Scholars Journal of Applied Medical Sciences (SJAMS) **ISSN 2320-6691 (Online)**
Sch. J. App. Med. Sci., 2016; 4(2C):536-539 **ISSN 2347-954X (Print)**

(An International Publisher for Academic and Scientific Resources)
www.saspublisher.com

Original Research Article

Comparison of Hemodynamic Effects between Unilateral Spinal Anaesthesia and Conventional Spinal Anaesthesia in Elderly for Trauma Hip

Fall ML, Leye PA, Bah MD, Ndiaye PI, Barboza D, Traore M, Hilal G, Moulaye C, Diouf E.
Service d'Anesthésie et de Réanimation CHU Aristide Le Dantec Dakar Sénégal

***Corresponding author**
Dr Mohamed Lamine FALL
Email: tallafal@yahoo.fr

Abstract: Compare, for traumatic hip surgery for elderly over 70years, unilateral spinal anesthesia (USA) and conventional spinal anesthesia (SA) in terms of hemodynamic consequences. Prospective randomized single blind study. 70 patients aged over 70 years, whatever the ASA score, trauma proposed for hip surgery were randomized into 2 groups SA and USA. Spinal anesthesia was performed with 7.5 mg of bupivacaine 0.5% hypobaric and fentanyl 25µg. Patients were kept in lateral decubitus for 15 min (USA) and immediately turned supine (SA). Hemodynamic parameters and characteristics of sensory block and motor block were collected. In results both groups were comparable regarding surgical and demographic characteristics. The hemodynamic consequences were significantly lower in the USA group. The onset times of maximum sensory block on the operated side were comparable between the two groups. The regression time of sensory block on the side operated two metameres was faster in the RA group compared to the USA group with a significant difference (p = 0.06). A bi lateralization was observed in 68% of cases. In concusion USA compared to the SA for traumatic hip surgery in elderly patients over 70 years, can offer better hemodynamic stability and provides the operated side sensory block of longer duration.
Keywords: Unilateral Spinal Anesthesia - Elderly Patients - Spinal Anesthesia - Haemodynamic Repercussion.

INTRODUCTION

The femoral fracture represent a very common condition in the elderly; it is grafted a significant morbidity and mortality and is therefore a public health issue. [1]. The anesthetic risk is increased in the elderly, making the debate on the choice of anesthetic technique (general anesthesia versus regional anesthesia) still valid and no technique has demonstrated its superiority in terms of mortality and morbidity [2]. Among the regional anesthesia techniques, SA exposes the subject to sudden drops in blood pressure; the incidence varies between 25 and 69% [3]. During recent years several authors have studied the unilateral spinal anesthesia (USA) in all the confused adulthood; this technique is simple with moderate hemodynamic consequences [4]. The hemodynamic changes could nevertheless be marked in the elderly over 70years. [5] Thus we propose, through a prospective randomized study to compare the hemodynamic consequences of the USA and the SA for traumatic hip surgery in elderly patients.

MATERIAL AND METHODS

This is a forward-looking education, conducted randomized single-blind, after approval by the Ethics Committee, over a period of six months (January 2010-June 2011) and including those aged 70years and over, no matter the score ASA. Hospitalized for surgery on the upper end of the femur, and having given their written informed consent. The exclusion criteria were against an indication for spinal anesthesia, and those with a proven allergy to local anesthetics. After the establishment of a monitoring comprising a non-invasive blood pressure, pulse oximetry and a électrocardioscope, volume expansion by 10 ml / kg NaCl 9% was administered over 30 minutes just before anesthesia. The anesthetic solution is a mixture of 1.5 ml 0.5% bupivacaine isobaric (7.5mg); hypobaric made by adding fentanyl 25 µ. The patients were randomized into two identical groups (USA) and (SA) by lot.

In the USA group median puncture using a 25-gauge Whitacre needle left, was performed at the L3-L4 space after spontaneous reflux of the cerebrospinal fluid, the Office of the spinal needle was facing side to operate, the mixture was injected approximately 30s without bubbling. Patients were kept in lateral decubitus for 20 minutes before putting them back in the supine position. SA in the injection group was conducted during the same time period through the hole of the needle looking cranial direction. Patients were immediately returned supine after injection of local anesthetic. Hemodynamic parameters [systolic blood

pressure (SBP), diastolic blood pressure (DBP), mean arterial pressure (MAP) and heart rate (HR)] were recorded before the dural puncture and then every five minutes until at the end of the intervention. Significant hypotension was defined as a decrease in SBP of 30% more compared to the baseline. This one was treated by intravenous bolus ephedrine 3mg every 2min until the normalization of blood pressure. Bradycardia defined by an HR less than 45 beats / min, was treated by intravenous injection of 15µg / FG atropine. The incidence of profound hypotension and the total consumption of ephedrine were collected Evaluation of sensor motor block took place in the 20th minute by an uninformed observer of the chosen technique while patients in both groups were given on the back and then every ten minutes for the duration of anesthesia. The sensory block was evaluated on both sides (ipsilateral and contralateral to the bill) by the test of pique - key in the following quotation (0: normal sensation, decreased sensation 1; 2: lack of sensation). The engine block was evaluated on both sides (ipsilateral and contralateral to the bill) by score Bromage [0: no engine block (complete flexion of the knee and ankle); 1: partial block (partial and complete knee flexion of the ankle); 2: almost total block (null and partial knee flexion of the ankle); 3: complete block (not bending the knee and ankle)]. At the end of the intervention patients were transferred SSPI; hemodynamic parameters and the extension and intensity of sensory and motor blocks were noted every ten minutes. Postoperative pain was assessed by EVS score (0: absent pain; 1: mild pain, 2: moderate pain; 3: severe pain). A titration of morphine was achieved if the upper EVS or equal to 2: 2 2mg intravenously every five minutes until a less than 2 EVS; the total consumption of morphine was noted. The output of the SSPI was authorized after obtaining a modified Aldrete score = 10. The complication occurrence was observed: nausea, nausea, vomiting, itching, headache and urinary retention. Statistical analysis was based on Chi 2 test or Fisher exact test for categorical variables and quantitative variables on your kind reduces the gap and non-parametric tests Mann Whitney. A test was considered significant when p was less than 5%.

RESULT

Seventy patients were included. The demographic and surgical characteristics were comparable in both groups.

Regarding the hemodynamic consequences, the study of changes in blood pressure vs. time showed a significant mean SBP Rating Decrease in 20th and 30th minute and mean WFP in the 20th minute in the SA group compared to the USA group. The incidence of hypotension episodes was significantly lower in the RAU group compared with the SA group with a statistically significant difference. (42% versus 71%, respectively; p = 0.045). This hypotension was deeper and longer lasting in the SA group with a significant difference. The doses of ephedrine used in the SA group were higher compared to the USA group with a statistically significant difference. In the USA group, patients with significant blood pressure are those who have presented a bilateral distribution of anesthesia. SA in the patient group that received Ephedrine had a sensory level above D10 in 84% of cases.

The puncture-incision time was higher in the USA group compared with the SA group with a statistically significant difference. The onset time of sensory block on the operated side was comparable between the two groups. The maximum sensory level on the operated side was comparable between the two groups. The extension of sensory block was comparable between the two groups at 10, 30 and 60 minutes; However a statistically significant difference regarding the extension of sensory block to 9 and 120 minutes for the USA group. 100% of patients in both surgical anesthesias have the operated side. Onset of the engine block on the operated side was comparable between the two groups. The engine block was bilateral in 100% of patients in the SA group against 38% in the USA group with a significant difference (p less than 0, 001). Five patients in the SA group (15%) and two patients in the USA group (15%) required additional analgesia to complete the surgery. No cases of conversion were recorded in the two groups.

Regarding the postoperative period, the averages of PAM, PAS and CR were comparable between the two groups. The operated side the regression time of sensory block were two metameres SA faster compared to the USA group with a statistically significant difference (103 + or - 5 min versus 111 + or - 7min respectively, p = 0.04). No significant difference in the total duration of sensory block of the operated side between the USA group and SA group; the average values of the SVS was more postoperative declines in the USA group than in the SA group (p = 0.017) with a lower consumption of morphine + 1 or 3mg-5 versus + or 2mg; (p = 0.01). The incidence of postoperative complications is summarized. The incidence of pruritus was similar (51 vs. 59% for the USA and SA groups; p = 0.5). Three patients (7%) of the group SA submitted a urine retention versus only one (4.7%) of the USA group, with no significant difference (p = 0.3). The total satisfaction of patients in both groups was similar (p = 0.3). The satisfaction of both groups was comparable p = 0.6.

COMMENTS

Our objective was to compare the USA to the SA (gold standard) in the elderly over 70years. To best reflect our daily practice, we have voluntarily made no

selection of patients on ASA class and / or associated pathologies. While the exposition of strict unilateral Spinal seems more frequent with the use of hyperbaric solutions, we opted for a hypobaric solution [6]. This choice is justified by the side lying layout with the member charged Trendelenburg position and for performing spinal anesthesia in comfortable conditions for the patient. Bupivacaine dose administered intrathecally (7.5 mg) was chosen knowing that a 5mg dose would probably insufficient to reach a level T10 [7] and greater than or equal to 10 mg doses of bupivacaine are accompanied by significant hypotension in 27-69% of cases according to [8] studies. The fentanyl addition improves the quality of the anesthetic block without changing the secondary sympathetic block to the administration of local anesthesia. [9] The incidence of profound hypotension, in our study, was higher in the RAC group compared to the USA group with a statistically significant difference (42% vs 21%; p = 0.01). This result is consistent with the literature [10-12]. The incidence of hypotension during the unilateral spinal anesthesia in the literature varies from 5-20% [10,13,11]; this difference can be explained by the difference in definitions of hypotension used by the difference of the study population [age, ASA class, type of surgery) and the dose of the local anesthetic used, hemodynamic spinal anesthesia are the result of sympathetic block with vasodilation and arterial vasodilation and hypotension associated with a fall in venous return and a possible hematoma at the focus of the bill in a mostly dehydrated topic. In patients younger there is a drop in peripheral vascular resistance of about 10-15%, probably due to the low base of sympathetic activity [4]. In the elderly or in the presence of heart disease, sympathetic activity at rest is higher, the drop in resistance is then higher (25-30% and hemodynamic instability resulting can be particularly deleterious [15]. Feyton *et al.;* [16] studied by transthoracic echocardiography secondary hemodynamic changes to a USA to 8 mg of hyperbaric bupivacaine. They showed that pressure systolic, diastolic and mean significantly deprived 5-16 min after anesthesia in comparison with baseline values; in only one patient out of 20, these hemodynamic changes are much smaller than that observed with conventional spinal anesthesia The best hemodynamic stability during the unilateral spinal anesthesia can be explained by the small size of [12] sympathetic block, the installation of more prolonged period which can jeopardize vascular homeostatic mechanisms similar to those during the epidural. [12] This hemodynamic stability can be particularly beneficial in the elderly and frail subjects. Khattouf M *et al.;* [24] studied the hypobaric unilateral spinal anesthesia in elderly patients for traumatic hip surgery and showed that it provides satisfactory operating conditions without including major hemodynamic changes in these subjects with an average decline NIP observed less than 13% throughout the operation period. The unilateral nature fixed immediately or secondary bilateral extension of the anesthetic block does not seem to play on the hemodynamic consequences for these high ASA class patients, which was found [18]. Several hypotheses can be advanced to explain this particularity. Firstly, it appears that the proportion of strictly unilateral sympathetic blocks [19]. Moreover, in the image of what is observed for sensory block, it is likely that the extension of bilateral sympathetic block is a slow and gradual process that allows mechanisms against hypotension to put into action. Finally, the upper sensory level is still so high on the side contralateral to the operated side, which probably limits the extent of the sympathetic block. In our study, the dose used of 7.5 mg bupivacaine achieved a sensory block at least T10 in the two groups that made possible the surgical procedure. In the literature, relatively high failure rate seen with the same dose of bupivacaine in both the USA group than in the SA. This is explained by young adults operated for surgery above the knee. At the sensory level, a strictly unilateral block was obtained in 58% of cases. In literature, it is between 28 and 52% of cases depending on the series [10, 11, 20, 22] although the sensitivity impairment of non concerned side by surgery was usually less extensive compared to the operated side. Concern the engine block; it was unilateral in 62% of cases in our study, the values reported in our literature range from 10-80% [10, 11, 20, 22]. An important fact in our study, the regression time of sensory block meta two meters was longer in the USA group compared with the SA group (111 +/- 7 versus 103 +/- 11 min; p = 0.08) . This is consistent with the study of Fanelli (81 +/- 25 vs 99 +/- 28 min); this is probably due to the reduced surface area available for absorption and elimination of local anesthesia; it is the same for the study of Casaty [23]. Regarding postoperative analgesia, the USA has provided, in our work, better quality of postoperative analgesia compared to the SA. The two main disadvantages of the USA with respect to the SA are lengthening incision puncture period and the need for a lateral position for 15minutes [24].

CONCLUSION

Hypobaric unilateral spinal anesthesia is a former regional anesthesia technique but too little used and taught. It allows good operating conditions without major hemodynamic changes compared to conventional spinal anesthesia in very old patients with femoral neck invoice.

REFFERENCES

1. Kallio H, Snall EV, Tuomas CA, Rosenberg PH; Comparaison of hyperbaric and plain ropivacaine 15 mg in spinal anesthesia for lower limb surgery. Br J Anaesth. 2004; 93: 664-669.

2. De Kock M, Gautier P, Fanard L, Hody JL, Lavand'homme P; Intatechal ropivacaine and clonidine for ambulatory knee arthroscopy: a dose-response study. Anesthesiology. 2001; 94: 574-578.
3. Kallio H, Snall EV, Suvanto SJ, Tuomas CA, Iivonen MK, Pokki JP, *et al.;* Spinal hyperbaric ropivacaine-fentanyl. Reg Anesth Pain Med. 2005; 30: 48-54.
4. Fettes W, Hocking G, Peterson MK, Luck JF, Wildsmith JAW; Comparison of plain and hyperbaric solutions of ropivacaine for spinal anaesthesia. Br J Anaesth. 2005; 94: 107-111.
5. Lee YY, Ngan Kee WD, Muchhal K, Chan CK; Randomized double blind comparison of ropivacaine-fentanyl and bupivacaine-fentanyl for spinal anaesthesia for urological surgery. Acta Anaesthesiol Scand. 2005; 49: 1477-1482.
6. Casati A, Moizo E, Marchetti C, Vinciguerra F; A prospective, randomized, double-blind comparison of unilateral spinal anesthesia with hyperbaric bupivacaine, ropivacaine, or levobupivacaine for inguinal herniorrhaphy. Anesth Analg. 2004; 99: 1387-1392.
7. Mc Donald SB, Liu SS, Kopacz DJ, Stephenson CA; Hyperbaric spinal ropivacaine: a comparison to bupivacaine in volunteers.Anesthesiology. 1999; 90: 971-977.
8. Lee YY, Muchhal K, Chan CK; Levobupivacaine versus racemic bupivacaine in spinal anaeshesia for urogical surgery. Anaesth Intensice Care. 2003; 31: 637-641.
9. Milligan KR; Recent advances in local anaesthetics for spinal anesthesia. Eur J Anaesth. 2004; 21: 837-847.
10. Marcantonio ER, Flacker JM, Michaels M, Resnick NM; Deliriumis independently associated with poor functional recovery after hip fracture. J Am Geriatr Soc 2000; 48(6): 618 24.
11. Ben-David B, Frankel R, Arzumonov T, Marchevsky Y, Volpin G; Minidose bupivacaïne-fentanyl spin al anesthesia for surgical repair of hip fracture in the aged. Anesthesiology 2000; 92(1): 6-6.
12. Sutter PA, Gamulin Z, Forster A; Comparison of continuous spinal and continuous epidural anaesthesia for lower limb surgery in elderly patients. A retrospective study. Anaesthesia 1989; 44(1): 47-50.
13. Labaille T, Benhamou D, Westermann J; Hemodynamic effects of continuous spinal anesthesia: a comparative study between low and high doses ofbupivacaine. Reg Anesth 1992; 17(4): 193-6.
14. Noble AB, Murray JG; A review of the complications of spinal anesthesia with experiences in Canadian teaching hospital from1959 to 1969. Can Anaesth Soc J 1971; 18(1): 5-17.
15. Collard CD, Eappen S, Lynch EP, Concepcion M; Continuous spinal anesthesia with hemodynamic monitoring for surgical repair of the hip in two patients with severe aortic stenosis. Anesth Analg 1995; 81(1): 195-8.
16. Peyton PJ; Complications of spinal anaesthesia. Anaesth Intensive Care 1992; 20: 417-38.
17. Casati A, Fanelli G, Aldegheri G, Colnaghi E, Casaletti E, Cedrati V; Frequency of hypotension during conventional or asymmetric hyperbaric spinal block. Reg Anesth Pain Med 1999; 24(3): 214-9.
18. Kaya M, Oğuz S, Aslan K, Kadıoğulları N; A low dose bupivacaine: a comparison of hyperbaric and hypobaric solution for unilateral spinal anesthesia. Reg Anesth Pain Med 2004; 29(1): 17-22.
19. Casati A, Fanelli G, Cappelleri G, Aldegheri G, Leoni A, Casaletti E; Effects of spinal needle type on lateral distribution of 0.5% hyperbaric bupivacaine. Anesth Analg 1998; 87(2): 355-9.
20. Enk D, Prien T, Van Aken H, Mertes N, Meyer J, Brüssel T; Success rate of unilateral spinal anesthesia is dependent on injection flow. Reg Anesth Pain Med 2001; 26(5): 420-27.
21. Anderson L, Walker J, Brydon C, Serpell MG; Rate of injection through Whitacre needles affects distribution of spinal anaesthesia. Br J Anaesth 2001; 86(2) : 245-8.
22. Horlocker TT, Wedel DJ, Wilson PR; Effects of injection rate on sensory level and duration of hypobaric bupivacaine spinal anesthesia for total hip fracture. Anesth Analg 1994; 79(4): 773-777.
23. Casati A, Fanelli G, Cappelleri G, Aldegheri G, Berti M, Senatore R *et al.;* Effects of speed of intrathecal injection on unilateral spinal block by 1% hyperbaric bupivacaine. A randomized, double-blind study. Minerva Anestesiol 1999; 65(1-2): 5-10.
24. 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; 24(3): 249-54.