Comparison of two doses of hypobaric bupivacaine in unilateral spinal anesthesia for hip fracture surgery: 5 mg versus 7.5 mg

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Abstract

Introduction: Hip fracture is a frequent and severe disease. Its prognosis depends on the perioperative hemodynamic stability which can be preserved by the unilateral spinal anesthesia especially with low doses of local anesthetics. This study aims to compare the efficacy and hemodynamic stability of two doses of hypobaric bupivacaine (7.5 mg vs 5 mg) in unilateral spinal anesthesia. Methods: In this prospective, randomized, double-blind study, 108 patients scheduled for hip fracture surgery under unilateral spinal anesthesia were enrolled to receive either 5 mg (group 1) or 7.5 mg (group 2) of hypobaric bupivacaine. Spinal anesthesia was performed in lateral position. Patients’ socio-demographic characteristics, hemodynamic profile, sensory and motor blocks parameters were recorded. Results: Both groups were comparable regarding to demographic data. Two cases of failure occurred in group 1 and one case in group 2 corresponding to a comparable efficiency rates (96.29% and 98.14% respectively; p = 0.5). A higher mean onset and lower mean regression times of sensory block were significantly noted in group 1 (7.79±3.76 min vs 5.75±2.35 min, p < 0.001 and 91.29±31.55 min vs 112.77±18.77 min, p <0.001 respectively). Incidence of bilateralization (29.62% vs 87.03%, p < 0.001), incidence of hypotensive episodes (59.25% vs 92.59%, p < 0.001) and vascular loading (1481.48±411.65 ml vs 2111.11±596.10 ml, p < 0.001) were significantly higher in group 2. Conclusion: The dosage of 5mg of hypobaric bupivacaine in unilateral spinal anesthesia is as effective as the dosage of 7.5 mg with lower bilateralization incidence and better hemodynamic stability.
Introduction

Hip fracture is a frequent and severe disease that affects mainly old patients with comorbid conditions [1, 2]. It represents a major problem of public health because of its high incidence and morbidity-mortality [1-4]. The prognosis of this disease depends on the comorbidities and the quality of perioperative care [1-7]. Indeed, any support delay worsens the patient outcome [5-7]. In addition, the choice of anesthetic technique is essential as it interferes with the perioperative hemodynamic status and the postoperative rehabilitation quality [8-10]. The high incidence of coronary diseases in patients with proximal femur fracture makes them more vulnerable to hypotensive episodes with increased risk of perioperative myocardial ischemia [11]. Overall, both general and regional anesthesia are possible but spinal anesthesia is the most used technique [8, 9, 12]. The reduced cardiovascular compensation mechanisms in the elderly increase significantly the frequency and severity of hypotensive episodes by sympathetic block in spinal anesthesia [13]. However, despite a better intraoperative hemodynamic stability with general anesthesia, several published studies are rather in favor of regional anesthesia [8,9,12]. In fact, spinal anesthesia may also provide satisfactory hemodynamic stability via sympathetic block reduction. Several solutions have been proposed, such as continuous spinal anesthesia (CSA) and even better, unilateral spinal anesthesia (ULSA) [14-17] especially when low doses of local anesthetic are used [18-20]. This study aims to compare the efficacy and safety of two doses of hypobaric bupivacaine (7.5 mg vs 5 mg) in unilateral spinal anesthesia.

Methods

This is a prospective, randomized, double-blind study, conducted in the orthopedic surgery operating room of Sahloul teaching hospital (Sousse, Tunisia) during a 9-month period. All patients scheduled for hip fracture surgery under ULSA, were included in the study after their consent. Exclusion criteria were the contraindications of spinal anesthesia, a BMI > 30, diabetes mellitus at the stage of peripheral neuropathy, uncooperative patients and those proposed for total hip replacement.

After the approval of the ethics committee, patients were randomized into two groups depending on the dose of hypobaric bupivacaine used in the ULSA: group 1 (5 mg) and group 2 (7.5 mg). Randomization was done according to a pre-established form. Both preparations had the same volume (3 ml) and were carried out by a member of the anesthetic team not involved in patients’ therapeutic management. For group 1, the preparation contained 1 ml of isobaric bupivacaine 0.5%, 1.5 ml of distilled water and 25 µg of Fentanyl. For group 2, the preparation contained 1.5 ml of isobaric bupivacaine 0.5%, 1 ml of distilled water and 25 µg of Fentanyl. The sample size was estimated at 54 patients per group after assuming a difference in therapeutic effectiveness between the two groups not exceeding 10% and considering an α risk at 5% and a β risk at 20%.

In the operating room, the patient was supine with standard monitoring (heart rate, noninvasive blood pressure and SpO2). After premedication with 0.05 mg/kg of midazolam, an ilio-fascial block was performed with 20 ml of lidocaine epinephrine 1%. Then, the patient was placed in lateral position, limb to operate above, while maintaining the table in neutral position. Spinal anesthesia was performed in the L3-L4 or L4-L5 spaces. The end of the injection of the local anesthetic marked the reference time (T0).

A systematic loading with 5 ml/kg of isotonic saline was performed. The patient was kept in slightly downhill lateral decubitus for 15 minutes and then transferred on operating table. The collected parameters were socio-demographic characteristics of patients; hemodynamic parameters; the sensory block assessed by the pinprick test (onset time, duration and level); the motor block assessed by a two levels scale (present or absent). The primary endpoint was the efficacy of the ULSA. The secondary endpoints were the arterial blood hypotension, the ephedrine and fluid resuscitation requirements, patient and surgeon satisfaction. ULSA failure was defined as a sensory level block in the dependent limb not reaching D12 at 15 minutes and imposing in this case general anesthesia conversion. A hypotension was defined as a decrease in systolic blood pressure ≥ 20% from baseline. It was treated with iterative boli of 6 mg of Ephedrine and vascular loading with 7 ml / kg of Voluven *(HES 130 / 0.4). Statistical analysis was performed with the version 18.00 of SPSS software. Continuous data were analyzed with the Anova test. Categorical data were analyzed with the chi-2 test. A p value < 0.05 was considered statistically significant.
Results

Our study included 108 patients. The mean age was 80.73 ± 7.64 years (with extremes ranging from 65 to 96 years). The sex ratio was 1.2. The mean BMI was 24.12 kg / m² ± 3.04 (with extremes ranging from 17.78 to 29.89). ASA score ≥ 3 was found in 18 cases corresponding to 16.7% of the population. The two study groups were found to be similar regarding to demographic data (Table 1). The mean duration of surgery was also comparable in both groups (59.40 ± 26.69 min vs 57.77 ± 17.61 min; p = 0.77). Three cases of failure were noted in the study. Two cases occurred in group 1 corresponding to an efficiency rate of 96.29%. One case occurred in group 2 corresponding to an efficiency rate of 98.14%. Thus, the efficacy was comparable in both groups (p = 0.5).

The mean onset time of sensory block was significantly higher in group 1 (7.79 ± 3.76 min vs 5.75 ± 2.35 min; p < 0.001). The mean time of regression of sensory block was significantly lower in group 1 (91.29 ± 31.55 min vs 112.77 ± 18.77 min; p < 0.001). The incidence of bilateralization was significantly higher in group 2 (Table 2). Aside from the fifth minute, the incidence of hypotensive episodes was significantly higher in group 2 (Figure 1). The vascular loading was also significantly higher in group 2 (1481.48 ± 411.65 ml vs 2111.1 ± 596.10 ml; p < 0.001). Ephedrine consumption was higher in group 2 with no significant difference (Table 2). Patient satisfaction was better in group 1 while that of surgeons were better in group 2 with no significant difference (Table 2).

Discussion

In our study, we compared the dose of 5 mg hypobaric bupivacaine in the ULSA to the dose of 7.5 mg. The results showed a comparable efficiency rate in both groups with significant lower incidence of hypotensive episodes in group 1. The feasibility of spinal anesthesia with low doses of local anesthetic has been widely studied in the literature but mainly for conventional spinal anesthesia with hyperbaric bupivacaine.

Nair et al published a literature review analyzing clinical studies of spinal anesthesia for arthroscopic knee surgery. Fifteen randomized controlled trials were included with 1248 patients in total. Among these studies, five trials (387 patients) compared the effectiveness of several hyperbaric bupivacaine doses ranging from 3 to 15 mg. The authors concluded that the dose of 4 to 5 mg was sufficient [21].

The effectiveness of such low doses was also found by Minville et al in a study of 74 patients aged over 75 years and scheduled for hip fracture surgery under spinal anesthesia with isobaric bupivacaine. The patients were divided into two groups: a 7.5 mg conventional spinal anesthesia group and CSA group using iterative bolus of 2.5 mg. The mean bupivacaine requirement in the later group was 5 mg which were sufficient to ensure suitable surgical conditions. In addition, it had allowed a better hemodynamic stability. In fact, the occurrence of hypotensive episodes and ephedrine consumption were significantly lower in the CSA group [19].

These low doses were subsequently tested with the ULSA. Kaya et al evaluated the efficacy of 7.5 mg of bupivacaine, in 50 patients scheduled for lower limb orthopedic surgery and divided into two groups. A hyperbaric bupivacaine group was compared to a hypobaric bupivacaine group. Both protocols were effective with intraoperative hemodynamic stability, rapid regression of sensory and motor block, at the expense of a higher risk of bilateralization in hyperbaric bupivacaine group [22]. The efficacy of such dose in ULSA was also confirmed by Khatouf et al in an observational study of 25 patients aged over 80 years and operated for proximal femur fracture [23].

Imbelloni et al tested the 5 mg dose of bupivacaine in ULSA in a study of 150 patients scheduled for unilateral orthopedic surgery. The patients were divided into three groups of 50 patients each according to the local anesthetic baricity (hypobaric, isobaric or hyperbaric). The three protocols were effective. However, the risk of bilateralization was more important in the isobaric group. The level and the mean duration of the sensitive blockade were significantly higher in the hypobaric group [24].

Kiran et al conducted a study on 40 patients scheduled for outpatient knee arthroscopy under hyperbaric bupivacaine ULSA. Patients were divided into 2 groups of 3 and 4 mg. The authors concluded to the efficacy of 3 mg [25]. Local anesthetics doses have been reduced by the addition of opioids [26-28]. The synergistic effect of opioids has been widely studied in the literature. Maves et al, in an animal study of 24 rats confirmed the synergistic effect of intrathecal morphine-lidocaine combination on nociception [26]. Tejwani et al have also studied this synergistic effect on rats. They explained it by conformational changes in spinal opioid receptors
(delta and kappa) induced by bupivacaine and resulting in an increase of the affinity of these morphine receptors [27]. Wang et al have shown that this synergy affects only nociceptive afferent pathways and spares sympathetic efferent ones [28].

Thereby, opioids have reduced local anesthetics doses in spinal anesthesia, and therefore, the importance of sympathetic block which is dose-dependent, without having specific effects on sympathetic efferent pathways [24-28]. These two mechanisms largely explain the hemodynamic stability with low doses of local anesthetics. This justifies the interest of seeking the lowest possible dose in order to better preserve patient hemodynamic status. The same objective also justifies the use of ULSA, since the unilateral distribution of local anesthetic contributes to the reduction of sympathetic block [15, 22, 24, 29]. Kaya et al found lesser risk of bilateralization with hyperbaric mixture [22]. However, better results were found with hypobaric mixture in the trial of Imbelloni et al [24].

The perioperative hemodynamic instability is related to cardiovascular repercussions of neuraxial blockade and patient compensation mechanisms which are often altered by aging and comorbidities [11]. Its prevention is based essentially on limiting the cardiovascular impact of neuraxial blockade. At least two means are easy and practical: limitation of local anesthetic doses and one-sided sympathetic block. Several studies have confirmed the effectiveness of these techniques either associated or separated. Thus, the risk of hemodynamic instability ranging from 25 to 69% with conventional spinal anesthesia using ordinary doses decreases significantly with the ULSA in particular with low dosage [15, 30, 31].

In our study, the probability of having at least one hypotensive episode under hypobaric bupivacaine ULSA was 59.25 % in the 5 mg group versus 92.59 % in the 7.5 mg group. Thus, the later dosage is associated with 8.59 times more likely to have hypotensive episodes that the first one. In addition, vascular loading requirements (2111.11 ± 596.10 ml versus 1481.48 ± 411.65 ml; p < 0.001) and sympathomimetic consumption (23.89 ± 10.28 mg versus 7.61 ± 7.63 mg; p =0.53) were lower in the 5 mg group.

While most studies agree about the feasibility of conventional or ULSA with low doses of local anesthetic, discrepancies exist regarding onset and regression times of sensory block. Both timeframes should be interpreted with caution before mistakenly conclude to spinal anesthesia failure. Compared to conventional spinal anesthesia with usual doses, the onset time is extended ranging from 15 to 30 minutes in the literature, whereas the regression period is shorter ranging from 30 to 140 min [21, 24, 32, 33]. These thresholds must be interpreted according to the dosage of used opioid and the considered judgment criteria.

In the end, our study which is the first to compare two low doses of hypobaric bupivacaine in ULSA, has some limitations that must be considered in interpreting the results. First, the two doses used had not the same baricity. Second, the risk of bilateralization, interfering with hemodynamic stability regardless of the administered dose, has not been well studied in particular concerning its predictive factors. Third, the time chosen to declare the failure of the ULSA (15 minutes) was short since the onset time can take up to 30 minutes.

**Conclusion**

The dosage of 5mg of hypobaric bupivacaine in unilateral spinal anesthesia is as effective as the dosage of 7.5 mg with lower bilateralization incidence and better hemodynamic stability.

**What is known about this topic**

- Spinal anesthesia is known to induce frequent and severe hypotensive episodes mostly in the elderly;
- Unilateral spinal anesthesia may also provide satisfactory hemodynamic stability via sympathetic block reduction especially with low doses of bupivacaine.

**What this study adds**

- The dosage of 5 mg of hypobaric bupivacaine in unilateral spinal anesthesia is as effective as the dosage of 7.5 mg;
- Low dose of hypobaric bupivacaine in unilateral spinal anesthesia can also be compared to new short-acting local anesthetics which are not currently available in many countries.

**Competing interests**

The authors declare no competing interests.
Authors’ contributions

Mohamed Kahloul, Mohamed Said Nakhli and Walid Naija: responsible for conception and design of the research study, and assisted with the writing of the manuscript and approving the final article for publication. Amine Chouchene and Nidhal Chebbi contributed to the literature review. Salah Mhamdi and Walid Naija assisted in conception and design study, drafting initial manuscript and approving the final article. All authors have read and agreed to the final manuscript.

Tables and figures

Table 1: Demographic characteristics of the two studied groups
Table 2: Anesthetics patient characteristics
Figure 1: Patients’ hemodynamic profile depending on the anesthetic technique (*: p < 0.05)

References

1. Roche JJ, Wenn RT, Sahota O, Moran CG. Effect of comorbidities and postoperative complications on mortality after hip fracture in elderly people: prospective observational cohort study. BMJ. 2005 Dec; 331(7529):1374. PubMed | Google Scholar

2. Lawrence VA, Hilsenbeck SG, Noveck H, Poses RM, Carson JL. Medical complications and outcomes after hip fracture repair. Arch Intern Med. 2002 Oct; 162(18):2053-7. PubMed | Google Scholar

3. Brauer CA, Coca-Perraillon M, Cutler DM, Rosen AB. Incidence and mortality of hip fractures in the United States. JAMA. 2009 Oct; 302(14):1573-9. PubMed | Google Scholar

4. Braithwaite RS, Col NF, Wong JB. Estimating hip fracture morbidity, mortality and costs. J Am Geriatr Soc. 2003 Mar; 51(3):364-70. PubMed | Google Scholar

5. Zuckerman JD, Skovron ML, Koval KJ, Aharonoff G, Frankel VH. Postoperative complications and mortality associated with operative delay in older patients who have a fracture of the hip. J Bone Joint Surg Am. 1995 Oct;77(10):1551-6. PubMed | Google Scholar

6. Moran CG, Wenn RT, Sikand M, Taylor AM. Early mortality after hip fracture: is delay before surgery important?. J Bone Joint Surg Am. 2005 Mar; 87(3):483-9. PubMed | Google Scholar

7. Orosz GM, Magaziner J, Hannan EL, Morrison RS, Koval K, Gilbert M et al. Association of timing of surgery for hip fracture and patient outcomes. JAMA. 2004 Apr; 291(14):1738-43. PubMed | Google Scholar

8. Neuman MD, Rosenbaum PR, Ludwig JM, Zubizarreta JR, Silber JH. Anesthesia technique, mortality, and length of stay after hip fracture surgery. JAMA. 2014 Jun; 311(24):2508-17. PubMed | Google Scholar

9. Neuman MD, Silber JH, Elkassabany NM, Ludwig JM, Fleisher LA. Comparative effectiveness of regional versus general anesthesia for hip fracture surgery in adults. Anesthesiology. 2012 Jul;117(1):72-92. PubMed | Google Scholar

10. O’Hara DA, Duff A, Berlin JA, Poses RM, Lawrence VA, Huber EC et al. The effect of anesthetic technique on postoperative outcomes in hip fracture repair. Anesthesiology. 2000 Apr; 92(4):947-57. Google Scholar

11. Rooke GA, Freund PR, Jacobson AF. Hemodynamic response and change in organ blood volume during spinal anesthesia in elderly men with cardiac disease. Anesth Analg. 1997 Jul;85(1):99-105. PubMed | Google Scholar

12. Juelsgaard P, Sand NP, Felsby S, Dalsgaard J, Jakobsen KB, Brink O et al. Perioperative myocardial ischaemia in patients undergoing surgery for fractured hip randomized to incremental spinal, single-dose spinal or general anaesthesia. Eur J Anaesthesiol. 1998 Nov;15(6):656-63. PubMed | Google Scholar
13. Beaupre LA, Jones CA, Saunders LD, Johnston DW, Buckingham J, Majumdar SR. Best practices for elderly hip fracture patients - A systematic overview of the evidence. J Gen Intern Med. 2005 Nov;20(11):1019-25. PubMed | Google Scholar

14. Casati A, Fanelli G, Aldegheri G, Colnaghi E, Casaletti E, Cedrati V et al. Frequency of hypotension during conventional or asymmetric hyperbaric spinal block. Reg Anesth Pain Med. 1999 May-Jun;24(3):214-9. PubMed | Google Scholar

15. Klimscha W, Weinstabl C, Ilias W, Mayer N, Kashanipour A, Schneider B et al. Continuous spinal anesthesia with a microcatheter and low-dose bupivacaine decreases the hemodynamic effects of centroneuraxis blocks in elderly patients. Anesth Analg. 1993 Aug;77(2):275-80. PubMed | Google Scholar

16. Giugliano F, Lippera M, Brugnolo MP, Busca G, Roberti L, Fogliardi A et al. Continuous spinal anesthesia: first clinical evaluations. Minerva Anestesiol. 1990 Sep;56(9):935-7. PubMed | Google Scholar

17. Casati A, Fanelli G. Unilateral spinal anesthesia - State of the art. Minerva Anestesiol. 2001 Dec;67(12):855-62. PubMed | Google Scholar

18. Ben-David B, Frankel R, Arzumanov T, Marchevsky Y, Volpin G. Minidose bupivacaine fentanyl spinal anesthesia for surgical repair of hip fracture in the aged. Anesthesiology. 2000 Jan;92(1):6-10. PubMed | Google Scholar

19. Minville V, Fourcade O, Grousset D, Chassery C, Nguyen L, Asehnoune K et al. Spinal anesthesia using single injection small-dose bupivacaine versus continuous catheter injection techniques for surgical repair of hip fracture in elderly patients. Anesth analg. 2006 May;102(5):1559-63. PubMed | Google Scholar

20. Federici L, Fusi S, Conflitti A, Coletta A, Pecchi A. Hypotension and spinal anesthesia - Clinical study toward an optimal dose of anesthetic. Minerva Anestesiol. 1987 Mar;53(3):63-8. PubMed | Google Scholar

21. Nair GS, Abrishami A, Lermitte J, Chung F. Systematic review of spinal anaesthesia using bupivacaine for ambulatory knee arthroscopy. Br J Anaesth. 2009 Mar;102(3):307-15. PubMed | Google Scholar

22. Kaya M, Oğuz S, Aslan K, Kadioğullari N. A low-dose bupivacaine: a comparison of hyperbaric and hypobaric solutions for unilateral spinal anesthesia. Reg Anesth Pain Med. 2004 Jan-Feb;29(1):17-22. PubMed | Google Scholar

23. Khatouf M, Loughnane F, Boini S, Heck M, Meuret P, Macalou D et al. Unilateral spinal anaesthesia in elderly patient for hip trauma: a pilot study. Ann Fr Anesth Reanim. 2005 Mar;24(3):249-54. PubMed | Google Scholar

24. Imbelloni LE, Beato L, Gouveia MA, Cordeiro JA. Low dose isobaric, hyperbaric, or hypobaric bupivacaine for unilateral spinal anesthesia. Rev Bras Anestesiol. 2007 Jun;57(3):261-70. PubMed | Google Scholar

25. Kiran S, Upma B. Use of small-dose bupivacaine (3 mg vs 4 mg) for unilateral spinal anesthesia in the outpatient setting. Anesth Analg. 2004 Jul; 99(1):302-3. PubMed | Google Scholar

26. Maves TJ, Gebhart GF. Antinociceptive synergy between intrathecal morphine and lidocaine during visceral and somatic nociception in the rat. Anesthesiology. 1992 Jan;76(1):91-9. PubMed | Google Scholar

27. Tejwani GA, Rattan AK, McDonald JS. Role of spinal opioid receptors in the antinociceptive interactions between intrathecal morphine and bupivacaine. Anesth Analg. 1992 May;74(5):726-34. PubMed | Google Scholar

28. Wang C, Chakrabarti MK, Whitwam JG. Specific enhancement by fentanyl of the effects of intrathecal bupivacaine on nociceptive afferent but not on sympathetic efferent pathways in dogs. Anesthesiology. 1993 Oct; 9(4):766-73. Google Scholar
29. Casati A, Fanelli G, Beccaria P, Aldegheri G, Berti M, Senatore R et al. Block distribution and cardiovascular effects of unilateral spinal anaesthesia by 0.5% hyperbaric bupivacaine - A clinical comparison with bilateral spinal block. Minerva Anestesiol. 1998 Jul-Aug;64(7-8):307-12. PubMed | Google Scholar

30. Coe AJ, Revanäs B. Is crystalloid preloading useful in spinal anaesthesia in the elderly?. Anaesthesia. 1990 Mar;45(3):241-3. PubMed | Google Scholar

31. Critchley LA, Stuart JC, Short TG, Gin T. Haemodynamic effects of subarachnoid block in elderly patients. Br J Anaesth. 1994 Oct;73(4):464-70. PubMed | Google Scholar

32. Liu SS, Ware PD, Allen HW, Neal JM, Pollock JE. Dose-response characteristics of spinal bupivacaine in volunteers - Clinical implications for ambulatory anesthesia. Anesthesiology. 1996 Oct;85(4):729-36. PubMed | Google Scholar

33. Ben-David B, Levin H, Solomon E, Admoni H, Vaida S. Spinal bupivacaine in ambulatory surgery: the effect of saline dilution. Anesth Analg. 1996 Oct;83(4):716-20. PubMed | Google Scholar

### Table 1: Demographic characteristics of the two studied groups

|                          | Group 1 n=54 | Group 2 n=54 | p value |
|--------------------------|--------------|--------------|---------|
| Age (years)              | 80.57 ± 8.52 | 80.88 ± 6.73 | 0.29    |
| Sex ratio                | 0.86         | 1.7          | 0.061   |
| BMI (kg/m²)              | 24.42 ± 2.94 | 23.99 ± 2.85 | 0.63    |
| ASA status ≥ 3           | 49 (90.7%)   | 41 (75.92%)  | 0.076   |
| **Treatment**            |              |              |         |
| Converting enzyme inhibitor | 19 (35.18%) | 23 (42.59%) | 0.55    |
| Beta blocker             | 7 (12.96%)   | 11 (20.37%)  | 0.22    |
| Diuretics                | 2 (3.70 %)   | 1 (1.85%)    | 0.5     |

BMI: body mass index, ASA: American Society of Anesthesiologists.
Table 2: Anesthetics patient characteristics

|                          | Group 1 n=54 | Group 2 n=54 | p value |
|--------------------------|--------------|--------------|---------|
| **Sensory block**        |              |              |         |
| Mean onset time (min)    | 7.79 ± 3.76  | 5.75 ± 2.35  | < 0.001 |
| Mean duration (min)      | 91.29 ± 31.55| 112.77 ± 18.77 | < 0.001 |
| **Motor block**          |              |              |         |
| present                  | 46 (85.18 %) | 50 (92.59 %) | 0.18    |
| absent                   | 8 (14.81 %)  | 4 (7.40 %)   |         |
| Bilateralization block n (%) | 16 (29.62 %) | 47 (87.03 %) | 0.0001  |
| Failure of unilateral spinal anesthesia | 2 (3.70 %) | 1 (1.85 %) | 0.5     |
| At least one hypotensive episode | 32 (59.25%) | 50 (92.59%) | < 0.001 |
| Average ephedrine consumption (mg) | 7.61 ± 7.63 | 23.88 ± 10.28 | 0.53    |
| Average need of intravenous fluids (ml) | 1481.48 ± 411.65 | 2111.11 ± 596.10 | < 0.001 |
| **Satisfaction n (%)**   |              |              |         |
| patient                  | 50 (92.59 %) | 48 (88.88 %) | 0.37    |
| surgeon                  | 50 (92.59 %) | 53 (98.14 %) | 0.18    |

Figure 1: Patients’ hemodynamic profile depending on the anesthetic technique (*: p < 0.05)