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Varicose Vein Stripping Under Low-Dose Spinal Anaesthesia

Düşük Doz Spinal Anestezi ile Varis Operasyonu

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Abstract

Aim: Spinal anesthesia is frequently used for procedures involving the lower limbs. Compared with general anesthesia, low-dose spinal anesthesia is a cost-effective method and has advantages such as avoiding hypotension, longer duration of anesthesia and increased length of hospitalization. The aim of this trial was to compare two different low-dose bupivacaine drug regimens.

Methods: Sixty unpremedicated patients were randomly allocated into two groups (n=30). There were no differences between the groups in age, weight, the American Society of Anesthesiologists (ASA) physical status classification, gender, and duration of surgery. We performed spinal anesthesia at the L3-4 interspace with the patient in the lateral decubitus position. We administered 6.5 mg (group 1) and 8 mg (group 2) 0.5% heavy bupivacaine into the subarachnoid space. We positioned the patient laterally to the operation side for 15 minutes, then, turned to supine position. Motor and sensory block was assessed by the Bromage scale and pinprick test. **Results:** There were significant differences between the two groups in duration of motor block, but no significant differences in hemodynamic response to spinal anesthesia. None of the patients had intraoperative pain. Five patients in group 1 and 2 patients in group 2 had urinary retention.

Conclusion: Our observations suggest that 6.5 mg heavy bupivacaine is efficient and suitable for unilateral varicose veins stripping operation. *(The Medical Bulletin of Haseki 2014; 52: 25-8)*

Key words: Spinal, low-dose, bupivacaine, varicose vein

Özet

Amaç: Spinal anestezi sıklıkla alt ekstremite operasyonları için kullanılmaktadır. Düşük doz spinal anestezi genel anesteziye göre daha ekonomik bir metot olup, hipotansiyon, anestezinin uzun sürmesi, hastanede uzun süreli yatış gibi durumlardan kaçınılması gibi avantajlara sahiptir. Bu çalışmanın amacı 2 farklı düşük doz bupivakaini karşılaştırmaktır.

Yöntemler: Premedikasyon yapılmamış 60 hasta randomize olarak 2 gruba ayrıldı. Gruplar arasında yaş, ağırlık, ASA grubu, cinsiyet, ameliyat süreleri bakımından farklılık yoktu. Spinal anestezi L3-L4 aralığından lateral dekübit pozisyonda yapıldı. Grup 1'e 6.5 mg, grup 2'ye 8 mg %0.5 ağır bupivakain subaraknoid aralıktan verildi. Hastalar operasyon yapılacak tarafta 15 dakika bekletildikten sonra sırtüstü pozisyona çevrildi. Motor blok Bromage, duysal blok Pinprick testi ile değerlendirildi.

Bulgular: İki grup arasında motor blok açısından anlamlı farklılık varken, spinal anesteziye hemodinamik cevap açısından anlamlı bir farklılık yoktu. Hiçbir hastada intraoperatif ağrı olmadı. Grup 1'de 5 hastada, Grup 2'de 2 hastada üriner retansiyon gelişti.

Sonuç: 6.5 mg ağır bupivakainin unilateral varis operasyonları için uygun olacağı kanısındayız.t *(Haseki Tıp Bülteni 2014; 52: 25-8)*

Anahtar Sözcükler: Spinal, düşük doz, bupivakain, varis

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Introduction

Low-dose spinal anesthesia is usually used for elective caesarean sections and outpatient surgery (1,2). Bupivacaine is the most commonly used local anesthetic in spinal anesthesia. Higher doses of bupivacaine administration into the subarachnoid space are associated with hypotension, low heart rate (HR) and longer duration of motor block (3). Conversely, low-dose bupivacaine administration has a risk of insufficient analgesia and anesthesia (4,5). The aim of this trial was to compare two different low-dose bupivacaine drug regimes.

Methods

This single-blind study was approved by the Local Medical Ethics Committee, and informed consent was obtained from the patients scheduled for low extremity varicose veins stripping. Sixty patients with no premedication were randomly allocated to two groups (n=30). There were no differences between the groups in age, weight, the American Society of Anesthesiologists (ASA) physical status classification or duration of surgery. We performed spinal anesthesia in the lateral decubitus position (operating side), inserting a 25-gauge Quincke needle at the L3-4 interspace. We administered 6.5 mg (group 1: via 2 mL syringe, Omnifix, Braun, Mesulgen AG, Germany, drug contain 1.3 mL) and 8 mg (group 2, via 2 mL syringe, Omnifix, Braun, Melsulgen AG, Germany, drug contain 1.6 mL) 0.5% bupivacaine in dextrose (Marcaine Heavy, Astra Zeneca, Eczacıbası, İstanbul) for subarachnoid anesthesia.

In both groups, systolic arterial pressure (SAP), diastolic arterial pressure (DAP), mean arterial pressure (MAP), HR, and peripheral oxygen saturation (SPO_2) values were measured and recorded before the local anesthetic injection and 5, 10, 15, 30, 45, 60 minutes after injection.

Motor and sensory block level was assessed by the Bromage scale and pinprick test 15 minutes after injection, at the end of the operation and at the second hour postoperatively. We placed the patients in the lateral position for fifteen minutes with the side to be operated dependent for distribution of motor block to the operative side. 4 L/min of oxygen was administered via nasal mask. Midazolam 0.07 mg/kg and 6-8 ml/kg crystalloid infusion was administered after the supine position.

A Bromage scale score of I or II and 2 levels regression of sensory block with pin-prick test was attributed to the reversal of spinal blockade.

Results

Spread of sensory analgesia, degree of motor block, and hemodynamic parameters were recorded. There were no significant differences in age, Body Mass Index (BMI), ASA class, sex and duration of operation (Fisher's exact test, Table 1). There were significant differences between the two groups in duration of motor block but no significant differences in hemodynamic response (Table 2, $p<0.02$, independent samples t-test). Five patients in group 1 and 2 patients in group 2 had urinary retention. All patients obtained hemodynamic stability and no patient developed postdural puncture headache. There was no difference in MAP, HR, and SPO_2 values between the two groups $p>0.05$.

Satisfactory surgical anesthesia was achieved in 26 patients (86.7%) in each group. Sensory block (pinprick test) height was inadequate for surgery in 4 patients in each group (lower than L3) who received supplemental anesthesia and were excluded from the study which was then performed with 52 patients.

Discussion

The advantages of low-dose spinal anesthesia are hemodynamic stability, patient satisfaction and rapid recovery from anesthesia. Recent studies showed that in maternal state, low-dose spinal anesthesia confers advantages including less maternal hypotension, greater maternal satisfaction due to reduced duration of motor blockade over conventional dose regimes. Unilateral spinal anesthesia with hyperbaric solutions has an incidence of 10% to 20% hypotension, regardless of injection rate (6). In our study, both groups (with 6.5 and 8 mg of 0.5% hyperbaric bupivacaine) achieved successful unilateral spinal anesthesia with no hypotension, low HR and post dural puncture headache. For outpatient surgery, anesthetists prefer low-dose spinal anesthesia and unilateral spinal block to avoid increased duration of motor blockade, urine retention and increased hospital stay with conventional dose regimes (7-9). Methods used for unilateral spinal block are controversial and they produce unsafe spinal anesthesia (7,10,11). Only

Table 1. Demographic data

	Group I	Group II	P
Age (years)	38.57± 9.83	40.83±10.62	0.39
BMI (kg/m²)	25.94± 4.55	26.03±3.25	0.92
ASA I/II	27/3	26/4	0.5
Sex F/M	12/14	17/9	0.26
Operation time (min)	31.90± 13.16	28.77±6.85	0.25

Table 2. Sensory and motor block time

	Group I (n:26)	Group II (n:26)	P
Sensory block time	328.70±67. 86	336.80±79.84	0.67
Motor block time	131.60±67. 71	169.57±56.33	0.02

specific nerve roots are affected at unilateral spinal block with using low-dose local anesthetic drugs (12). Most of the clinicians prefer low-dose administration to avoid hypotension, undesired drug interactions, elevated block level, and delayed mobilization. Hypotension that may worsen myocardial ischemia is one of the common side-effect of spinal anesthesia. Previous studies have shown that increased local anesthetic drug volume is associated with increased rate and severity of hypotension (3,4). In maternal population, low-dose spinal anesthesia produces less maternal hypotension and fetal acidosis due to decreased uteroplacental blood flow compared with conventional dose regimes. Hypotension is the common complication with an incidence of 20%-100% in maternal population undergoing to caesarean section (5,13,14).

Previous studies have shown that reduction at doses used for spinal anesthesia is related with increased hemodynamic stability and doses of intrathecal bupivacaine between 5 mg and 7 mg are sufficient to provide effective anaesthesia (1). Varicose vein stripping operations are suitable for outpatient surgery. The incidence of insufficient spinal anesthesia with low doses varies between 10% and 25% (2,15). In our study, 4 patients in each group had insufficient spinal anesthesia observed with pinprick test and they were excluded from our study.

In a study by Kaya et al., unilateral spinal anesthesia was achieved in 68% of patients who were administered hyperbaric bupivacaine and in 24% of subjects who received hypobaric bupivacaine (16). Another study showed that hyperbaric bupivacaine produces a more unilateral spinal block compared with isobaric bupivacaine (17).

In studies using hyperbaric bupivacaine, it was advised to give lateral position to the patient on the operation side approximately for 10-20 minutes to establish efficient unilateral spinal block (18,19). In our study, the patients were turned to lateral position on the operation side for 15 minutes and intratechal injection time was about 40 seconds. The effect of different speeds of intrathecal injection on the unilateral spinal block formation is controversial (19,20).

In studies by Fanelli and Casati, maximum sensory block levels obtained with unilateral and bilateral spinal anesthesia with 8 mg hyperbaric bupivacaine 0.5% were T9 (T2-T12) and T10 (T2-L1), respectively. In both studies, the patients were laterally positioned for 15 minutes (21,22). In our study, after 15 minutes of lateral positioning on the operation side, maximum block levels were T10 and T8 in group 1 and group 2, respectively.

Low incidence of hypotension due to sympathetic blockade is one of the advantages of the low-dose local anesthetic injection (23). Unilateral spinal anesthesia minimizes the hemodynamic effects of the local anesthetic drug (24-26). In our study, in group1, there were no hypotension and low HR and none of the patients required fluid load and vasopressor agent but in group 2, 3 patients required fluid load and vasopressor agent due to hypotension and low heart rate. However, the difference between the two groups was not significant ($p>0.05$). The duration of motor block in group 1 was significantly lower than in group 2 (12,27). There were significant differences between the two groups in duration of motor block ($p<0.02$).

Urinary retention is another complication of conventional dose regimes. The incidence of post-operative urinary retention after spinal anesthesia has been reported to be between 14% and 37%. Delayed parasympathetic efferent block of the detrusor muscle is the possible cause of delayed urinary retention (28,30). Axelesson et al. found that urinary retention has a close relationship with sensory block (28). Kamphius et al. found that reversal of urinary retention was related with regression of the block to the third sacral segment and found that the incidence of urinary retention was lower with unilateral and low-dose spinal anesthesia (29).

Some studies showed that urinary retention is related with the type and duration of the surgery and anesthesia (30). Voelckel et al. showed that unilateral anesthesia did not affect the incidence of urinary retention after unilateral low-dose spinal anesthesia (31). In our study, there were 5 patients with urinary retention in group 1 and 2 patients in group 2. Our findings were similar to this study.

Our trial showed that 6.5 mg bupivacaine in dextrose solution decrease the incidence of hypotension without any insufficient intraoperative analgesia effect compared with 8.0 mg bupivacaine in dextrose.

In conclusion, in spinal anesthesia for varicose vein stripping operations, 6.5 mg hyperbaric bupivacaine can provide stable hemodynamic profile, effective sensorial blockade with shorter duration of motor block.

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