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Research Article

Caesarean Section with Spinal Anesthesia and Postspinal Headache

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Abstract

Purpose: To find out 'what is the leading cause of postpartum headache in patients undergoing caesarean section with spinal anesthesia under elective conditions?'

Methods: Our study was conducted with retrospective, controlled assessment of 304 patients who underwent caesarean section with spinal anesthesia under elective conditions at our institution between 1 June 2012 and 1 November 2012. The patients were assessed in terms of postpartum headache. They were divided into 2 groups: the group with headache versus the group without headache (the latter was the control group). Both groups were compared with respect to age, body mass index (BMI), number of previous pregnancies, indications for caesarean section, the spinal needle used during spinal anesthesia, preoperative and postoperative amount of fluid administration, and mobilization time.

Results: None of the factors that are effective in development of headache, i.e. age, multiparity, the indication for caesarean section, BMI, and needle type, was statistically significant in logistic regression analysis. Only the needle type was significantly related to headache in Chi-Square test. All headache episodes were mild and improved with conservative therapy. We did not find any difference between groups with respect to age, BMI, number of previous pregnancies, indications for caesarean section, preoperative and postoperative amount of fluid administration, and mobilization time.

Conclusion: In patients undergoing cesarean section with spinal anesthesia under elective conditions the main cause of headache is the type of the spinal needle used.

Keywords: caesarean section; headache; spinal anesthesia

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Introduction

Mother's desire to live the moment of birth, and to have the ability to touch and breastfeed her baby at an early period have led to widespread use of regional anesthesia in caesarean section. Spinal anesthesia is an easily performed anesthesia that has a rapid onset of action, providing suitable conditions in caesarean section [1]. In addition, compared to general anesthesia, it has lower fetal and maternal morbidity, and postoperative analgesic requirement [2]. However, postspinal headache that may be observed at postpartum period affects the overall wellbeing of patients, resulting in decreased baby care and increased complaints of the mother. Thus, measures to decrease postspinal headache have been increasingly used.

We aimed to examine the factors effective on development of headache in postpartum period.

Methods

A total of 304 patients were enrolled, who underwent caesarean section under elective conditions at Sifa University School of Medicine department of obstetrics and gynecology, between June 2012 and November 2012. A total of 581 patient records were scanned for the study during that period. Of those patients, 97 were excluded because they were switched to caesarean section during normal vaginal route, 44 were excluded because they were operated under epidural anesthesia, and 136 patients were excluded because they underwent caesarean section under general anesthesia.

The age range of the study population was 16-43 years. There were no significant differences between patients with respect to age, height, weight, and number of previous births . For spinal block, pencan (27-gauge pencan) needle was used in 136 (44.7%) patients, atraumatic (26-gauge) needle in 93 (30.6%) patients, and sharp-pointed (25-gauge Quinke) needle in 75 (24.7%) patients.

An 8-10 hour fasting period expired before the operation. Five hundred cc colloid fluid (6% hydroxyethyl starch 130/0.4 in 0.9% sodium chloride injection) was rapidly infused approximately 15 minutes before the spinal puncture. Following local antiseptic measures, spinal anesthesia was performed at the level of L3-4. The procedure was performed at a seated position. Patients shorter than 150 cm were administered 9 mg Marcaine +0.5% heavy Marcaine + 20 microgram fentanyl, those with a height of 150-170 cm were administered 10 mg Marcaine + 0,5% heavy Marcaine+ 20 microgram fentanyl, and those taller than 170 cm were administered 11mg Marcaine 0.5% heavy Marcaine + 20 microgram fentanyl. All patients were monitored with continuous ECG, O2 saturation, and 5-minute-interval blood pressure readings. All cases were mobilized at postpartum 12th hour. All cases were administered 1000 cc of isotonic saline solution, 1000 cc of lactated Ringer's solution, and parenteral non-steroidal antiinflammatory analgesics at postpartum 1st day. All cases were instructed to take ample oral fluids and caffeinated beverages (180 ml (57 mg) of nescafe twice a day). The patients were warned against fever, excessive vaginal bleeding, malodorous vaginal discharge, headache, and neck pain both at the postpartum period and at discharge. The patients were instructed how to breastfeed their infants. They were prescribed antibiotics and oral paracetamol with caffeine at 6-hour intervals, and intramuscular NSAIDs at 12-hour intervals. They were instructed to take 3 liters of oral fluids a day and continue to take caffeinated beverages for an additional 1 week. They were recommended to remain in bed for 1 week except for the need to use the bathroom, breastfeeding, and mobilization for 10 minutes every 2 hours to prevent postpartum embolization.

Presence of PSHA was assessed from the patient records at follow-up visits at 24 hours, 7 days, and 15 days. (The patients were evaluated based on 24th hour and 7th day visits in an attempt for

patient standardization). Any headache that is relieved in supine position and intensified in sitting or upright position was accepted as PSHA. Other types of headache were considered nonspecific and were not included in PSHA.

We performed the statistical analysis using the Student t test and the Chi-Square test. Two-sided P-values < 0.05 were considered significant.

Table 1 Postspinal headache, according to the data distribution

	General	Group with headache	Group without headache	p
Patient number	304	77	227	
Age (years)	29.69±4.93	29.99±5.19	29.59±4.84	0.538*
BMI (Body Mass Index)	29.54±4.59	30.22±4.82	29.31±4.50	0.132*
Parity (%)				0.345**
Primiparity	105 (34.5)	30 (39.0)	75 (33.0)	
Multiparity	199 (65.5)	47 (61.0)	152 (67.0)	
Indications for caesarean section (%)				0.302**
Previous caesarean	174 (57.4)	46 (59.7)	128 (56.6)	
Elective caesarean	38 (12.5)	7 (9.1)	31 (13.7)	
Infertility	20 (6.6)	6 (7.8)	14 (6.2)	
Anogenital human papillomavirus	4 (1.3)	1 (1.3)	3 (1.3)	
Breech presentation	31 (10.2)	8 (10.4)	23 (10.2)	
Fetal anomaly	10 (3.3)	-	10 (4.4)	
Maternal anomaly	9 (3.0)	2 (2.6)	7 (3.1)	
Cephalopelvic disproportion	8 (2.6)	2 (2.6)	6 (2.7)	
Plasenta previa	1 (0.3)	1 (1.3)	-	
Twin pregnancy	7 (2.3)	4 (5.2)	3 (1.3)	
Previous uterine operation	1 (0.3)	-	1 (0.4)	
The spinal needle type				0.001**
Atraumatic needle	93 (30.6)	30 (39.0)	63 (27.8)	
Pencan	136 (44.7)	20 (26.0)	116 (51.1)	
Sharp-pointed needle	75 (24.7)	27 (35.1)	48 (21.1)	
Postoperative amount of fluid administration	1000 cc of lactated Ringer's solution	1000 cc of lactated Ringer's solution	1000 cc of lactated Ringer's solution	
Postoperative mobilization time	12th hour	12th hour	12th hour	

* Student t test ** Chi-square test

Results

A total of 304 patients aged 16-43 years were included, who underwent caesarean section under spinal anesthesia for elective indications. Demographical data of the patients are also shown on Table 1. Age, body mass index, number of previous pregnancies, indications for caesarean section, and the

needle type were compared in both groups. Seventy-seven (%25.3) of 304 patients developed headache while 227 (%74.6) did not. Headache developed in 20 (14%) of those patients in whom a pen-point needle (27-gauge pencan) was used, 30 (32%) of those in whom an atraumatic (26-gauge) needle was used, and 27 (36%) of those in whom a sharp-pointed (25-gauge Quinke) needle was used. Age, body mass index, number of previous pregnancies, indications for caesarean section, and the needle type were compared in both groups. Only the type of needle was statistically significantly related to headache. In logistic regression analysis, none of them was significant (Table 2).

Table 2 Univariate analysis of the factors affecting headache

	Univariate	
Factor	r	p
Age	1.017	0.537
Multiparity	0.773	0.346
Indications for caesarean section		
Previous caesarean versus elective	0.633	0.312
Previous caesarean versus other	1.005	0.988
BMI (Body Mass Index)	1.043	0.134
The spinal needle type	1.051	0.781

The headache in 77 patients developed after a mean of 2.69 days. Two (2.6%) patients developed headache on first day, 55 (71.4%) on second day, 12 (15.6%) on third day of operation. Six (7.8%) experienced headache between 3 and 10 days while 1 patient had headache on 10th day and another one on 15th day.

The patients were administered intravenous NSAIDs first to relive post dural puncture headache. Resistant headaches were treated with aminocardol in 1000 cc of isotonic saline solution. Headache was completely relieved with parenteral analgesics in 72 (93.5%) patients while aminocardol was needed in 5 (6.5%) patients. They were then instructed to take oral analgesics containing caffeinated paracetamol at 6-hour intervals.

Discussion

Headache, a common postoperative complication of spinal anesthesia, has been known since the advent of spinal anesthesia. The term postspinal headache (PSHA) is used for the disorder. Its incidence has ranged between 0.2% and 24% [3]. Any injury to dura mater may cause headache after dural puncture. Headache may arise following lumbar puncture, myelography, spinal lanesthesia, and epidural anesthesia [4, 5]. Similarly, epidural catheters may also punctuate dura mater and cause headache. Headache is believed to originate from a decrease in intracranial pressure resulting from CSF leakage from the puncture site, resulting in an increased intracranial strain on the meningeal vessels and nerves. Headache is typically located bilaterally at frontal, retro-orbital, or occipital regions, extending to nuchal region. It also involves shoulders and neck. It has an ongoing and severe nature and it may be associated with photofobia, nausea, tinnitus, and impaired hearing. More serious cases may present with diplopia and cranial nerve palsies. These findings may be secondary to traction of related cranial nerves [3]. The main feature of this type of headache is its relationship

with body position. It is intensified when the patient is seated or upright, and is relieved when one assumes the supine position. Postspinal headache typically starts within 24-48 hours following an intervention and lasts for a few days [6, 7].

When untreated, it may last for weeks. It may even rarely lead to a surgical repair. The incidence is related to needle caliber, needle type, and the patient group. The risk of headache increases in parallel to increasing needle caliber. Sharp-pointed needles are associated with an increased headache incidence compared to pencil-point needles of the same caliber. A young age, female gender, early mobilization, inadequate hydration before and after procedure, a dura puncture perpendicular to dural fibers, pregnancy, and repeated dural punctures are the main risk factors for headache [8-10]. Thus, the highest incidence (20-50%) is to be expected in obstetric cases in whom dura mater is inadvertently punctured with an epidural needle whereas the lowest incidence (1%) is observed in aged men in whom a 27-gauge spinal needle is used. Rates as low as 3-4% have been reported with fine pencil-point needles in patients who underwent caesarean section under spinal anesthesia.[4] So far, various measures have been recommended to decrease the headache incidence. Measures such as a few hours bed rest, rest in supine position, oral or intravenous fluid administration, and caffeine or analgesic use have been used [11]. Keeping the patient in a supine position decreases the hydrostatic pressure leading to CSF leakage through the dural puncture, and thus minimizes headache. Analgesic options may range from acetominofen to non-steroidal antiinflammatory drugs. Hydration and caffeine increases CSF production. Caffeine also causes constriction of intracranial vessels. Headache may last for days despite conservative therapy. Epidural blood patch is a very effective treatment for headache.

The primary measure to relieve headache is the use of finer, pen-point needles [12-14]. A significant decrease in the incidence of headache due to dural puncture has been currently achieved with use of pen-point needles for spinal anesthesia [9].

The main feature of this type of headache is its relationship with patient position. It is intensified in seated or upright position and improved or eliminated upon assuming the supine position [15]. PSHA which is considered to develop as a result of a decreased CSF pressure due to a leakage of CSF from the puncture site created by the needle used for spinal anesthesia is an important complication causing patient discomfort. The most important risk factor for its development is the needle type and calibre [16].

The headache rates were high for all three needle types. We believe that it is due to the fact that our sample group consisted of most risky patients, i.e. patients who were younger, female, and pregnant [8-10]. Lunch et al. reported that 25-G Whitcare type needles were ideal [17]. Halpern et al. found that pen-point needles were effective in decreasing the rate of headache as a result of dural puncture and the metaanalysis recommended small-caliber, blunt-point needles [9].

In our study, headache developed in 20 (14%) of patients in whom a pen-point needle (27-gauge pencan) was used, 30 (32%) of those in whom an atraumatic (26-gauge) needle was used, and 27 (36%) of those in whom a sharp-pointed (25-gauge Quinke) needle was used. There was a significant difference between atraumatic spinal needle and sharp-pointed spinal needle with respect to headache incidence ($P < 0.05$). We attributed this difference to the use of a large-caliber, sharp-pointed needle type, resulting in a large amount of CSF leakage. Shutt et al. compared spinal anesthesia applications in caesarean operations using 22, 25, and 27-G needles and found that finer needles were associated with fewer headache incidences. In contrast, Sharma et al. reported that needles smaller than 26 G had considerably less advantage and were associated with considerably higher failure rates for spinal anesthesia [18].

A study by Lavi et al. in 2010 as well as a study by Hammond et al. in 2012 demonstrated that atraumatic needles are important in prevention of postspinal headache [19, 20]. Kim et al. found in one study that body mass index and neuroaxial space increased the success rates in spinal anesthesia [21]. In a 502-patient study, Kuntz et al. reported that a low body mass index was associated with an increased incidence of postspinal headache [22].However, we did not find any significant difference between the two groups with respect to body mass index ($P > 0.05$).

Factors effecting PSHA incidence in addition to needle caliber and body mass index are time to mobilization and hydration. Some previous studies have reported that prophylactic bedrest was not beneficial in decreasing incidence of PSHA [23-25]. Despite both patient groups in our study had similar mobilization time, and received similar amounts of preoperative and postoperative fluid, spinal anesthetic applications using different types of needles led to a change in PSHA incidence. However, a study by Andersen et al. employed bedrest for 24 hours in a patient group and early mobilization in another and found a PSHA rate of 11% in the early mobilization group and 14% in 24 hour bedrest group. Although the groups did not differ in terms of time to onset of headache, the researchers reported clinical importance of early mobilization in prevention of PSHA [26].

Analgesics containing caffeine should be the first drug of choice in relieving postspinal headache [27, 28]. However, despite all of our patients were routinely administered caffeinated paracetamol, the headache incidence was altered by the needle type only.

Conclusions

In patients undergoing cesarean section with spinal anesthesia under elective conditions the main cause of headache is the type of the spinal needle used. When the needle type is not changed it is not possible to observe any improvement in patients with post spinal headache despite all preoperative and postoperative measures. In the light of the above data, we believe that it may beneficial to use pen-point needles of small caliber. We recommend using pen-point (27-gauge pencan) spinal needle in case spinal anesthesia is preferred for caesarean section.

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