

An evaluation of regional anesthesia complications and patient satisfaction after cesarean section

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Ethics Committee Approval

Local Ethics Committee approval was obtained from Zekai Tahir Burak Women's Health Training and Research Hospital Ethics Committee on 26.12.2013 with the decision numbered 21. All procedures in this study involving human participants were performed in accordance with the 1964 Helsinki Declaration and its later amendments.

Conflict of Interest

No conflict of interest was declared by the authors.

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Abstract

Background/Aim: In obstetric anesthesia, regional techniques are considered advantageous for maternal mortality and morbidity. Nevertheless, serious or less severe complications related to regional anesthesia may occur. This study aimed to determine the postoperative early complications and assess postoperative pain and satisfaction of the patients by conducting a postoperative survey among those operated with regional anesthesia on the day after cesarean section.

Methods: All patients who underwent a cesarean section with regional anesthesia during the day within six months at our institution were considered for eligibility to participate in this cross-sectional study. On the day after the surgery, an anesthesiologist visited the patients and collected postoperative data, including demographic data and previous anesthesia experience, presence and intensity of the pain (current and from the operation until the postoperative visit), postoperative analgesia method, postoperative nausea, and vomiting (PONV), urinary catheterization, gas discharge, presence of backache, headache, shoulder pain, and initiation and the difficulties of breastfeeding. The patients were also questioned about their comfort during the operation, and their satisfaction with the anesthetic technique used.

Results: A total of 729 patients participated in the survey. Postoperative pain was managed with paracetamol and non-steroidal anti-inflammatory drugs in 696 (95.5%) patients, PCEA in 25 (3.4%) patients and intravenous PCA in 8 (1.1%) patients. Six hundred and ninety-three (87.7%) patients had pain at the time of the visit and the mean VAS score of current pain intensity was 4.2 (1.7). Seven hundred and twenty-two (99.0%) patients had pain between the end of the operation until the postoperative visit and the mean VAS score of maximum pain intensity was 6.4 (2.0). The mean time until postoperative pain began was 3.7 (2.4) hours. Among all, 48.7% of the patients experienced backache, 36.9% had shoulder pain, 17.8% had postoperative nausea, 6.6% had postoperative vomiting, and 20.2% had a postpartum headache. Breastfeeding was not initiated until the first postoperative day in 87.5% of the patients and the mean time until the onset of breastfeeding was 1.9 (2.8) hours. The intraoperative comfort and satisfaction with the anesthesia method were rated as good/very good by 74.7% and 84.4% of our patients, respectively.

Conclusion: Backache and shoulder pain are the most frequent minor complications in patients operated with regional anesthesia on the day after cesarean section. Determining and overcoming postoperative early complications is important for the satisfaction of patients after cesarean section.

Keywords: Cesarean, Regional anesthesia, Postoperative complications, Patient satisfaction

Introduction

Obstetric patients differ from the other surgical populations because of concerns about the baby's exposure to anesthesia and peripartum surgical recovery needs, like breastfeeding and caring for a newborn baby. The choice of anesthesia type for cesarean section is affected by many factors. Anesthesiologists aim to prefer the safer and more comfortable method for the mother that is less harmful to the newborn.

In obstetric anesthesia, regional techniques are considered advantageous for maternal mortality and morbidity. Regional anesthesia has the advantage of an awake mother and minimal anesthetic exposure of the newborn baby. Regional techniques avoid the risks of general anesthesia like maternal aspiration, difficult airway, and failed intubation. It also enables the use of neuraxial opioids for post-operative pain.

The cesarean procedure is still associated with higher rates of maternal and perinatal mortality and morbidity. The overall postoperative morbidity rate associated with cesarean births is 35.7% [1]. The higher mortality and morbidity rates might be attributable not only to the surgical but also to the anesthetic procedures. Regional anesthesia techniques also have infrequent life-threatening complications. The most serious complications are from accidental intravenous administration of local anesthetics, administration of an overdose of local anesthetic intrathecally (total spinal) from unintentional subarachnoid placement, or migration of an epidural catheter. In addition to these serious complications, more frequent and less severe complications and side effects may occur with neuraxial blockade both intraoperatively and postoperatively, including inadequate analgesia, hypotension, nausea, shivering, urinary retention, motor weakness, elevated temperature, and a prolonged block. More serious postoperative complications like meningitis, epidural hematoma, and nerve or spinal cord injury are extremely rare [2].

This study aims to determine the postoperative early complications and assess the quantity of postoperative pain and satisfaction of patients by establishing a postoperative survey of patients operated with regional anesthesia on the day after cesarean section.

Materials and methods

After Local Ethics Committee approval (Zekai Tahir Burak Women's Health Training and Research Hospital Ethics Committee- 26.12.2013-21) was obtained, all patients who had a cesarean section with regional anesthesia during the day within six months were considered for eligibility. Exclusion criteria included being under 18 years of age, inability to communicate, having a history of chronic pain or opiate abuse, having a caesarian section after 4 p.m. (during the night shift), and admission to the surgical intensive care unit postoperatively. Informed written consent was taken from the patients before they were enrolled in the study.

In our institution, the routine practice of neuraxial anesthesia involves the prehydration of all patients intravenously with 1000 mL of lactated Ringer's solution. For spinal anesthesia and the spinal component of combined spino-epidural anesthesia (CSE), 10-13 mg hyperbaric bupivacaine and 10-20 µg of

fentanyl are intrathecally administered via a 26-gauge needle inserted at the L3-L4 or L4-L5 interspace with an atraumatic spinal bevel. For epidural anesthesia, 15-20 ml of 0.5% bupivacaine is administered to the peridural area via an epidural catheter inserted at the L3-L4 or L4-L5 interspace. 50-100 µg of fentanyl is added to the local anesthetic solution. Metoclopramide 10 mg is routinely used for all patients for the prevention of nausea and vomiting.

Subsequent postoperative management is generally maintained by the surgical unit responsible for the patient. Patients are prescribed oral paracetamol (1g x 4) combined with intravenous tenoxicam 20 mg for routine postoperative analgesia. Patient-controlled epidural analgesia (PCEA) is not used routinely. When used, the PCEA device is programmed to give 5 ml of boluses of a solution of 0.5 mg.ml⁻¹ bupivacaine and 5 µg.ml⁻¹ fentanyl with a lockout interval of 20 min.

On the day after the surgery, an anesthetist visited the patients and collected postoperative data. The anesthesiologists who participated in interviewing the patients after their cesarean section were different from that who performed the intraoperative anesthesia. The questionnaire was administered via a face-to-face interview. The demographic data (maternal age, weight, height, education), previous anesthesia experience of the patients, type of previous anesthesia performed, presence and intensity of the pain (current and from the operation until the postoperative visit), postoperative analgesia method, time until decrement of motor block and first mobilization, the presence of postoperative nausea and vomiting (PONV), urinary retention, gas discharge, presence of backache, headache, and shoulder pain, and initiation and difficulties about breastfeeding. The patients were also questioned about whether they remembered the birth of their baby, their intraoperative comfort, satisfaction with the anesthetic technique used, if they would prefer the same method again in future surgeries, and their current pain level. Pain assessment was performed using a visual analog scale (VAS: 0–10 cm). The patients' intraoperative comfort and their satisfaction with the anesthetic technique used were assessed with a five-point scale as very good, good, average, bad, very bad.

Statistical analysis

Statistical analyses were performed using SPSS Software (Version 21.0, SPSS Inc., IL, USA). Categorical data were expressed as number and percentages (%) and continuous data, as mean (SD) (range).

Results

The total number of patients who had cesarean section within 6 months was 3210, 1128 of which had the operation during the day. General and regional anesthesia were administered to 276 and 852 patients, respectively. Among these 852 patients, 756 patients met the inclusion criteria, and 729 accepted to participate in the survey.

The demographic characteristics, previous anesthesia experience of the patients, and indications for cesarean section are detailed in Table 1. Postoperative analgesia was provided with paracetamol and non-steroidal anti-inflammatory drugs in 696 (95.5%) patients, PCEA in 25 (3.4%) and intravenous PCA in 8 (1.1%) patients. Six hundred and ninety-three (87.7%)

patients had pain at the time of the visit and the mean VAS score of current pain intensity was 4.2 (1.7). Seven hundred and twenty-two (99.0%) patients experienced pain between the operation until the postoperative visit and the mean VAS score of the maximum pain intensity was 6.4 (2.0). The mean time until pain onset after the operation was 3.7(2.4) hours. The mean times elapsed for decrement of motor block and the first mobilization were 3.9 (1.5) hours and 6.4 (1.9) hours, respectively (Table 2).

Table 1: Demographic characteristics, previous anesthesia experience of the patients and indications for cesarean section

Age (years), mean (SD)	29.0 (5.3)
Height (cm), mean (SD)	161 (8.1)
Weight (kg), mean (SD)	77.8 (12.7)
Education level, n (%)	Unschooling 14 (1.9%) Primary school 200 (27.4%) Secondary school 175 (24%) High school 218 (29.9%) College 122 (16.7%)
Previous anesthesia, n (%)	No 226 (31%) Yes 503 (69%)
Previous anesthesia type, n (%)	General anesthesia 315 (43.2%) Regional anesthesia 155 (21.3%) General + regional anesthesia 33 (4.5%)
Indication of surgery, n (%)	History of previous cesarean 441 (60.5%) Cephalopelvic disproportion 90 (12.3%) Fetal distress 65 (8.9%) Breech presentation 57 (7.8%) Maternal disease 25 (3.4%) Twin pregnancy 21 (2.9%) Labor arrest 10 (1.4%) Oligo/polyhydramnios 7 (1.9%) Placenta previa 2 (0.3%) Pre-eclampsia 6 (0.8%)

Table 2: Pain and motor blockage characteristics of the patients

Current pain intensity (VAS), mean (SD)	4.2 (1.7)
Maximum pain intensity (VAS), mean (SD)	6.4 (2.0)
Start of pain (hours), mean (SD)	3.7 (2.4)
Decrement of motor blockage (hours), mean (SD)	3.9 (1.5)
First mobilization (hours), mean (SD)	6.4 (1.9)

The percentage of patients who had PONV, urinary retention, gas discharge, backache, headache, shoulder pain is presented in Table 3. The mean time elapsed until the first gas discharge was 12.3 (5.4) hours. A total of 638 (87.5%) patients began breastfeeding, within a mean time of 1.9 (2.8) hours. One hundred and fifty-five (21.3%) patients had difficulty with breastfeeding (Table 4).

Table 3: Presence of complications

	Yes, n(%)	No, n(%)
Nausea	130 (17.8%)	599 (82.2%)
Vomiting	48 (6.6%)	681 (93.4%)
Gas discharge	565 (77.5%)	164 (22.5%)
Urine retention	18 (2.5%)	711 (97.5%)
Headache	147 (20.2%)	582 (79.8%)
Backache	355 (48.7%)	374 (51.3%)
Shoulder pain	268 (36.9%)	460 (63.1%)

Table 4: Breastfeeding characteristics of the patients

Lactation, n(%)	Yes 638 (87.5%) No 91 (12.5%)
Start of breastfeeding (h), mean (SD)	1.9 (2.8)
Difficulty in breastfeeding, n(%)	No 463 (63.5%) Yes 155 (21.3%) Baby in neonatal unit 20 (2.7%) No lactation 91 (12.5%)

Patients' intraoperative comfort and their satisfaction with the anesthetic technique used are presented in Table 5. The percentage of patients who remembered the birth of their baby was 74.1%. Six hundred and ninety-six (92%) patients stated that the anesthesia method was chosen by the anesthesiologist, 56 (7.7%) patients said it was their own choice and 2 (0.3%) patients stated it as the surgeon's choice. Five hundred and seventy (78.2%) patients would prefer the same method again, 152 (20.9 %) would not and 7 (0.9%) patients were not sure.

Table 5: Intraoperative comfort and satisfaction with the anesthetic technique of the patients

	Comfort *n (%)	Satisfaction ^β , n(%)
Very good	213 (29.2%)	281 (38.7%)
Good	328 (45.0%)	333 (45.7%)
Average	144 (19.8%)	83 (11.4%)
Bad	34 (4.7%)	21 (2.9%)
Very bad	10 (1.3%)	11 (1.3%)

* Intraoperative comfort ^β satisfaction with the anesthetic technique

Discussion

Giving thorough information to the patients and personal care of the anesthesia team are the most important factors for patient satisfaction with anesthesia care [3]. A postoperative visit by the anesthesiologist can increase perceived 'continuity of personal care by the anesthesiologist' and satisfaction [4]. In addition to concerns about patient satisfaction, a postoperative visit is important to determine early complications and assess postoperative pain.

Several large studies are evaluating postoperative or intraoperative patient satisfaction or anesthesia complications. This prospective observational study focuses on postoperative early complications, pain, breastfeeding status, recovery characteristics of post-cesarean patients who received regional anesthesia.

The management of post-cesarean pain is particularly important as recovery is affected by pain. Satisfactory pain relief improves mobility and enhances breastfeeding and infant care in the postpartum period. According to the results of a study, pain is the most frequently identified postpartum problem among women who had a CS, and 79% reported experiencing pain after surgery [5]. In a descriptive study, Karlstrom et al. [6] reported that high levels of experienced pain during the first 24 hours after CS were common. A VAS score of 4 or greater was reported by 78% of patients and the median VAS rating was 6. We found that the mean VAS pain score on the first postoperative day was 4.2 (1.7), and the mean maximum pain intensity score was 6.4 (2.0). Postoperative analgesia was provided with paracetamol and non-steroidal anti-inflammatory drugs in 95.5% of patients. NSAIDs do not only provide postoperative analgesia but also relieve the discomfort of uterine cramps after vaginal delivery [7]. Hsu et al. reported that intraoperative administration of 20 mg tenoxicam produced a morphine-sparing effect for 33% and was sufficient to potentiate the analgesic effect of morphine on uterine cramping pain, but not on resting or evoked wound pain [8]. Our results are consistent with the previous studies. The combination of NSAIDs and paracetamol is synergistic for postoperative pain and is used by many units in the United Kingdom [9]. Paracetamol and NSAID combination is also compatible with Enhanced Recovery After Surgery (ERAS) regimens [10].

Surgical birth affects the onset and continuation of breastfeeding [11]. Women undergoing CS, particularly an emergency CS, are in the high-risk group for breastfeeding difficulties [12]. In our study, 87.5% of the patients had begun breastfeeding by the first postoperative day and the mean time for the onset of breastfeeding was 1.9 (2.8) hours. Kutlucan et al. [13] reported that the lactation onset was delayed in patients undergoing cesarean section with general anesthesia when compared with patients undergoing cesarean section with spinal and epidural anesthesia, and patients giving normal vaginal birth. The other three groups were similar in terms of lactation onset.

The mean time until lactation onset was 10.8(10.2) hours in their study. In another study, the mean time until breastfeeding initiation was 5.9 (1.9) hours in mothers who had a cesarean section with spinal anesthesia. Early contact between the mother and her newborn on the delivery table was the most important predictor of early breastfeeding [14]. Early establishment of breastfeeding within one hour after the cesarean section was higher in the postnatal support group than the usual care group (70.29% vs. 57.14%) in a study comparing the postnatal support for breastfeeding and usual hospital care [15]. The onset of breastfeeding in our study was earlier when compared with the results of Kutlucan et al. [13] and Awi et al. [14], possibly because our maternity hospital is accredited as a baby-friendly hospital and places emphasis on postnatal lactation support. Trained personnel help mothers make skin-to-skin contact immediately after delivery and initiate breastfeeding as quickly as possible.

Postdural puncture backache (PDPB) is one of the most common complaints after neuraxial anesthesia, with an incidence of 2% to 29% in adults [16, 17]. It is defined as the continuous pain that is localized around the site of spinal puncture which does not radiate [18]. The pathophysiology of PDPB includes muscular relaxation with stretching of spinal ligaments and/or localized tissue trauma [17]. In this study, we found out that 355 (48.7%) of patients experienced backache after a cesarean operation. Abdullayev et al. [19] reported the rate of backache as 62.4% with an Atracuan tip needle and 44.2% with a Quincke tip needle after cesarean operations. In another study, 29.3% of the patients experienced back pain on the first postoperative day [20]. The percentage of patients with backache in our study population is lower than that in Abdullayev and colleagues' study, despite the use of the same type of needle.

Shoulder pain is usually seen after laparoscopic surgery. However, recent studies suggest that shoulder pain is also seen after cesarean section [21, 22]. It is one of the consequences of cesarean section and is mostly underestimated. In this study, we found that 36.9% of patients had shoulder pain. Sharp pain observed in these patients was experienced in the shoulder area or under the diaphragm. The pain is described as originating from deep within the shoulder, or from the right chest, and usually disappears within 2-3 days after surgery. Zirak et al. [21] reported the prevalence of shoulder pain after CS as 39.45%, and the incidence of shoulder pain among cesarean patients by general anesthesia was higher than that of spinal anesthesia. This was attributed to air trapping, subdiaphragmatic clot, or peritoneal irritation. In another study, diaphragmatic irritation with amnion fluid or blood was the most important factor for shoulder pain after cesarean section. They reported the incidence of shoulder pain as 26.6 % among patients who had a cesarean section with spinal anesthesia [23]. Shoulder pain may be associated with breastfeeding difficulties. As seen in our study and the previous studies, the incidence of shoulder pain after cesarean section ranges between 26.6-39.6%, and more studies are needed focusing on the reason and the treatments of this complication.

The incidence of nausea and vomiting during regional anesthesia for cesarean delivery varies between 21%-79% [10]. They are reported to reduce patient satisfaction and delay

hospital discharge. In our study, 130 (17.8%) patients experienced postoperative nausea and 48 (6.6%) had postoperative vomiting. We used 10 mg intravenous metoclopramide for routine nausea and vomiting prophylaxis in all our patients. Metoclopramide is a prokinetic agent which increases the tone of the lower esophageal sphincter. It also has an antidopaminergic action on the chemoreceptor trigger zone [24]. According to the results of a meta-analysis, metoclopramide is reported to cause a significant reduction in intraoperative and postoperative nausea and vomiting among patients undergoing cesarean section under neuraxial anesthesia without significant side effects [25].

Postpartum headache is the complaint of headache and neck or shoulder pain occurring within the first 6 weeks after delivery [26]. One prospective cohort study showed that 39% of women reported headaches in the first week after delivery, 75% were reported as primary headaches with the majority attributed to tension-type headaches, 4.7% were PDPH, and 8.1% were due to undetermined causes [27]. In another study by Stella et al., [28] tension and migraine headache were considered the cause in 47% of women, pre-eclampsia or eclampsia in 24%, and PDPH in 16% of the study group. In this study, we found out that 147 (20,2%) of our patients had a postpartum headache. Our results are consistent with the literature. Although most postpartum headaches are caused by temporary situations, more serious causes like cortical vein thrombosis, subarachnoid hemorrhage, posterior reversible leukoencephalopathy syndrome, subdural hematoma, cerebral infarction/ischemia, and meningitis must always be considered. All patients with headaches were further evaluated by our pain department.

Determining patient satisfaction enables evaluating the patient experience of anesthesia and may help to improve the quality of the anesthesia procedure. In our study, the number of patients who rated their intraoperative comfort as very good, good, bad, and very bad were 213 (29.2%), 328 (45.0%), 34 (4.7%), and 10 (1.3%), respectively. The number of patients who rated their satisfaction with the anesthetic technique as very good, good, bad, and very bad were 281 (38.7%), 333 (45.7%), 21 (2.9%), and 11 (1.3%), respectively. The bad and very bad ratings were evaluated as having had discomfort and dissatisfaction. The reasons affecting patient satisfaction or intraoperative comfort are not analyzed or discussed in our study. Many studies are focusing on this subject. In a study including all surgery types [29], the satisfaction rate was 96.8%, and moderate or severe postoperative pain, severe nausea and vomiting, and any other postoperative complications were related to patient dissatisfaction. In another study focusing on spinal anesthesia-related complications and reasons of satisfaction [30], postoperative pain at the surgical site, backache, and headache were major factors related to decreased patient satisfaction.

Conclusion

Backache and shoulder pain are the most frequent minor complications in patients operated with regional anesthesia on the day after cesarean section. Although routine pain control was established by obstetricians in the postoperative ward, a good follow-up of pain with a postoperative visit from the anesthesiology team might provide better pain control for patients. Determining and overcoming postoperative early

complications are important for the satisfaction of patients after cesarean section. Further studies which include more patients and longer-term follow-up may be needed.

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