Anaesthesist 2010 · 59:709–713
DOI 10.1007/s00101-010-1755-1
Received: 9. Februar 2010
Revised: 10. Mai 2010
Accepted: 28. Mai 2010
Online publiziert: 30. Juli 2010

Z. Kazak · P. Ekmekci · K. Kazbek
Department of Anaesthesiology and Reanimation, Faculty of Medicine, Ufuk University, Ankara, Balgat-Ankara

Hyperbaric levobupivacaine in anal surgery

Spinal perianal and spinal saddle blocks

In ambulatory anal surgical procedures the first voiding time, the time to first analgesic requirement and the time of discharge from hospital are very important factors. Perianal and saddle blocks are being utilized more frequently for these procedures. Local anesthetic agents at lower doses were used previously and proved to be a satisfactory method in minor anal surgery [1]. Wassef et al. reported in a previous study that a very low dose of spinal bupivacaine can be used successfully for short perianal surgery [2]. Levobupivacaine has also been used as an alternative for bupivacaine in spinal anesthesia [3, 4] and is a promising local anesthetic agent to replace bupivacaine. The aim of this study was to determine the efficacy of perianal or saddle block by using two different doses of levobupivacaine by means of reliability, satisfaction of anesthesia, voiding time and the hospital stay in anal surgery.

Methods

Ethical committee approval of Ufuk University Medical School and written informed consent of the patients were obtained for this prospective, double-blinded and randomized study. A total of 78 adult patients undergoing elective perianal surgery (ASA classification of I–II, aged between 30–75 years, height over 150 cm and weight between 50–100 kg) were included in this study. Patients older than 75 years, morbid obesity, bleeding disorders and contraindications for spinal anesthesia or a known history of allergic reactions to amide local anesthetics were not included. Following arrival in the block room an intravenous route was established with a 20-gauge cannula at the dorsum of the left hand. All patients were premedicated intravenously with 0.5 mg atropine sulphate and 0.05 mg/kg midazolam 30 min before the planned operation.

Continuous monitoring of electrocardiogram (ECG), non-invasive arterial pressure and pulse oxymetry was carried out. The patients were randomized into two groups using a computer generated sequence of numbers and a sealed envelope technique. The first group received 6 mg of 0.5% hyperbaric levobupivacaine (saddle group n=39) and the second group received 1.5 mg of 0.5% hyperbaric levobupivacaine (perinanal group n=39). Dural puncture was performed with the midline approach at the L4–5 intervertebral space using a 25-gauge Whitacre spinal needle with the patient in the seated position. Correct needle positioning was confirmed with free flow of cerebrospinal fluid and hyperbaric levobupivacaine (1.5 mg or 6 mg) was injected intrathecally. The same surgeon performed all operations.

Each of the patients in the study received hyperbaric levobupivacaine (Chirocaine: levobupivacaine hydrochloride 5 mg/ml, Abbott Laboratories, UK) in group perianal 1.5 mg levobupivacaine 0.3 ml with 2 ml of glucose 30 mg/ml (concentration 0.26%) and in group saddle 6 mg levobupivacaine 1.2 ml with 2 ml of glucose 30 mg/ml (concentration 0.18%).

Solutions used in the study were prepared by one of the authors and the syringe containing levobupivacaine was taped with a sterile bandage to leave only the first 2 ml of the syringe section visible. The sterile solutions were aseptically prepared immediately before injection by a blinded anesthesiologist and administered by a blinded author (K.K). Clinical follow-up of the patients was also performed by a blinded investigator (Z.K).

In both groups patients were kept in the seated position until sufficient block was established. Following intrathecal administration of the study drug the patient was seated on a horseshoe-shaped hard pillow approximately 10 cm high, leaving the anal region available for sensory testing. Sensory block was evaluated at 1 min intervals by using a surgical toothless clamp until the satisfactory block had reached the S4 level and the motor block was evaluated by a 4-point modified Bromage scale (0: no motor block, 1: inability to raise extended legs, 2: inability to flex knees and 3: inability to flex ankle joints).

As a hyperbaric solution was used patients were kept in the sitting position

Tab. 1 Demographic data (mean values ± standard deviation), anesthesia and operation times, surgical data

	Saddle group (n=39)	Perianal group (n=39)	p
Age (years)	39±15	37±10	0.710
Height (cm)	168±8	171±8	0.285
Weight (kg)	71±13	78±10	0.073
Gender (female/male)	18/21	22/17	0.497
Duration of surgery (min)	34±13	32.6±14.5	0.754
Surgical procedure (n)			
Pilonidal sinus excision	8	6	>0.05
Hemorrhoidectomy	17	16	
Anal fissure	6	8	
Anal polypectomy	5	7	
Perianal abscess drainage	3	2	
Surgical posture			
Jack-knife position (n)	36	35	>0.05
Lithotomy position (n)	3	4	

Tab. 2 Block characteristics and postanesthesia care unit variables

	Saddle group (n=39)		Perianal group (n=39)		p
Aided patient positioning	**n**	**%**	**n**	**%**	
	0	0	39	100	<0.001
	Median	**Range**	**Median**	**Range**	
Block onset time (min)	5	2–10	5	3–15	0.122
Maximum blocked dermatome					
Preoperative	S2	L4–S2	S4	S3–S4	0.015
Postoperative	S1	L3–S2	S4	S3–S4	0.009
Bromage score					
Preoperative	1	1–3	0	–	0.002
Postoperative	2	2–3	0	–	0.002
Motor block regression time (min)	100	80–126	0	0–6	0.006
Onset of anaesthesia at S4 dermatome (min)	4	3–10	5	4–15	0.040
Duration of sensory block at S4 dermatome (min)	145	100–160	115	53–140	0.048
Time to first analgesic requirement (min)	150	60–260	120	40–280	0.032
Time to ambulation (min)	145	115–164	101	78–126	0.017
Time to readiness for discharge (min)	182	134–205	112	95–131	0.032
Time to voiding (min)	207.5	145–290	140	45–430	0.008

Times are recorded starting from the intrathecal injection.
Preoperative: before surgery.Postoperative: on termination of surgery.

for at least 20 min in order to restrict the spread of local anesthetic to the surgical area and block was evaluated at this time.

Patient satisfaction was evaluated with a 5-point Likert score (1: completely comfortable, 2: quite comfortable, 3: slight discomfort, 4: painful and 5: very painful). Satisfaction scores of the surgeon were recorded as 1: unsatisfactory, 2: satisfactory and 3: excellent for each patient.

Time to ambulation, time to first analgesic requirement, first voiding time and time to discharge were assessed. Patients who did not need assistance for voiding and ambulation were considered to be ready for discharge. Lornoxicam 8 mg IV was used for rescue analgesia. Patients were contacted the following day to assess the presence of complications including backache and headache.

Group sample sizes of 39 achieve 90% power to detect a difference of 2 dermatomes between the groups with a significance level (α) of 0.05 using a 2-sided Mann-Whitney test assuming that the actual distribution is normal. Power analysis was performed using NSCC PASS 2007 software [2]. Statistical analysis was performed using SPSS for Windows 15.0. Data were presented as mean ± standard deviation, median (minimum-maximum) or frequencies as appropriate. Parametric data were analyzed using Student's *t*-test and the χ^2test was used for analyzing categorical variables. Non-parametric variables were analyzed by Mann-Whitney test. Significance level was stated at values $p<0.05$.

Results

Both groups were similar in respect to demographic data (**Tab. 1**). No significant hemodynamic changes, bradycardia or treatment requiring hypotension were observed in any of the patients.

All blocks were successful in both groups. There was no discernible motor block (Bromage score =0, p=0.006) and sensory block was limited to the S4 dermatome in the low-dose levobupivacaine perianal block group.

Surgical anesthesia was adequate and satisfactory during the operations in both groups. Duration of sensory block at S4 dermatome was significantly shorter in the perianal block group compared to the saddle block group (**Tab. 2,** p=0.048). All patients in the perianal block group were able to position themselves while in the saddle group none of patients could (**Tab. 2**). The maximum spread of sensory block was at L3 level in one patient and spread of the sensory block did not change in any of the patients after 20 min (**Tab. 2**).

Time to first analgesic requirement was significantly longer in the saddle block group (150 min versus 120 min, $p<0.05$; **Tab. 2**). Time to ambulation (101 min versus 145 min, $p<0.05$), voiding time (140 min versus 207 min, $p<0.05$) and hospital stay time (112 min versus 182 min, $p<0.05$) were significantly shorter in the perianal block group (**Tab. 2**).

Although both patient groups expressed high levels of satisfaction, it was slightly less in the saddle group. This was caused by a transient and minor numbness of the foot but none of the patients complained about headache or backache. None of the patients in both groups showed any significant discomfort related to surgical manipulation and most of

Abstract · Zusammenfassung

Anaesthesist 2010 · 59:709–713 DOI 10.1007/s00101-010-1755-1

Z. Kazak · P. Ekmekci · K. Kazbek

Hyperbaric levobupivacaine in anal surgery. Spinal perianal and spinal saddle blocks

Abstract

Background. An ideal anesthetic technique for anal surgery on an outpatient basis should permit early mobilization without pain or residual complications of anesthesia. The aim of this study was to analyze the reliability and efficacy of spinal perianal and spinal saddle block by using two different doses of levobupivacaine for perianal surgery and their effects on voiding, first analgesic requirement and hospital discharge times.

Methods. A prospective, randomized, double-blinded study was conducted on 78 ASA I-II patients scheduled for elective perianal surgery. Patients were randomized into two groups, the spinal perianal group and the spinal saddle group. Hyperbaric levobupivacaine 1.5 mg (perianal) or 6 mg (saddle) was administered intrathecally through the L4–5 intervertebral space by a 25-gauge Whitacre spinal needle with the patient in the sitting position. Sensory block was evaluated using a surgical toothless clamp until satisfactory block reached the S4 sensory level and motor block was evaluated using a modified Bromage scale. Patient and surgeon satisfaction were recorded for each patient. Ambulation, voiding and hospital discharge times were assessed.

Results. There was no statistical difference between the two groups demographically. Perianal low dose levobupivacaine use resulted in no motor block (Bromage=0, p=0.006) and a sensory block limited to the S4 level. The low and conventional doses of levobupivacaine provided sufficient anesthesia during the surgical procedures. The sensory block regression time in the perianal block group was shorter than the saddle group (p=0.048). Time to first analgesic requirement was significantly longer in the saddle block group (p<0.05). The times of first ambulation, the first voiding and hospital discharge in patients with the perianal block were significantly shorter than patients in the saddle block (p<0.05, p<0.01, p<0.05, respectively).

Conclusion. The results of the study showed that the use of 1.5 mg hyperbaric levobupivacaine provides sufficient and satisfactory anesthesia in ambulatory perianal surgery.

Keywords

Hyperbaric levobupivacaine · Anal Surgery · Spinal perianal · Spinal saddle block

Hypobares Levobupivacain in der Analchirurgie. Spinaler perianaler und spinaler Sattelblock

Zusammenfassung

Hintergrund. Die ideale Anästhesie in der ambulanten Analchirurgie soll dem Patienten die frühe Mobilisierung ohne Schmerzen oder unerwünschte Nachwirkungen der Anästhesie ermöglichen. Ziel dieser Studie war es, die Zuverlässigkeit und Wirksamkeit des spinalen perianalen und des spinalen Sattelblocks unter der Anwendung von 2 Levobupivacaindosierungen sowie deren Einfluss auf Entleerung, ersten analgetischen Bedarf und Entlassungszeiten zu analysieren.

Methode. Eine prospektive, randomisierte Doppelblindstudie wurde mit 78 Patienten des Status I–II in der Klassifikation der American Society of Anesthesiologists (ASA), die sich einer elektiven Perianaloperation unterziehen mussten, durchgeführt. Die Patienten wurden in 2 Gruppen randomisiert: Perianalgruppe und Sattelgruppe. Mithilfe einer 25-G-Whitacre-Injektionskanüle wurde den sitzenden Patienten hyperbares Levobupivacain (1,5 mg perianaler oder 6 mg Sattelblock) durch das Spatium intervertebralis bei L4–5 intrathekal infundiert. Die sensorische Blockade wurde mithilfe einer chirurgischen zahnlosen Klemme überprüft, bis eine ausreichende Wirkung in der S4-Ebene erreicht war; der motorische Block wurde mit einem modifizierten Bromage-Scale evaluiert. Die Zufriedenheit von Patient und Chirurg wurde für jeden Fall dokumentiert. Mobilisations-, Entleerungs- und Entlassungszeiten wurden erfasst.

Ergebnisse. Es fanden sich keine statistischen demografischen Unterschiede zwischen den beiden Gruppen. Die Applikation von niedrig dosiertem Levobupivacain resultierte in der Perianalgruppe in keinem motorischen Block (Bromage=0, p=0,006) und in einem sensorischen Block, der auf die S4-Ebene begrenzt war. Durch die niedrigen und konventionellen Dosierungen von Levobupivacain wurde während der Operationen eine ausreichende Anästhesie erreicht. Die Regressionszeit des sensorischen Blocks war in der Perianalgruppe kürzer als in der Sattelgruppe (p<0,05). Erste Mobilisierungszeit, erste Entleerungszeit und Entlassungszeiten waren signifikant kürzer bei Patienten der Perianalgruppe als bei Patienten der Sattelgruppe (p<0,05, p<0,01 resp. <0,05).

Schlussfolgerung. Die Ergebnisse dieser Studie zeigen, dass die Applikation von 1,5 mg hyperbarem Levobupivacain in einer ausreichenden und zufriedenstellenden Anästhesie für ambulante perianale Operationen resultiert.

Schlüsselwörter

Hyperbare Levobupivacain · Analchirurgie · Spinalperianalblock · Spinalsattelblock

Tab. 3 Surgeon and patient satisfaction

	Saddle group (n=39)		Perianal group (n=39)		p
	n	%	n	%	
Surgeon satisfaction					
Excellent	39	100	39	100	1
Patient satisfaction					
Completely comfortable	28	71.8	29	74.4	0.241
Quite comfortable	9	23.1	10	25.6	
Slight discomfort	2	5.1	0	0	
Painful	0	0	0	0	
Very painful	0	0	0	0	

Patient satisfaction was evaluated using the Likert scale.

them expressed complete overall satisfaction (◘ **Tab. 3**).

Discussion

The aim of this study was to analyze the reliability and efficacy of the neuraxial spinal blocks using two different doses of levobupivacaine and their effects on the voiding time, the first analgesic requirement time and the hospital discharge time for perianal surgery. This study showed that a low dose of intrathecal hyperbaric levobupivacaine is sufficient for minor anal surgical procedures.

Spinal anesthesia is widely used in a variety of surgical procedures involving the lower extremities or lower abdominal area. Data concerning the use of spinal perianal block in minor perianal surgery are limited [2]. Wassef et al. used bupivacaine in a study designed to evaluate the efficacy of low doses of local anesthetics in minor anal procedures [2].The spinal perianal technique serves to limit the levobupivacaine bolus to the distal end of the dural sac. In order to obtain the selective S4 dermatome blockade for surgery, maintaining the seated position is very important.

There were several studies in which local anesthetics effected the specific nerve roots responsible for innervation of the surgical field of interest [5, 6]. In the perianal block group, blockade was limited to the caudal spinal nerve roots (S4-coccygeal). Thus, there was no motor or sensory blockade of the lower extremities which was the primary outcome and the patients were able to ambulate and void earlier, factors which made earlier discharge possible which was the secondary outcome. The effects of low dose bupivacaine have been investigated in many studies but there is not enough knowledge about the use of low dose hyperbaric levobupivacaine in spinal perianal or spinal saddle block [2, 5, 6, 7, 8, 9].

Levobupivacaine is a local anesthetic which seems to be a rational alternative to bupivacaine due to its significantly low cardiovascular [10, 11] and central nervous system [12] toxicity.

The comments on the incidence of motor block following intrathecal levobupivacaine administration versus bupivacaine are contradictory. Cuvas et al. used 5 mg plain bupivacaine and levobupivacaine in spinal anesthesia for minor anal surgery and reported that both regimens were effective and safe. They also reported that usage of levobupivacaine caused less motor block [1], whereas Luck et al. administered 15 mg each of hyperbaric ropivacaine, levobupivacaine and bupivacaine and reported that ropivacaine was the only agent which caused less motor block [13]. It has also been reported that despite being marketed in approximately the same concentrations, levobupivacaine contains 12.6% more active drug than those of racemic bupivacaine because of a change in the regulations before drug labeling [14]. In this study the only agent used was hyperbaric levobupivacaine in high and low doses (6 and 1.5 mg, respectively).

Therefore it can only be stated that a relatively higher dose of levobupivacaine may be expected to result in a more extensive motor block. However when 1.5 mg hyperbaric levobupivacaine was used the results were both satisfactory and associated with no motor block.

In a previous study Wassef et al. concluded that restriction of the blockade to the area desired, earlier ambulation and voiding made this dosage preferable for anesthesia in such procedures [2]. In the current study it was demonstrated that lower doses of levobupivacaine provided safe and efficient anesthesia, early ambulation and voiding time and earlier discharge.

Additionally adequate anesthesia, analgesia as well as surgeon and patient comfort were reported for all patients and there were no complications during anesthesia and surgery. None of the patients sustained inconveniences with respect to surgery and all found the spinal perianal block completely acceptable. In this study the use of low dose levobupivacaine in perianal and saddle blocks produced favorable results.

Conclusion

Absence of motor block, shorter duration and faster regression of sensory block in the perianal block group as a result of intrathecal 1.5 mg hyperbaric levobupivacaine has provided an advantage in terms of shorter hospital stay which is a major point of interest in outpatient surgery.

Corresponding address

Z. Kazak
Department of Anaesthesiology and Reanimation, Faculty of Medicine, Ufuk University, Ankara
Mevlana Bulvarı (Konya Yolu) No: 86–88, 06520 Balgat-Ankara
Türkei
kazakzuleyha@yahoo.com

Conflict of interest. The corresponding author states that there are no conflicts of interest.

Literatur

1. Cuvas O, Gulec H, Karaaslan M, Basar H (2009) The use of low dose plain solutions of local anaesthetic agents for spinal anaesthesia in the prone position: bupivacaine compared with levobupivacaine. Anaesthesia 64:14–18
2. Wassef MR, Michaels EI, Rangel JM, Tsyrlin AT (2007) Spinal perianal block: a prospective, randomized, double-blind comparison with spinal saddle block. Anaesth Analg 104:1594–1596

3. Lee YY, Muchhal K, Chan CK (2003) Levobupivacaine versus racemic bupivacaine in spinal anaesthesia for urological surgery. Anaesth Intensive Care 31:637–641
4. Glaser C, Marhofer P, Zimpfer G et al (2002) Levobupivacaine versus racemic bupivacaine for spinal anaesthesia. Anaesth Analg 94:194–198
5. Valanne JV, Korhonen A, Jokela RM et al (2001) Selective spinal anaesthesia: a comparison of hyperbaric bupivacaine 4 mg versus 6 mg for outpatient knee arthroscopy. Anaesth Analg 93:1377–1379
6. Kuusniemi KS, Pihlajamaki KK, Pitkanen MT (2000) A low dose of plain or hyperbaric bupivacaine for unilateral spinal anaesthesia. Reg Anesth Pain Med 25:605–610
7. Horlocker TT, Hebl JR (2003) Anaesthesia for outpatient knee arthroscopy: is there an optimal technique? Reg Anesth Pain Med 28:58–63
8. Enk D (1998) Unilateral spinal anaesthesia: gadget or tool? Curr Opin Anaesthesiol 11:511–515
9. Casati A, Fanelli G (2004) Restricting spinal block to the operative side: why not? Reg Anesth Pain Med 29:4–6
10. Morrison SG, Dominguez JJ, Frascarolo P, Reiz S (2000) A comparison of the electrocardiographic cardiotoxic effects of racemic bupivacaine, levobupivacaine, and ropivacaine in anaesthetized swine. Anaesth Analg 90:1308–1314
11. Bardsley H, Gristwood R, Baker H et al (1998) A comparison of the cardiovascular effects of levobupivacaine and rac-bupivacaine following intravenous administration to healthy volunteers. Br J Clin Pharmacol 46:245–249
12. Huang YF, Pryor ME, Mather LE, Veering BT (1998) Cardiovascular and central nervous system effects of intravenous levobupivacaine and bupivacaine in sheep. Anaesth Analg 86:797–804
13. Luck JF, Fettes PDW, Wildsmith JAW (2008) Spinal anaesthesia for elective surgery: a comparison of hyperbaric solutions of racemic bupivacaine, levobupivacaine, and ropivacaine. Br J Anaesth 101:705–710
14. Schug SA (2001) Correction factor for comparisons between levobupivacaine and racemic bupivacaine. Reg Anesth Pain Med 26:91

Uwe Frank, Begründet von Daschner

Antibiotika am Krankenbett

Heidelberg: Springer 2010, 15. Auflage, 270 S., (ISBN 978-3-642-10457-2), brosch., 22.00 EUR

Schwere Infektionen stellen in der täglichen klinischen Praxis nach wie vor eine der wichtigen Herausforderungen dar. Patienten mit komplexen begleitenden Erkrankungen, die Prävalenz multi-resistenter Keime und die Einführung neuer antiinfektiver Wirkstoffe, erfordern vom Klinikarzt eine permanente intensive Auseinandersetzung mit dem Gebiet der Infektiologie. Dabei wird es immer schwerer neben neuen mikrobiologischen Erkenntnissen z.B. über die Entwicklung und Ausbreitung von Resistenzmerkmalen, oder neben den Veränderungen der lokalen und globalen epidemiologischen Situation, auch das ganze Repertoire der antiinfektiven Substanzen „en detail" für die klinische Anwendung präsent zu haben. Nicht nur Berufsanfänger, sondern auch infektiologische Profis greifen deshalb seit über zwei Jahrzehnten im Alltag zum Kitteltaschenbuch-Klassiker, dem ursprünglich von Franz Daschner begründeten Buch „Antibiotika am Krankenbett".

Uwe Frank, der Daschners Nachfolge als Autor angetreten hat, legt jetzt mit der 15. Auflage seine zweite Aktualisierung dieses Standardwerks der schnellen praktischen Hilfe am Krankenbett vor. Das Buch bietet die bewährte schnelle und übersichtliche Orientierung zu aktuellen Therapiestandards bakterieller und mykotischer Infektionen. Grundlegende Prinzipien der antiinfektiven Therapie einschließlich des Vorgehens bei Therapieversagen werden dabei genauso kurz und bündig dargestellt, wie das Wirkspektrum und die adäquate Dosierung der aktuell verfügbaren antimikrobiellen Substanzen. Wichtige Ergänzungen zur Verabreichung dieser Substanzen bei Nieren- bzw. Leberinsuffizienz und während des Einsatzes von Nierenersatzverfahren finden genauso Beachtung wie die Therapie von Schwangeren. Darüber hinaus geht der Autor mit aktuellen Informationen detailliert auf die Resistenzsituation in Deutschland ein.

„Antibiotika am Krankenbett" stellt auch mit dieser Aktualisierung weiter aktuelle, wertvolle und schnell verfügbare Informationen zur Verfügung, die für die Orientierung im klinischen Alltag sehr hilfreich sind.

C. Lichtenstern und M. A. Weigand (Gießen)