RESEARCH ARTICLE / Araştırma Makalesi

Çocuk Hastalarda İlioinguinal/İliohipogastrik Sinir Bloğunda Bupivakain Ve Levobupivakainin Postoperatif Ağriya Etkilerinin Karşilaştirilmasi: Retrospektif Çalişma

Comparison Of Bupivacaine And Levobupivacaine On Postoperative Pain After Ilioinguinal/Iliohypogastric Nerve Block In Pediatric Patients: A Retrospective Study

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Geliş Tarihi / Received : **04.07.2017**
Kabul Tarihi / Accepted : **12.08.2017**

Abstract

Objective Ilioinguinal/iliohypogastric (II/IH) nerve block added to general anesthesia is frequently used for postoperative analgesia in pediatric patients. We aimed to compare the postoperative analgesic effects of bupivacaine and levobupivacaine for II/IH nerve block for inguinal hernia repair in pediatric patients, which is not investigated previously.

Materials and Methods: In this 2-year retrospective study, data were collected from the medical charts of patients that underwent unilateral inguinal hernia repair. Patients were included who received an II/IH nerve block with 0.2 mL/kg 0.5% of either bupivacaine (Group B) or levobupivacaine (Group L). Non-elective cases, age under 2 years and patients with multiple procedures were excluded. Demographic properties of the patients (age, weight, and sex), duration and side of surgery, pain scores, additional analgesic requirement and complications were documented. The chi-square test and the Mann-Whitney U test were used for statistical analysis

Results: In both groups, the pain scores were not significantly different at post anesthesia care unit, 1, 2, 6 and 24th hours; nevertheless, the pain scores at 4th hour were significantly lower in Group L.

Conclusion: II/IH nerve block added to general anesthesia is effective in inguinal region surgery of pediatric patients in postoperative pain control, and 0.5% levobupivacaine and bupivacaine had similar analgesic effect. **(Sakarya Med J 2017, 7(3):120-124)**

Keywords: Bupivacaine, levobupivacaine, pediatric anesthesia, ilioinguinal/iliohypogastric nerve block, postoperative pain

Özet

Amaç: Genel anesteziye eklenen ilioinguinal/iliohipogastrik (İİ/İH) sinir bloğu pediyatrik hastalarda postoperatif analjezi için sıklıkla kullanılmaktadır. Daha önce araştırılmadığından dolayı, pediyatrik hastalarda inguinal herni onarımı için İİ/İH sinir bloğunda uygulanan bupivakain ve levobupivakainin postoperatif analjezik etkilerini karşılaştırmayı amaçladık

Gereç ve Yöntem: Bu 2 yıllık retrospektif çalışmada, veriler tek taraflı kasık fıtığı ameliyatı yapılan hastaların tıbbi kayıtlarından elde edildi. 0.2 mL/kg %0.5 bupivakain (Grup B) veya levobupivakain (Grup L) ile İİ/İH sinir bloğu uygulanan hastalar alındı. Elektif olmayanlar, 2 yaş altı hastalar ve birden fazla cerrahi prosedür içerenler çalışma dışı bırakıldı. Hastaların demografik özellikleri (yaş, kilo ve cinsiyet), cerrahi süre ve taraf, ağrı skorları, ek analjezik gereksinimi ve komplikasyonlar kayıt altına alındı. İstatistiksel analiz için Ki-kare testi ve Mann-Whitney U testi kullanıldı.

Bulgular: Her iki gruptaki ağrı skorları post-anestezi bakım ünitesinde, 1, 2, 6 ve 24. saatlerde farklı değildi. Bununla birlikte, 4. saatteki ağrı skorları Grup L'de anlamlı derecede düşüktü.

Sonuçlar: Genel anesteziye eklenen İİ/İH sinir bloğu, postoperatif ağrı kontrolünde pediyatrik hastaların inguinal bölge cerrahisinde etkilidir ve %0.5 levobupivakain ve bupivakainin benzer analjezik etkisi vardır. **(Sakarya Tıp Dergisi 2017,7(3):120-124).**

Anahtar Kelimeler: Bupivakain, levobupivakain, pediyatrik anestezi, ilioinguinal/iliohipogastrik sinir bloğu, postoperatif ağrı

Introduction

Perioperative pain control provides early mobilization and earlier discharge through enabling a painless postoperative period. In pediatric surgeries, caudal and lumbar epidural block, ilioinguinal/iliohypogastric (II/IH) and penile nerve block are used most frequently for postoperative pain control.[1] II/IH nerve block applying in pediatric surgical procedures, such as inguinal hernia repair, hydrocelectomy and orchidopexy and providing adequate analgesic efficacy is a regional anesthetic technique.[2]

Bupivacaine is a local anesthetic which is commonly used for II/IH nerve block in pediatric patients.[3,4] Levobupivacaine, S (-) enantiomer of bupivacaine, was reported to have less toxicity on cardiac and central nervous system, besides having a similar analgesic effect with bupivacaine.[5,6] Due to these properties, levobupivacaine usage may be safer in pediatric patients.[2,6-9]

We did not find a study that comparing the analgesic effects of II/IH nerve block with 0.5% levobupivacaine or 0.5% bupivacaine in pediatric patients. Therefore, the purpose of this retrospective study was to compare the postoperative analgesic effects of II/IH nerve block with bupivacaine or levobupivacaine for inguinal hernia repair in pediatric patients.

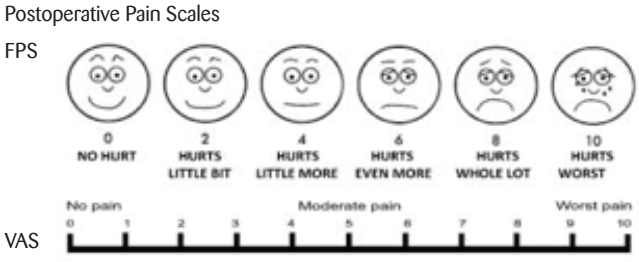
Materials and Methods

We performed a retrospective study comparing the postoperative analgesic effects in pediatric patients who have received an II/IH nerve block with bupivacaine or levobupivacaine for inguinal hernia repair surgery. After approval from Local Ethics Committee, data were collected from the medical charts that focus on postoperative analgesia records. We analyzed 77 patients' charts who underwent right or left side inguinal hernia repair that was performed by the same surgeon in the period of January 2012 to December 2013. Patients were included who received an II/IH nerve block with 0.2 mL/kg 0.5% of either bupivacaine (Group B) or levobupivacaine (Group L) in addition to general anesthesia and were American Society of Anesthesiologists (ASA) class 1 or 2. Data from non-elective cases, age under 2 years and patients with multiple procedures were excluded.

Demographic properties of the patients (age, weight, sex), duration and side of surgery were recorded.

Ilioinguinal/iliohypogastric nerve block was performed by one same surgeon under direct vision on surgical area during the surgery. Pain scores were obtained from postoperative analgesia recording form. Postoperative pain was measured by a face pain scale for preschoolers and visual analog scale (VAS) for older children (0: no pain, 10: worst pain) at six times, including post anesthesia care unit (PACU), 1, 2, 4, 6, and 24th hours after surgery (Figure 1), and these scores were documented on postoperative analgesia recording form. When VAS was 4 or higher, the patient received 1 mg/kg intravenous tramadol as an additional analgesic. However, additional analgesic requirements and complications such as local anesthetic toxicity, allergy, and hematoma or tissue edema were also recorded.

Figure 1: The evaluation of postoperative pain score.
(FPS: Face pain scale, VAS: Visual analog scale)



Statistical Analysis

Statistical analyses were performed using SPSS for Windows, version 16.0 (SPSS Inc., Chicago, IL, USA). Results were expressed as mean±standard deviation (SD), range or n where appropriate. The chi-square test was used for inter-group comparisons of parameters that showed a normal distribution and the Mann-Whitney U test was used for inter-group comparisons of parameters that did not show a normal distribution. A p value less than 0.05 was considered as statistically significant.

Results

There were no differences in age, sex, weight, ASA physical status, duration and side of surgery between the two groups (Table 1).

The pain assessment were not significantly different at PACU, 1, 2, 6 and 24th hours (Table 2). However, the pain scores at 4th hour were significantly lower in Group L (p = 0.023).

When the groups were compared in terms of additional analgesic requirement, there were no significant difference (Table 1).

Table 1. Patient characteristics, duration and side of surgery and additional analgesic administration

	Group B (n=31)	Goup L (n=46)	P value
Age (years)	5.2±2.71	4.7±3.50	NS
Weight (kg)	18.7±6.53	18.7±9.13	NS
Sex (F/M) (n)	4/27	8/38	NS
ASA (I/II) (n)	26/5	38/8	NS
Duration of surgery (min)	12.8±4.68	13.6±4.72	NS
Side of surgery (Right/Left) (n)	20/11	26/20	NS
Additional analgesic requirement (n)	15/31	19/46	NS

Data aremean±standard deviation or n

ASA: American Society of Anesthesiologists; NS:not significant

Table 2. Pain scores of the groups

Postoperative	Group B (n=31)	Goup L (n=46)	P value
At postanesthesia care unit	0.3±0.87	0.8±1.54	0.183
1. hour	0.6±1.26	0.5±0.98	0.983
2. hours	0.3±1.04	0.1±0.49	0.569
4. hours	0.5±0.99	0.1±0.70*	0.023
6. hours	0.3±0.91	0.2±0.91	0.528
24. hours	0.2±0.86	0.1±0.65	0.184

*P<0.05 versus Group B. Bold P value is significant. Data are mean±standard deviation.

None of the children in both groups suffered from local anesthetic toxicity, allergy, and hematoma or tissue edema.

Discussion

We demonstrated that 0,5% levobupivacaine and 0,5% bupivacaine have similar analgesic effects at the assessment of PACU,1, 2, 6, and 24th hours after the unilateral inguinal hernia surgery. Additionally, we found that levobupivacaine was more effective than bupivacaine at the 4th hour.

Levobupivacaine, is a long-acting local anesthetic with a low systemic and cardiac toxicity profile.[10] Levobupivacaine also has a number of other properties, which may be useful in pediatric anesthesia. The lower lipid solubility and greater intrinsic vasoactivity of the S-enantiomers also has the potential to produce differential neural blockade with less motor block and more prolonged postoperative analgesia.[11,12]

In the literature, bupivacaine and levobupivacaine were reported to be used in different concentrations and volumes for II/IH nerve block in pediatric patients.[2-4,6,13-18] In these studies, while bupivacaine was applied in 0.5% concentration and 2 mg/kg and 0.3 mL/kg dose;[4,13] in 0.25% concentration and 0.1-0.25-0.3 ml/kg and 0.75 mg/kg dose;[3,14-16] levobupivacaine was applied in 0.5% concentration and 0.25-0.4 mL/kg;6,17 in 0.25 concentration and 0.1-0.4 mL/kg and 0.375% and 0.125% concentration and 0.4 mL/kg doses.[2,18] In our study, we included the cases in whom bupivacaine and levobupivacaine were used in 0.5% concentration and 0.2 mL/kg dose.

Gunter et al.[6] performed the first clinical study with 0.5% levobupivacaine for ilioinguinal block in children and reported that it is an effective agent for postoperative analgesia in ilioinguinal block when compared to placebo. In another study which compares 3 different doses of levobupivacaine for II/IH nerve block for inguinal hernia repair and reported that 0.25% levobupivacaine was better than 0.125%, similar with 0.375% for providing a sufficient postoperative pain control.[2] In addition, peak plasma concentrations, time to reach the peak plasma concentration and distribution half-life of bupivacaine and levobupivacaine were found similar in a study comparing the pharmacokinetic properties of 2 mg/kg 0.5% levobupivacaine or bupivacaine in II/IH nerve block in children.17 However we did not encounter a study comparing the analgesic effects of 0.5% levobupivacaine and 0.5% bupivacaine in II/IH nerve block in children. In the present study, we concluded that in equal doses of levobupivacaine or bupivacaine had similar analgesic effect in postoperative analgesia.

The main limitations of our study includes its retrospective design and small number of patient's sampled.

In conclusion, we consider that II/IH nerve block added to general anesthesia is effective in inguinal region surgery of pediatric patients in postoperative pain control, and similar analgesic effect with 0.5% bupivacaine could be obtained by 0.5% levobupivacaine.

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