryptamine subtype 3 (5-HT₃) receptors in the spinal nucleus of the trigeminal nerve in the medulla as well as through activation of mu-opioid receptors in the itch-specific neurons in the spinothalamic tract of the dorsal horn and subsequent release of serotonin. High frequency electrical acupuncture stimulation increases dynorphin, while lower frequency stimulation increases endorphin and enkephalin levels.

Dynorphin inhibits pruritus at the dorsal horn. The authors of this study hypothesized in their discussion that press needles may not generate sufficient stimulation to cause the release of dynorphin, and thus may partially explain the lack of an effect on pruritus incidence. I have no experience with acupuncture, but this theory seems plausible.

It is interesting that acupuncture stimulation at the P6 point did not reduce the incidence of nausea given that stimulation of this points has been shown in other studies to reduce the rate of nausea. In fact, the nausea rate was *higher* in the acupuncture group.

However, these results should be viewed cautiously because the difference was not significant.

This was a very well-designed clinical trial that followed established guidelines for acupuncture studies. The use of sham needles increased the methodological rigor of the study and minimized the risk of bias. Unfortunately, it is rare to see such a rigorous study published on acupuncture. I hope future investigations follow this study's lead.

Dennis Spence PhD, CRNA

Notes:

In Japan 5-HT₃ receptor antagonists are rarely used because they are not covered by national health insurance. Nalbuphine, a first-line treatment for pruritus, is not commercially available in Japan. Pentazocine and naloxone are rarely used to treat pruritus in Japan.

The views expressed in this article are those of the author and do not reflect official policy or position of the Department of the Navy, the Department of Defense, the Uniformed Services University of the Health Sciences, or the United States Government.

CE EFFECT OF ALBUTEROL PREMEDICATION VS PLACEBO ON THE OCCURRENCE OF RESPIRATORY ADVERSE EVENTS IN CHILDREN UNDERGOING TONSILLECTOMIES THE REACT RANDOMIZED CLINICAL TRIAL

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von Ungern-Sternberg BS, Sommerfield D Slevin L, Drake-Brockman TFE, Zhang G, Hall GL

Abstract

Purpose The purpose of this study was to examine the effect of preoperative albuterol on subsequent perioperative respiratory adverse events. The hypothesis was that children who received albuterol before tonsillectomy would have at least 50% fewer adverse respiratory events compared to control children.

Background Tonsillectomy is one of the most commonly performed surgical procedures in children, often related to sleep disordered breathing. Up to 50% of these patients experience adverse airway events such as desaturation < 95%, airway obstruction, laryngospasm, or bronchospasm. Fatal adverse airway events occur twice as frequently in children as in adults. Risk factors for adverse airway events in children include:

- younger age
- obesity
- respiratory infection

Numerous techniques are used in an attempt to prevent adverse airway events in children. Albuterol might be expected to benefit children with asthma and recent or current respiratory infection. Albuterol is also known to inhibit the release of inflammatory mediators which may reduce adverse airway events in addition to producing bronchodilation.

Methodology Children up to eight years old scheduled for tonsillectomy, with or without additional procedures, were included in this triple blinded study. The airway was managed with an LMA in children aged 3-8 years and an ETT in children aged 0-6 years. Children were assessed for obstructive sleep apnea (OSA) during the preanesthetic assessment. They were also specifically assessed for other risk factors of adverse airway events, including:

- respiratory infection within 2 weeks
- wheezing ≥ 3 times in 12 months
- wheezing during exercise
- asthma
- night time dry cough
- eczema
- second hand smoke exposure

Preoperatively, each patient received two puffs from a metered dose inhaler identical in appearance. A spacer was used for each inhalation. The inhaler contained either albuterol 100 μ g / puff or placebo. The study substance was administered 20 minutes before induction. If over one hour elapsed before induction, the same metered dose inhaler was administered again 20 minutes before induction.

Anesthesia was induced with either inhaled sevoflurane or >3 mg/Kg IV propofol. Sevoflurane inhalation inductions most often included nitrous oxide and IV propofol 1-2 mg/Kg as soon as IV access was obtained. After induction was complete by either method, only then was an LMA or ETT

placed. The choice of airway device was made by the clinician managing the anesthetic, not the research protocol. At the completion of the case ETTs were removed either deep or awake. Likewise, LMAs were removed deep in the OR or awake in the PACU. This too was up to the clinician managing the anesthetic.

The primary outcome was the incidence of adverse airway events either during or after the anesthetic. A secondary outcome was the impact of a preoperative diagnosis of OSA on the incidence of adverse airway events. Obstructive sleep apnea was assessed by clinical history, not with polysomnography.

Result Complete data was collected from 479 children; 241 who received albuterol and 238 who received placebo. Their age ranged from 1.6 years to 8.9 years with a median age of 5.6 years. More subjects were boys (59%) than girls. Early in the data collection period local clinical practice changed to using LMAs for all tonsillectomies. As a result, LMAs were used in almost 90% of all study cases. Age, body weight, ASA physical status, type of anesthetic induction, and the number of risk factors had no relation to subsequent adverse airway events.

At least one adverse airway event occurred in 28% of the albuterol group vs. 48% of the control group ($P<0.001$). Taking all adverse airway events into account, control group children were 2.4 times more likely to experience an adverse airway event. Each of the following specific adverse airway events were also less frequent in the albuterol group:

- laryngospasm 5% vs. 12% ($P=0.009$)
- oxygen desaturation 15% vs. 23% ($P=0.03$)
- coughing 11% vs. 33% ($P<0.001$)
- airway obstruction 9% vs. 13% ($P=NS$)

Children in the placebo group who had OSA were up to five times more likely to experience an adverse airway event compared to children who received albuterol. For example, in the placebo group those with severe OSA had an incidence of adverse airway events of 80% vs. 43% in the albuterol group ($P=0.03$).

Conclusion Preoperative albuterol inhalation was associated with a clinically significant reduction in perioperative adverse airway events in children undergoing tonsillectomy with general anesthesia. This benefit was greater in children with a presumptive diagnosis of obstructive sleep apnea.

Comment Pediatric tonsillectomies are an extremely common procedure for which we provide an anesthetic. With most common surgical procedures, we continuously refine our anesthetic in an attempt to provide the absolute safest and most effective care possible. For that reason, I began reading this article with much enthusiasm as it has great potential to directly impact my clinical practice. The authors state there was a local practice change and all airways began being managed via LMAs. My focus immediately shifted from the impact of albuterol on adverse airway events to the risk vs. benefit profile of an LMA over ETT for pediatric tonsillectomies. To date, I have never placed an LMA for a tonsillectomy. Securing the airway during tonsillectomy via ETT provides the following benefits:

- Prevents blood and secretion aspiration via a tracheal seal.
- Lowers risk of airway fire via high-concentration oxygen containment.

- Optimizes surgical environment via low-profile seat on base of tongue.
- Decreased OR pollution via containment of volatile anesthetic gases.

LMAs and ETTs provide different airway management functions and accordingly have different airway safety profiles. The aim of the study focused on adverse airway events, yet the research protocol failed to control the type of airway used. It is unlikely the results of the study were not directly impacted by the change in clinical practice.

With that being said, the control group's adverse airway events correlate with what I see in clinical practice. I've yet to preoperatively treat with albuterol so I have no clinical experience with the study group's results. However, I feel confident appropriately-timed preoperative albuterol decreases the incidence of adverse airway events and I will be implementing it in my practice. The best approach will most likely be to familiarize the preoperative staff with the importance of albuterol treatment pre-tonsillectomy as their involvement will be of the utmost importance. Albuterol is inexpensive, accessible, and has minimal side-effects when used in the appropriate surgical population. In my opinion, preoperative albuterol treatment in the 0-8 year old tonsillectomy population offers significant potential benefit with minimal barriers to clinical use.

Ken Taylor, DNP, CRNA

CE A COMPARATIVE STUDY TO EVALUATE ULTRASOUND-GUIDED TRANSVERSUS ABDOMINIS PLANE BLOCK VERSUS ILIOINGUINAL ILIOHYPOGASTRIC NERVE BLOCK FOR POST-OPERATIVE ANALGESIA IN ADULT PATIENTS UNDERGOING INGUINAL HERNIA REPAIR

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Kamal K, Jain P, Bansal T, Ahlawat G

Abstract

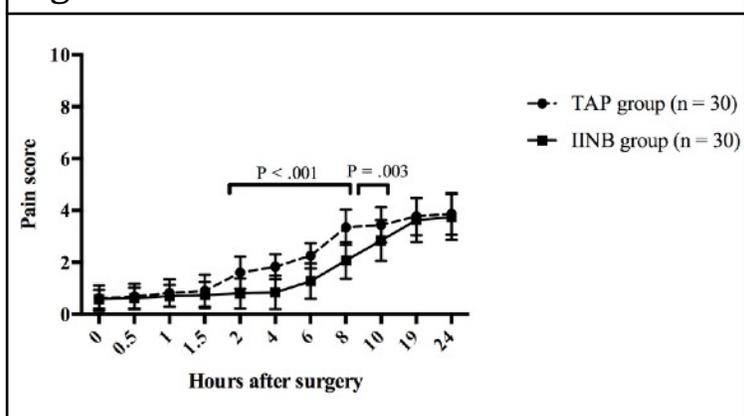
Purpose The purpose of this study was to compare the efficacy of ultrasound-guided ilioinguinal iliohypogastric nerve block (IINB) to transverse abdominus plane block (TAP) in patients undergoing open inguinal hernia repair.

Background One of the most common surgical procedures is an inguinal hernia repair. Persistent postsurgical pain occurs in up to 43% of inguinal hernia repair patients. Various techniques have been used to minimize postoperative pain, including pharmacologic and non-pharmacologic techniques, and local infiltration and nerve blocks such as TAP and IINB. Unfortunately, blind placement of an IINB has a failure rate of 20-30%. Ultrasound-guided TAP blocks have been shown to be effective in reducing postoperative pain and opioid consumption after inguinal hernia repair; however, head-to-head comparisons of ultrasound-guided IINB with TAP have produced conflicting results. The authors of this study compared these two blocks in adult patients undergoing open inguinal hernia repair.

Methodology This was a prospective, randomized, single-blind study of 60 ASA I and II adult patients,

aged 18 to 60 years undergoing open inguinal hernia repair. A standard anesthetic and postoperative pain regimen were used in all subjects. After induction and intubation an ultrasound-guided TAP block (n = 30) or IINB (n = 30) was performed. For the TAP block, 0.75% ropivacaine (3 mg/Kg) to a maximum 25 mL was administered. In the IINB group, 10 mL 0.75% ropivacaine was injected. A SonoSite M-Turbo ultrasound machine with high frequency 38 x 13-6 MHz 40 mm broadband linear array probe was used for both blocks. Subjects received tramadol 2 mg/Kg IV if pain scores on a visual analogue scale (VAS) were ≥ 4 in the first four hours after surgery. For persistent pain ≥ 4 , diclofenac 75 mg IV was administered. After four hours, patients were administered oral diclofenac 75 mg for pain ≥ 4 . Ondansetron 4 mg IV was given for post-operative nausea and vomiting.

The primary outcome was total analgesic consumption in the first 24 hours. Secondary outcomes included time to first analgesic requirement, and pain scores, which were measured at 0, 0.5, 1, 1.5, 2, 4, 6, 8, 10, 19, and 24 hours after surgery. The investigators did not report if the individual collecting postoperative data was blinded to group assignment.

Figure 1. Pain Scores

Statistical analysis was appropriate. A P value < 0.05 was significant.

Result No significant difference was found in baseline demographics (age, height, or weight). The TAP block was slightly faster to perform; mean time for the TAP block was 3.5 min compared to 4.7 min in the IINB group ($P < 0.001$). The mean number of attempts to perform both the TAP block and IINB was slightly more than 1.

Postoperative pain scores were significantly lower in the IINB group between 2 h and 10 h after surgery ($P < 0.05$; Figure 1). No significant differences were found at any other time points. The mean time to first analgesic request was 408 min in the TAP group and 320 in the IINB group ($P = 0.005$). During the first 4 hours after surgery 23% of patients in the TAP block group required tramadol compared to only 7% in the IINB group ($P = \text{NS}$). No patients required IV diclofenac. The mean oral diclofenac administered was 200 mg in the TAP block group and 173 mg in the IINB group ($P = 0.004$). Two patients in the IINB developed a postoperative hematoma compared to

none in the TAP block group. Two patients in the TAP block group who received tramadol experienced postoperative nausea.

Conclusion An ultrasound-guided ilioinguinal iliohypogastric nerve block resulted in statistically significantly lower postoperative analgesic requirements after open inguinal hernia repair compared to an ultrasound-guided transverse abdominus plane block.

Comment

This study demonstrated that an ultrasound-guided ilioinguinal iliohypogastric nerve block offered statistically better pain control between 2 h and 10 h and lower 24 h analgesic requirements compared to a transverse abdominus plane block in adults undergoing open inguinal hernia repair. However, the differences in pain scores were not clinically significant. For the most part, the pain scores only differed by 1 point. Likewise, I am not sure a 27 mg difference in oral diclofenac is a clinically significant difference. However, if you combine that with the higher rate of IV tramadol administration in the

transverse abdominus plane block group, then the results may be clinically significant.

The results of this study are only relevant to open inguinal hernia repair surgery. In the USA most inguinal hernia repairs are performed laparoscopically. So, it may be difficult to gain enough experience to become proficient in performing an ultrasound-guided ilioinguinal iliohypogastric nerve block. Anesthesia professionals wishing to learn how to perform this block should work with an experienced provider to gain experience.

Dennis Spence PhD, CRNA

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