Correlative factors of post-dural puncture backache in cesarean section

Pasban Noghabi S*, Hamzei A2, Nazemi SH2, Kamran Bilandy H3

Abstract

Introduction: Spinal anesthesia is an optional method chosen for cesarean section. One main reason for the decline of this method is backache. This study was conducted to investigate the factors associated with post-dural puncture backache in cesarean section.

Materials and Methods: This cross-sectional study was carried out on 200 patients aged 20-40 years old, who were candidates for Cesarean section under spinal anesthesia. The patients’ physical status of American Society of Anesthesiologists was I and EI in 12 months. The procedures were performed in sitting position, with a disposable 25-gauge needle, 75 mg Lidocaine 5% and 25 micrograms Fentanyl. The patients were followed up for incidence of backache in the first 24 hours and the first week after spinal anesthesia.

Results: Incidence of backache in the first 24 hours was 5% and in the first week after spinal anesthesia it was 9.5%. There was a significant relationship between age, dural puncture in the lower part, post-dural puncture headache, high spinal anesthesia, nausea, vomiting and backache in the first 24 hours. Moreover, there was a significant relationship between age, nausea, vomiting and backache in the first week after spinal anesthesia (P<0.05).

Conclusion: Early age, dural puncture in the lower part, high spinal anesthesia, nausea, vomiting, high spinal anesthesia and post-dural puncture headache increased the possibility of post-dural puncture backache.

Keywords: Cesarean Section, Spinal Anesthesia, Back Pains

Introduction

Spinal anesthesia is commonly used in outpatient and numerous routine surgeries. Despite being a good technique, it has complications including headache and backache after dural puncture (1-3). Given that it reduces maternal mortality rate and is devoid of the maternal or neonatal complications common in general anesthesia, spinal anesthesia has become the most common anesthetic technique used in cesarean sections today. In fact, maternal mortality related to cesarean section with spinal anesthesia occurs 16 times less than when general anesthesia is performed (4).
Spinal anesthesia causes denervation of the sympathetic, sensory and motor nervous system. Moreover, injection of the spinal anesthesia solution into the subarachnoid space causes a conduction block in the small unmyelinated sympathetic fibers before blocking conduction of large myelinated fibers (sensory and motor) (5). A transient minor backache is usually observed after the spinal anesthesia, which is associated with the number of times the needle has been inserted for finding the suitable site of injection and the patient’s position during surgery (5). The incidence of post spinal anesthesia backache is reported to be between 52.5% and 54% (6-7). The posterior area of the human body has a complex structure consisting of a network of bones, joints, muscles, ligaments, and nerves interconnected to this muscular structure. The source of traumatic backache can be the spinal column, the muscles, the ligaments and the surrounding fascia, or any combination of them. Detecting the cause of backache is not easy. In their study, David et al. argue that the source of acute backache is not diagnosed in 85% of patients (8). Several factors are involved in the pathogenesis of post-surgical backache, including the type and duration of surgery, duration of immobility and the patient’s position during spinal anesthesia (9). According to recent studies, regardless of the type of anesthesia, 25% of patients will experience backache after surgery, and the backache after spinal anesthesia should not be merely thought of as being caused by the insertion of the needle in patient’s back (10). Use of 25G or 26G needle does not affect the development or intensity of backache (11). Parameters effective in post-dural puncture backache have not been accurately studied yet (11).

In an opinion poll of anesthetists in the UK, 63% of the women recommended regional anesthesia, 32% the method selected by the patient after discussions and 5% general anesthesia (12). Based on this poll, the main obstacle to performing spinal anesthesia was patient’s dissatisfaction for various reasons. Two studies conducted on cesarean section candidates showed that the main reasons for refusing spinal anesthesia were backache, needle phobia and staying awake during surgery (13). There is little evidence to support the relationship between persistent backache and spinal anesthesia. Acute backache after spinal anesthesia is a self-restricting condition that improves within 7 days without any treatments. Warm and cold massages and administration of a weak painkiller such as acetaminophen or topical non-steroidal anti-inflammatory drugs can benefit the healing process (8). Given that backache is a reason for patients’ refusal of spinal anesthesia and given that, in the city of Gonabad, with its social circumstances, the incidence rate for this complication and its correlative factors have not been investigated as of yet, the present study was conducted in 2012 in Gonabad.

**Materials and Methods**

The present research was an analytical cross-sectional study conducted over one year in 22nd Bahman Hospital in Gonabad. The study population consisted of women undergoing cesarean section with spinal anesthesia. The study subjects included 200 patients aged 20 to 40, who, according to the anesthetist, fell in class 1 emergency 1 of the American Society of Anesthesiologists and had undergone spinal anesthesia during the cesarean surgery (5).

Study exclusion criteria were: undergoing a second anesthesia during the course of the study, showing symptoms of high intracranial pressure, having an abnormal spinal anatomy such as scoliosis, infection in the site of spinal anesthesia, coagulation problems, history of persistent backache and the use of complementary medicines during the cesarean section for completing the anesthesia and analgesia. Purposeful convenience sampling was carried out. To that end, all the patients undergoing
cesarean section with spinal anesthesia and meeting the study criteria were selected as subjects of the study. Spinal anesthesia was performed on all the patients by the same person using disposable 25G needles while the patient remained in a seated position, using 25 µg of fentanyl and 75 mg of lidocaine 5%. Sample size was estimated at 200 patients given the incidence rate of 30%, the withdrawals and the confidence interval of 95% while also noting similar studies. Rising spinal anesthetic level means anesthesia levels exceeding T5, and systolic blood pressure drop over 20% of the base pressure or a blood pressure less than 100 mmHg (14). Positions considered in the present study included lying down with the head straight (no pillows under the head), lying down with the head raised, half-sitting, getting out of bed and walking. Nausea and vomiting meant churning stomach and the active expulsion of the gastric content through the mouth during surgery.

Demographic data of participating cesarean section candidates were obtained through completion of the first section of the questionnaire. The spinal anesthesia in-surgery questionnaire was completed during surgery. The patients were then interviewed in person in the first 24 hours after the spinal anesthesia and then through a telephone call over the first week and were examined by the anesthetist with regard to the incidence of backache. Parameters investigated in this study included age, height, weight, occupation, BMI, history of spinal anesthesia and history of cesarean section. Complications during the spinal anesthesia, including nausea and vomiting, rising spinal anesthetic level, hypotension and post-surgical complications, patient’s condition over the first 24 hours and post spinal anesthesia headache were studied as well.

After entering the collected data into SPSS-11.5 software, the statistical analyses were carried out using the independent t, Chi-square, and Fisher’s exact tests.

**Results**

According to findings of the study, the mean age of the patients was 20.06±5.39 years (minimum 20 and maximum 40 years old). Of the subjects studied, 73 (36.5%) were high school graduates, 51 (25.5%) university graduates, 46 (23%) had primary school education, 27 (13.5%) had junior high school education and 3 (1.5%) were illiterate. In terms of occupation, housekeepers had the highest frequency (86.5%). Based on the classification system of the American Society of Anesthesiologists, the highest frequency belonged to the emergency class 1 (53.5%) followed by class 1 (46.5%). On the one hand, 56% of the patients had no history of cesarean section while 87.5% had never experienced spinal anesthesia before. The post spinal anesthesia backache was observed in 10 patients (5%) over the first 24 hours and in 19 patients (9.5%) over the first week. Table 2 presents statistical results of the independent t test and Chi-square test as well as certain related factors.

According to study results, there is a significant relationship between age and the incidence of backache over the first 24 hours (P=0.000) and within the first week (P=0.022) of spinal anesthesia, but no significant relationship was found between height and weight and headache (P>0.05). Furthermore, none of the other demographic characteristics had a significant relationship with the incidence of post spinal anesthesia backache (P>0.05) (table 1).
There was a significant relationship between factors during the spinal anesthesia and backache experienced in the first 24 hours, namely, rising spinal anesthetic level (P=0.003) and nausea and vomiting during spinal anesthesia (P=0.03); however, there was no relationship between hypotension and backache (P=0.4). Moreover, a significant relationship was found between nausea and vomiting during spinal anesthesia and backache over the first week of the spinal anesthesia (P=0.032), but the relationship between spinal anesthetic level (P=0.5) and hypotension (P=0.3) and backache was not significant. Table 2 presents examined factors in relation with the spinal anesthesia technique.

Table 2: Relationship between examined factors and the spinal anesthesia technique

<table>
<thead>
<tr>
<th>Correlative factors</th>
<th>Backache</th>
<th>Test results</th>
<th>Test results</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>First 24 hours within spinal anesthesia</td>
<td>First week within spinal anesthesia</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Yes Frequency</td>
<td>No Frequency</td>
<td>Yes Frequency</td>
</tr>
<tr>
<td>Number of attempts taken at spinal anesthesia</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Once</td>
<td>9(5.6)</td>
<td>152(94.4)</td>
<td>14(8.7)</td>
</tr>
<tr>
<td>Twice</td>
<td>1(4.2)</td>
<td>23(95.8)</td>
<td>5(28.8)</td>
</tr>
<tr>
<td>Thrice</td>
<td>0(0)</td>
<td>15(100)</td>
<td>0(0)</td>
</tr>
<tr>
<td>Space used for spinal anesthesia</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>L₂-L₃</td>
<td>2(3.3)</td>
<td>60(96.7)</td>
<td>4(6.5)</td>
</tr>
<tr>
<td>L₃-L₄</td>
<td>6(6.2)</td>
<td>92(93.8)</td>
<td>10(10.2)</td>
</tr>
<tr>
<td>L₄-L₅</td>
<td>1(2.7)</td>
<td>37(97.3)</td>
<td>5(13.2)</td>
</tr>
<tr>
<td>S₁-L₄</td>
<td>1(50)</td>
<td>1(50)</td>
<td>0(0)</td>
</tr>
</tbody>
</table>
According to table 2, the only significant relationship found was that between the space used for spinal anesthesia and the incidence of backache within the first 24 hours \((P=0.002)\) while no significant relationships exist between backache and the other factors studied \((P>0.05)\).

One of the factors studied after the spinal anesthesia was the patient’s condition in the first 24 hours of the anesthesia, for which the data obtained showed no significant relationship with backache (over the first 24 hours \(P=0.8\), and over the first week \(P=0.6\)). Findings of the study revealed a significant relationship between the incidence of backache over the first 24 hours and the incidence of post-dural puncture headache \((P=0.000)\), but no such relationship existed between the latter and the incidence of backache over the first week \((P=0.8)\).

**Discussion**

Backache induced by spinal anesthesia is the main reason for the refusal of this anesthetic technique among women undergoing cesarean section. The present study investigated the incidence rate of backache over the first 24 hours after spinal anesthesia and within the first week of the surgery. According to the present study, the incidence rate of this complication is 5% (10 patients) over the first 24 hours and 9.5% (19 patients) over the first week. These figures are not higher than figures found in other studies. In a study conducted by Haghighi et al., the incidence rate of backache within the first day, week and month of orthopedic surgery was 16%, 9%, and 35% respectively (15). The difference of results between these two studies can be attributed to the duration of surgery because cesarean section often takes shorter than orthopedic surgeries. The study conducted by Homairi H et al. reports the prevalence rate of post spinal anesthesia backache in cesarean section to be 46.5% (10). This difference of results could be due to the patients being asked about backache a day after surgery and then 6 weeks after discharge and the incidence of post spinal anesthesia backache was reported in total. In a study conducted by Jahani Sh et al., the incidence rate of backache was reported to be 13.5% in cesarean section patients undergoing spinal anesthesia and 9.6% for those undergoing general anesthesia, which were not significantly different (16).

In the present study, complications were investigated both during and after spinal anesthesia. Findings were indicative of a significant relationship between age and backache. In other words, the likelihood of the incidence of backache increases with younger age. Previous studies have also noted this relationship (17). Factors such as height, weight, history of spinal anesthesia and cesarean section and BMI did not reveal a significant relation with complications resulting from anesthesia. In the study conducted by Homairi et al., a significant relationship was found between BMI and backache in such a way that in patients with lower BMI, the prevalence of backache was also lower (10). Haghighi et al. believe that a history of spinal anesthesia is among the factors associated with the incidence of post spinal anesthesia backache (15). Among other factors studied were the complications arising during spinal anesthesia, out of which nausea and vomiting displayed a significant relationship with rising spinal anesthetic level \((P<0.05)\). As there were only two patients in this study who suffered from the rising spinal anesthetic level complication, a larger sample size is required to ascertain the relationship. Moreover, no scientific justification was found for nausea and vomiting and these complications comprised a mere clinical finding.

As for the inter-vertebral space selected for performing the spinal anesthesia, results indicated that the incidence of post spinal anesthesia backache is reduced with the choice of higher spaces.
Meticulous studies have been conducted on the type and size of spinal anesthesia needle and its relationship with the incidence of post spinal anesthesia backache. For example, no difference was observed in the incidence rate of post spinal anesthesia backache in the 274 patients on whom 23G and 25G needles had been used (18). Lowery & Oliver compared the prevalence rate of post-dural puncture headache and backache in 99 children after the use of a cutting needle 22 and a pencil tipped needle 25. Results showed that 11 patients in the needle 22 group were experiencing backache while none of the patients in the needle 25 group were (19). Results of certain studies conducted in the past reveal that the number of attempts taken at successful spinal anesthesia increases the risk of trauma and potential backache after surgery (8). Therefore, in the present study, spinal anesthesia was performed on the majority of patient with only one attempt.

In the investigations performed after the spinal anesthesia, a significant relationship was found between headache and backache in the first 24 hours of the spinal anesthesia; however, no relation was found between the patients’ condition in the first 24 hours of surgery and post spinal anesthesia backache.

According to a study conducted in Isfahan on 500 patients between the ages of 16 and 60, the prevalence of post surgical backache is 27.4% and is related to factors such as the extent of surgery, spinal anesthesia and patient’s supine position during surgery (20). Shoab et al. investigated enduring post spinal anesthesia backache within the first three months and one year of anesthesia in 245 patients. Their study was comparable to 11 other studies they cited (15.4% compared to 18%). Many of these patients had been suffering from backache prior to surgery and did not associate their long-term backache with spinal anesthesia (21).

Other studies reveal that 49% of women complain about backache during pregnancy. Back problems prior to pregnancy, age, multiple birth and certain physical and physiological job-related factors increase the risk of backache (22). Another related factor is the injection of saline or local anesthetic into the interspinous ligament and the development of supraspinous hematoma. Excessive stretching of the ligaments after the releasing of the paraspinus muscles and local trauma to the inter-vertebral disc can also affect the incidence of backache (8).

A limitation of the present study is that the criterion for the incidence of backache has only been the patient’s own complaint and no paraclinical examinations have been conducted in addition to interviews and autobiographies to investigate the presence or lack thereof pathological lesions. Such procedures require the close cooperation of the patient and the expenditure of huge amounts of time and money. It is recommended that the intensity of the backache be evaluated in future studies using criteria such as the Visual Analogue Scaling.

Conclusion
According to findings of the present study, 5% of the patients experienced backache in the first 24 hours of the spinal anesthesia while 9.5% experienced it over the first week. Factors influential in increasing the risk of backache in the first 24 hours of spinal anesthesia include the patient’s age, performing spinal anesthesia in lower spaces, nausea and vomiting during surgery, rising spinal anesthetic level and the incidence of post-dural puncture headache. Given the relatively low percentage of the prevalence of backache in the present study, the likelihood of the incidence of backache can be reduced by presenting strategies and controlling correlative factors.
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Conflict of interest
The authors declare to have no conflicts of interest in this study.

References:
