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Original Article

The effects of spinal neddle on skin puncture pain during spinal anesthesia for caesarian sections: Comparison of 26G Quincke and 26G atraumatic spinal needles

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Abstract

Aim: Skin puncture pain during spinal anesthesia is the reason of wincing from spinal anesthesia in many patients. In this study we aimed to compare the effect of two different spinal needles on skin puncture pain during spinal anesthesia for caesarian sections.

Material and Methods: Eighty pregnant women scheduled to undergo elective caesarean section under spinal anesthesia were studied. Spinal anesthesia was induced with hyperbaric bupivacaine 10-15 mg via a 26G Quincke (Group Q, n=40) or 26G atraumatic (Group A, n=40) spinal needle in the sitting position at the L3–4 or L4-5 vertebral level using median approach. Skin puncture pain during spinal anesthesia was assessed on a scale of 0 to 10, where 0 means refers no pain and 10 the worst possible pain (0 no, 1–3 mild, 4–6 moderate, 7–10 severe).

Results: Skin puncture pain VAS values, median (range) [IQR], were 2(1-5)[1-3] in Group Q and 2(1-7)[1-3] in Group A. There were no statistically differences between the groups (p=0.707).

Conclusion: We believe that Quincke and Atraumatic spinal needles don't have any difference in terms of skin puncture pain during spinal anesthesia for cesarean section.

Keywords: Skin Puncture Pain; Spinal Anesthesia; Spinal Needle; Caesarian Sections.

INTRODUCTION

Spinal anesthesia is a simple, fast and reliable method of anesthesia that is frequently preferred during the surgery of the lower body parts. However, many patients reject spinal anesthesia due to back pain and fear of needles (1). Skin puncture pain during spinal anesthesia has both somatic and psychological components (2). Many techniques have been used to alleviate the skin puncture pain during spinal anesthesia including infiltration analgesia and eutectic mixture of local anesthetic (EMLA) patch. However, local anesthetics themselves may produce pain on injection and may cause disappearance of anatomical landmarks (3-6).

It should be noted that, reducing the skin puncture pain during spinal anesthesia not only increases the comfort and satisfaction of the patient, but also allows the anesthetist to apply spinal anesthesia more quickly and easily.

In this study we aimed to compare the effect of 26G Quincke and 26G atraumatic spinal needles on skin puncture pain during spinal anesthesia for caesarian sections.

MATERIALS AND METHODS

Institutional ethics committee approval and written consent from the patients were obtained for the study. Eighty pregnant women, with gestational age of 38-40 weeks, between the ages of 19-45 years, ASA physical status II, scheduled to undergo elective caesarean section under spinal anesthesia, were studied.

Exclusion criteria were contraindication to neuraxial anesthesia or known allergy to bupivacaine, spinal puncture failure, body mass index (BMI) >35 kg/m2,

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multiple gestation, emergency CS and preoperative presence of any other abdominal mass or ascites. Patients with a history of back surgery, communication problems, skin problems, scars, eczema, and history of previous neuraxial block, more than one skin puncture attempt, pregnancy-induced hypertension, preeclampsia, eclampsia and gestational diabetes, coagulopathies were also excluded from the present study.

The patients were randomized, by using a computer-generated block randomization, into 2 groups: Group Q; (n=40) spinal anesthesia with 26G Quincke spinal needle (Egemen International, Turkey), Group A; (n=40) spinal anesthesia with 26G atraumatic spinal needle (Atraucom® - Egemen International, Turkey).

All patients were expected to fast 6-8 hours before CS, and no one was pre-medicated. Routine monitors (consisting of a pulse oximeter, 3-lead ECG and a non-invasive blood pressure cuff) were applied. Following pre-hydration with Ringer's lactate solution 500 mL, spinal anesthesia was induced with hyperbaric bupivacaine 10-15 mg via a 25G Quincke or non traumatic spinal needle in the sitting position at the L3–4 or L4-5 vertebral level using median approaches by an anesthesiologist with more than 5 years of experiences. Patients were then positioned in a 10˚ left-lateral tilt. Oxygen (4 L.min-1) was administered through a facemask. Surgery was initiated when the sensory block level reached at T4. Patients' demographic data such as; age, weight, height, body mass index (BMI), and physical status according to American Society of Anesthesiologists (ASA) were also noted.

Skin puncture pain during spinal anesthesia was assessed on a scale of 0 to 10, where 0 means no pain and 10 the worst possible pain (0 no, 1–3 mild, 4–6 moderate, 7–10 severe). The time taken by CSF to fill spinal needle hub were recorded by an anesthesia nurse blind to the study with a stop watch (starting from spinal puncture).

Sample size analysis

In a previous study, 70% of moderate and severe skin puncture pain during spinal anesthesia was detected with the Quincke spinal needle (7). The number of patients required to reduce this moderate and severe pain by half was calculated as 37 patients with $\alpha = 0.05$ and $\beta = 0.80$. Considering the possible losses, it was planned to include 40 patients in both groups and 80 patients in total.

Statistical analysis

Statistical analyses were performed with SPSS 15.0 software (SPSS Institute, Chicago, IL, USA). Continuous data were tested for normality. Normally distributed data were summarized using mean and standard deviation and were compared using unpaired two-tailed t-tests. Skewed data were summarized using median (range) [IQR] and were compared using Mann-Whitney-U test. Categorical data were summarized using number (%) and were compared using X2 test. A P-values less than 0.05 were considered statistically significant.

RESULTS

A total of 75 patients completed the study. Three patients in the Group Q and two patients in the Group A were excluded from the study because of more than one skin puncture attempt during spinal anesthesia (Figure 1).

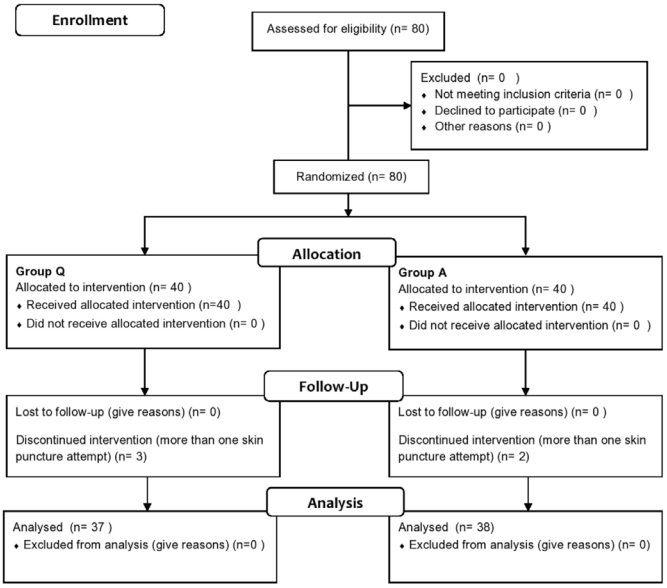

Figure 1. CONSORT flowchart detailing patient recruitment.

Patients' demographic data summarized in Table 1, and there were no significant differences between the two groups regarding age, weight, height, BMI, and ASA physical status (p=0.504, p=0.136, p=0.174, p=0.052 and 0.224, respectively). Comparison of skin puncture pain during spinal anesthesia between the groups are summarized in Table 2.

Table 1. Patients' characteristics

	Group Q (n=37)	Group A (n=38)	p
Age. yr	28.63±6.96	29.60±5.34	0.504
Height, cm	161.36±4.51	163.00±4.82	0.136
Weight, kg	72.75±11.52	69.71±7.12	0.174
BMI, kg/m2	27.88±3.84	26.29±3.05	0.052
ASA physical status, number (%)			0.224
I	26 (70.3)	31 (81.6)	
II	11 (29.7)	7 (18.4)	

Values are mean±SD and number (proportion)
BMI: Body mass index, ASA: American Society of Anesthesiologist

Table 2. Assessment of Skin Puncture Pain

	Group Q (n=37)	Group A (n=38)	p
Skin Puncture Pain VAS (1-10)	2 (1-5) [1-3]	2 (1-7) [1-4]	0.707
Skin Puncture Pain Severity, n (%)			0.446
Mild	30 (81.0)	28 (73.7)	
Moderate	7 (19.0)	9 (23.7)	
Severe	0 (0)	1 (2.6)	

Values are median(range)[IQR] and number (proportion)
VAS: visual analog score; IQR: Interquartile range

Skin puncture pain VAS values, median (range) [IQR], were 2(1-5)[1-3] in Group Q and 2(1-7)[1-3] in Group A. (Figure 2).

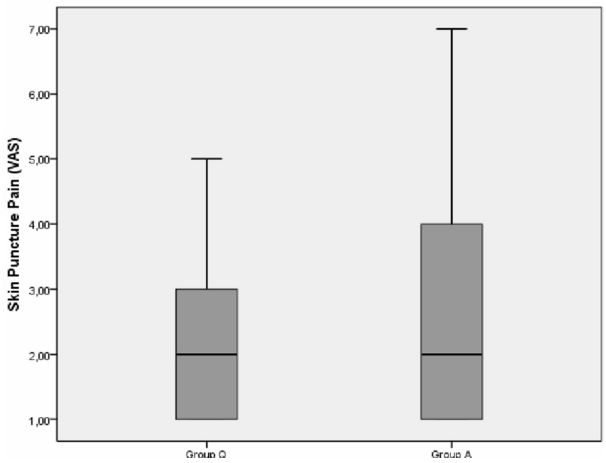

Figure 2. Skin puncture pain VAS values

There were no statistically difference between the groups (p=0.707). In group Q, the maximum VAS value ranged from 1 to 3 (mild pain) in 30 (81%) of the patients and the maximum VAS value ranged from 4-7 (moderate pain) in 7 (19%) of the patients. In group A, the maximum VAS value ranged from 1 to 3 (mild pain) in 28 (73.7%) of the patients and the maximum VAS value ranged from 4-7 (moderate pain) in 9 (23.7%) of the patients. While there were no patients with severe (VAS value>7) skin puncture pain during spinal anesthesia in group Q, severe skin puncture pain developed in only 1 (2.6%) patient in group A. When the pain severity was compared between the groups, no statistical difference was found (p=0.446).

The needle hub filling time was statistically shorter in Group A compared to Group Q (p=0.003, Table 3). The needle hub filling time was (mean±SD) 18.45±2.53 sec in Group Q and 16.34±3.38 sec in Group A.

Table 3. Time Taken by CSF to Fill Needle Hub

	Group Q (n=37)	Group A (n=38)	p
Time to fill needle hub (sec)	18.45±2.53	16.34±3.38	0.003

Values are mean±SD

DISCUSSION

In the present study we observed that there was no differences in the skin puncture pain incidence of Quincke and atraumatic spinal needles during spinal anesthesia for caesarian sections.

Skin puncture during spinal anesthesia can even cause patients to refuse spinal anesthesia due to pain and stress. Both the needle fear and the skin puncture pain may cause both physical and psychological problems to the patient (8). Therefore, various methods have been tried to alleviate skin puncture pain during spinal anesthesia. Pharmacological methods are the most popular among these methods.

In a study of Duman et al. comparing with i.v. fentanyl with 5% prilocain-lidocaine cream applied to the puncture area, prilocaine-lidocaine cream was shown to be superior to alleviate skin puncture pain to both the control group and the iv fentanyl group (9). It is also seen that the pain scores in this study are lower in both groups than the results of present study. We believe that this difference is due to male gender of all patients in this study. It is known that women respond to painful stimuli with higher pain scores than men (10).

Sharma et al. have stated that EMLA cream reduces pain more than lidocaine infiltration in the puncture area in studies using EMLA cream to reduce skin puncture pain during spinal anesthesia (11). In our study, the pain scores of the patients in both groups were lower in this study than in the patients treated with lidocaine, but it seems to be close to the pain scores in the patients who were applied EMLA cream.

In another study, EMLA cream application significantly reduced skin puncture pain scores compared to placebo and placebo + local anesthetic infiltration (12). It was also found that the pain scores of the patients in both groups of our study were similar to those in the placebo and placebo + local anesthetic infiltration groups in this study. However, higher pain scores were observed in both groups in our study compared to the pain scores in patients treated with EMLA cream.

According to our study, it is predictable that lower VAS scores can be obtained in studies using EMLA cream. Because, while EMLA cream is a local anesthetic agent, in our study, only spinal needle factor was evaluated for skin puncture pain effect. However, it is obvious that similar pain scores with our study was stated in some studies using the EMLA cream. It has been shown that EMLA cream can act up to a maximum of 5 mm from 90 to 120 minutes after application of the cream (13), and it should be remembered that a needle penetration of more than 5 mm is required during spinal anesthesia. On the other hand, it is obvious that local anesthetic infiltration causes skin puncture pain in itself.

In addition, all these studies used different patient populations and spinal needles of different sizes, and none of them were aspired for a specific group with a higher pain perception as in our study.

Apart from all these pharmacological agents, the effects of Valsalva maneuver on skin puncture pain during spinal anesthesia were evaluated in 2 different studies (2,7). In these two studies, it has been shown that the Valsalva maneuver relieves skin puncture pain during spinal anesthesia. Among these studies, 25 G Quincke spinal needle was preferred by Kumar et al. and the pain scores in the control group were higher than those of the two groups in our study (2). In this study, the incidence of skin puncture pain during spinal anesthesia, which was 100% in the control group, was reduced to 10% by Valsalva maneuver. As in other studies on this subject, a

specific patient population is not preferred in this study. Furthermore, the applicability of the Valsalva maneuver in each patient is not questioned.

Many studies have compared Quincke and non traumatic spinal needles, but none of these studies have evaluated skin puncture pain during spinal anesthesia. Comparisons of spinal needles are more about PDPH, and many studies have demonstrated the superiority of non traumatic spinal needles with Quincke spinal needles in terms of PDPH (14,15). In addition, when the effects of Quincke and atraumatic spinal needles on the incidence of backache were compared, a higher rate was found in non traumatic needles (14).

CONCLUSION

In conclusion, atraumatic spinal needles, with obvious advantages in reducing the incidence of PDPH, has no superiority to reduce skin puncture pain during spinal anesthesia for cesarean section.

Competing interests: The authors declare that they have no competing interest.
Financial Disclosure: There are no financial supports
Ethical approval: Institutional ethics committee approval and written consent from the patients were obtained for the study

REFERENCES

1. Gajraj NM, Sharma SK, Souter AJ, et al. A survey of obstetric patients who refuse regional anaesthesia. Anaesthesia. 1995;50:740-1.
2. Kumar S, Gautam SK, Gupta D, et al. The effect of Valsalva maneuver in attenuating skin puncture pain during spinal anesthesia: a randomized controlled trial. Korean J Anesthesiol. 2016;69:27-31.
3. Morris RW, Whish DKM. A controlled trial of pain on skin infiltration with local anaesthetics. Anaesthesia and Intensive Care. 1984;12:113-4.
4. Morris R, McKay W, Mushlin P. Comparison of pain associated with intradermal and subcutaneous infiltration with various local anesthetic solutions. Anesthesia and Analgesia. 1987;66:1180-2.
5. Kapelushnik J, Koren G, Sohl H, et al.. Evaluating the efficacy in alleviating pain associated with lumbar puncture: comparison of open and double-blinded protocols in children. Pain. 1990;42:31-4.
6. Kobayashi Y, Kamada Y, Ichimiya T, et al. Is local anesthesia necessary for spinal needle insertion? Masui. 1999;48:1033-6.
7. Mohammadi SS, Pajand AG, Shoeibi G. Efficacy of the valsalva maneuver on needle projection pain and hemodynamic responses during spinal puncture. Int J Med Sci. 2011;8:156-60.
8. Gupta D, Agrawal A, Dhiraaj S, et al. An evaluation of balloon inflation on venous cannulation pain in children: a prospective, randomized, controlled study. Anesth Analg. 2006;102:1372-5.
9. Duman EN, Karaca M. Comparison of Five Percent Prilocaine-lidocaine Cream and Intravenous Fentanyl in Reducing the Spinal Puncture Pain. International Journal of Pharmacology 2011;7:836-42.
10. Gursoy A, Ertugrul DT, Sahin M, et al. The analgesic efficacy of lidocaine/prilocaine (EMLA) cream during fine-needle aspiration biopsy of thyroid nodules. Clin Endocrinol (Oxf). 2007;66:691-4.
11. Sharma SK, Gajraj NM, Sidawi JE, et al. EMLA cream effectively reduces the pain of spinal needle insertion. Reg Anesth. 1996;21:561-4.
12. Koscielniak-Nielsen Z, Hesselbjerg L, Brushøj J, et al. EMLA patch for spinal puncture. A comparison of EMLA patch with lignocaine infiltration and placebo patch. Anaesthesia. 1998;53:1218-22.
13. Bjerring P, Arendt-Nielsen L. Depth and duration of skin analgesia to needle insertion after topical application of EMLA cream. Br J Anaesth. 1990;64:173-7.
14. Abdullayev R, Küçükebe OB, Çelik B, et al. Does Atraucan cause more postdural puncture backache? Turk J Med Sci. 2015;45:877-81.
15. Pan PH, Fragneto R, Moore C, et al. Incidence of postdural puncture headache and backache, and success rate of dural puncture: comparison of two spinal needle designs. South Med J 2004;97:359-6.