ISSN: 0975-833X

Availableonlineathttp://www.journalcra.com

International Journal of Current Research
Vol. 11, Issue, 05, pp.3700-3704, May, 2019

DOI: https://doi.org/10.24941/ijcr.35460.05.2019

INTERNATIONAL JOURNAL OF CURRENT RESEARCH

RESEARCH ARTICLE

COMPARISON BETWEEN THE SIDE EFFECTS OF SPINAL AND GENERAL ANESTHESIA DURING CAESAREAN SECTION

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ARTICLEINFO

Article History:
Received 04th February, 2019
Received in revised form
24th March, 2019
Accepted 25th April, 2019
Published online 30th May, 2019

Key Words:

General anesthesia,
Spinal anesthesia,
Hemoglobin,
Platelets,
Headache,
Vomiting.

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ABSTRACT

Background: Currently, spinal anesthesia is an acceptable method for cesarean section (CS) throughout the world, since general anesthesia is associated with higher maternal morbidity and mortality rates. The current study was aimed to compare the side effects of general vs. spinal anesthesia during caesarean operation. **Materials and methods:** This study was performed on women who were candidates for elective Caesarean section at Nineveh private hospital, in Mosulcity, Iraq. Informed consents were obtained from all the patients and the risks and side effects of both spinal and general anesthesia were explained preoperatively, One day after the operation, all mothers were examined with respect to the variables. A total of (100) randomly selected participants, Half Of them (50) participants referred as case group A (undergo operation with general anesthesia), and the other half (50) participants were referred as case group B (undergo operation with spinal anesthesia). Blood samples were collected before and after the operation to see the differences in Hemoglobin concentration and platelets count, Blood pressure and body temperature were also measured after operation, other parameters were collected from patient's thick report or by direct interviewing questionnaire. **Results:** The Mean Age Of Participants Was 32.5 Years Old With A Range Between 25-40 Years. The Mean Age of Participants with Spinal Anesthesia Was 32.32 While for Participants with General Anesthesia was 32.72. Majority of them have their first or second caesarean section. 46/50 (92%) of spinal anesthesia was decided with the doctor while 40/50 (80%) of general anesthesia was chosen the patient's themselves. Local pain and headache were clearly observed in spinal anesthesia while vomiting, fever, ICU admission and infection were very rare when using both types of anesthesia. Marked differences were observed in the hemoglobin concentration and platelets count when using the two techniques of anesthesia before and after operation. In our study, we observed in 44 % of participants suffered from pain and 36 % suffered from headache after operation in both groups A and B. No remarkable difference was noted on blood pressure range (but some participants have slightly decrease in BP). All participants have slight changes in platelets count, and Hemoglobin concentration. **Conclusion:** We should cautiously consider that general anesthesia may be associated with slightly increased in peri-operative room time, hospital stay & the differences were observed in the tested parameters between general and spinal anesthesia regarding postoperative pain at injection site, headache, lumbar pain, vomiting, fever ICU admission & infection So it is highly recommended to leave the decision of type of anesthesia to the doctor upon patients' clinical condition.

Citation: Dr. Dawood Ahmed Dawood Sulaiman and Dr. Alaa Adrees A. Al-Dhannoon, **2019.** "Comparison between the side effects of spinal and general anesthesia during caesarean section", *International Journal of Current Research*, 11, (05), 3700-3704.

INTRODUCTION

Caesarean section is when a baby is born through an incision in the mother's abdomen and uterine wall. This requires effective anesthesia which can be regional (epidural, spinal) or a general anesthesia, women who have a cesarean section usually have a choice of two or three options: a general anesthetic, where they are completely unconscious, and two types of regional anesthetic known as "epidural" and "spinal" anesthesia. Regional anesthetics numb the body from the waist down. The woman is awake for the birth and can see her child immediately afterwards (Afolabi, 2012). In spinal anesthesia, also known as a spinal block, the medication is injected closer to the spinal cord: into the cerebrospinal fluid in the "subarachnoid space." This causes the entire lower half of the body to feel numb. In spinal blocks a smaller amount of anesthetic medication is needed, this single injection last for 2-3 hour & they block the nerve more completely &more rapidly than epidural regional anesthesia (Russell, 1997).

With general anesthesia, the mother is unconscious for the birth with the an aesthetic affecting her whole body, but there is a risk of the woman vomiting while unconscious and the vomit getting into her lungs (called aspiration of stomach contents). Although this is very rare, it can be life-threatening. Women who have a spinal block occasionally experience a sudden major drop in blood pressure. They might also have a type of headache ("post-dural puncture headache"), it is important to know the balance of the benefits and side effects of these different types of anesthesia (World health organization, 2007). Cesarean section (CS) is probably performed for nonmedical reasons leading to an overall overuse of this surgical obstetric intervention. Indeed, it has been acknowledged that elective primary and repeat CS have contributed heavily to the rise in CS (Kararmaz, 2003). For instance, the overall CS rates increased by 14% from 1998 to 2001 as a result of a 13% increase in medically indicated primary CS and a 53% increase in the rate of elective primary CS (Marc, 2000), both methods have advantages and disadvantages, there is also a great difference between countries, regions or even hospitals regarding the preference for the method of anesthesia (Cardoso, 1998). Caesarean section can be achieved using a general anesthetic or regional a spinal anesthetic there are times when these techniques may be used together (Ong, 1998). Compared to general anesthesia, spinal anesthesia has several advantages, including reduced need for postoperative analgesia, higher Apgar scores, fewer thromboembolic events, and more importantly, earlier onset of postoperative oral nutrition in mothers (Juhani, 1993). Spinal anesthesia is a favorable anesthetic technique for cesarean section (CS). Since its first application in obstetric anesthesia, it has evolved and gained worldwide approval and popularity (Kestin, 1991). Anesthesiologists usually prefer a method, which is safe and comfortable for the mother and is associated with the least fetal depression and the best surgical conditions for the gynecologist; spinal anesthesia has all these characteristics (Auquier *et al*., 2005; Bashir *et al*., 2011; Arzola, 2011).

PATIENTS AND METHODS

This analytical study was performed on women who were candidates for elective CS at Nineveh private hospital, in Mosulcity, Iraq. Between the period from Aug.2018 and May 2019 the inclusion criteria were as follows: 1) maternal age range of 25 - 40 years; 2) as class i and ii) undergoing CS. On the other hand, the exclusion criteria were neurologic defects, coagulopathies, incomplete pain blockage (perioperative pain), and perioperative complications leading to the change of the anesthetic method. An anesthesiologist thoroughly explained general and spinal anesthesia, the associated risks, and side effects to mothers who were candidates for elective CS at Nineveh private hospital. The study covers in total, 100 mothers signed the informed consent forms to undergo spinal & general anesthesia and entered the study. Were divided into two groups. Group (a) was50 females with caesarean section who subjected to general anesthesia and group b were 50 females with caesarean section who subjected to spinal anesthesia. All participants were selected randomly despite their age, clinical condition the subjects' data were gathered and recorded in a prepared questionnaire. Blood samples were collected by vein puncture prior and after the operation, hemoglobin concentration (Hb), and platelets (Plts) count were measured and data were recorded. Blood pressure and body temperature were measured using sphygmomanometer and thermometer, respectively after the operation. Other data include age, type of anesthesia used, number of previous caesarean section(s), and presence of side effects after operation which includes: pain, headache and vomiting were collected from patient's clinical record. On arrival to the operating room, standard monitoring (electrocardiographic monitoring, pulse oximetry, and noninvasive blood pressure systems) was established. After receiving 5 ml/kg of normal saline infusion, spinal anesthesia was administered in the sitting position by means of a quincke spinal needle (with a suitable size) on the best site through midline injection; the first choice was a 25-gauge quincke spinal needle on the l4 - l5 intervertebral level, bupivacaine 0.5% (12.5 mg) was injected intrathecally to induce anesthesia, after immediately moving the patient to the supine position, surgery was started, following reassurance of favorable sensory block by the anesthesiologist, based on the clinical protocols of the surgery ward of Nineveh private hospital, in Mosul city, the patients' postoperative pain was managed using adult diclofenac suppository. Twenty-four hours after the surgery, the subjects were visited by an anesthesiologist, who had neither participated in the surgery nor intervened in the anesthesia procedure, numeric pain rating were used to evaluate pain severity and satisfaction level, respectively. & the other group was received general anesthesia.

RESULTS

A total of 100 participants who come for caesarean section were evaluated in this study, 50 with general anesthesia and 50 with spinal anesthesia. The mean age of participants was 32.5 years old with a range between 25-40 years. The mean age of participants with spinal anesthesia was 32.32 while for participants with general anesthesia was 32.72. The majority of caesarean sections with general anesthesia (40/50) were decided by patients themselves, most of them on their first delivery operation, while the majority of caesarean sections with spinal anesthesia (46/50) were decided by doctors. The most frequent perioperative complications were hypotension (50%), bradycardia (26.2%), nausea and vomiting (13.1%), and dyspnea (8.3%), respectively. Overall, 14.3% of the subjects had nausea and vomiting until 24 hours after surgery, the mean post anesthesia headache severity was 0.74 ± 1.53, the mean lumbar pain severity following spinal anesthesia (1.65 ± 2.39) & . Moreover, 28.6% of the subjects reported discomfort due to perioperative awareness. All participants enrolled in this study had no infection after operation while 4 participants with spinal anesthesia had complications which required ICU admission compared to just one participant having general anesthesia (Figure1). The mean of hemoglobin concentration and platelets count were decreased after caesarean section with marked decrease in the mean to participants with general anesthesia (Table 1). No remarkable difference was noted between the mean of systolic and diastolic blood pressure for both participants with spinal anesthesia and general anesthesia (Table 1).

DISCUSSION

The purpose of this study was to compare perioperative adverse events following spinal & general anesthesia, in addition the type of anesthesia is an important issue for better outcome of surgery, several studies have reported benefits of spinal anesthesia, including reduction in thromboembolic events, blood transfusio, & the potential for use in

Table 1. The Difference between participants subjected to spinal and general anesthesia before and after the caesarean section (in the in the mean ± SD)

Variable	Before operation (mean ± SD)		P value	After operation (mean ± SD)		P value
Hemoglobin (g/L)	General anesthesia	Spinal anesthesia	0.868	General anesthesia	Spinal anesthesia	0.674
	11.43 ± 3.477	10.80 ± 1.792		90.73 ± 1.63	10.17 ± 1.501	
Platelets count (×109/L)	221.08 ± 80.235	192.4 ± 40.234	0.035*	211.28 ± 56.523	181.8 ± 46.377	0.308
Systolic blood pressure (mmHg)	Not Done	Not Done	ND	101.88 ± 14.712	100.92 ± 20.093	0.67
Diastolic blood pressure (mmHg)	Not Done	Not Done	ND	63.28 ± 10.706	60.6 ± 13.048	0.862

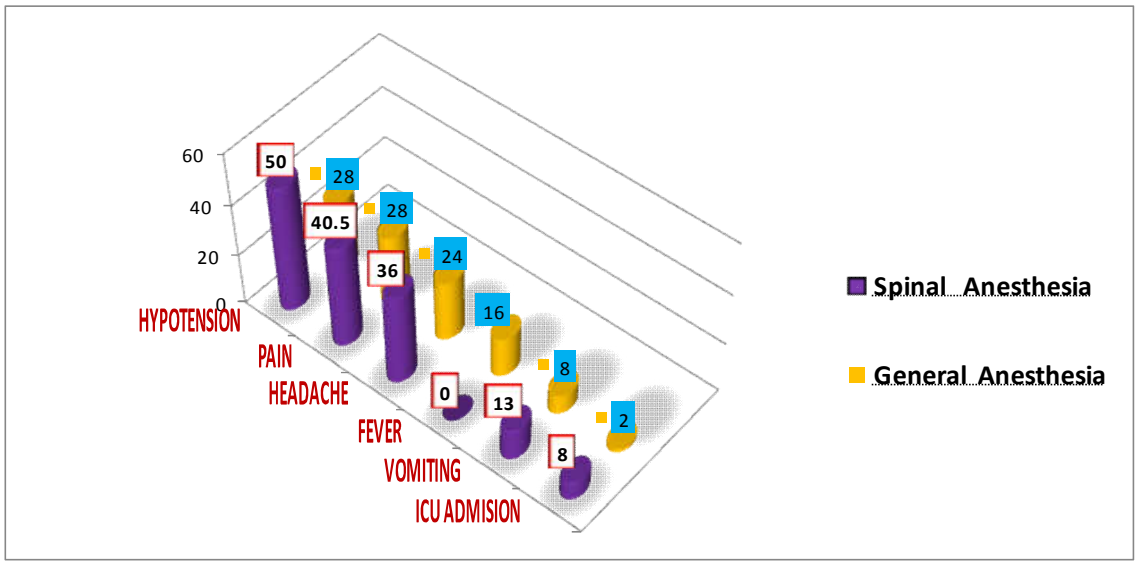

Figure 1. Side effects associated with the two type of anesthesia {General & Spinal Anesthesia}

postoperative pain management (Modig, 1983; Sharrock, 1991; Jorgensen, 1991), however disadvantages of spinal anesthesia in term of hemodynamic compromise have also been reported (Moiniche, 1994; Gedney, 2013), in addition, concern over the use of spinal anesthesia include delayed operation start & less optimal muscle relaxation which make surgical site exposure more difficult. Also the postoperative room time following general anesthesia is dependent on the recovery of spontaneous respiration & muscle relaxation. In contrast, this is not necessary in spinal anesthesia, thus postoperative room time following general anesthesia is usually longer than spinal anesthesia (Hosseinzadeh, 2013; Kanonidou, 2007). Moreover vasoconstriction under general anesthesia impair tissue perfusion & decreases tissue oxygen tension (Buggy, 2000), also the volatile anesthetics & opioids impair neutrophils ,macrophage ,dendritic cell, T-cell & natural killer cell functions & thus diminish host defenses (Sacerdote *et al*., 2000), in contrast spinal anesthesia provide a sympathetic blockade, & greater vasodilatation could result in improved tissue oxygenation (Treschan, 2003; Kabon *et al*., 2003), increased numbers of polymorph nuclear cells at surgical sites (Mauermann, 2006) & better maintenance of regional normothermia (Kurz, 1996). Among other aspects of spinal anesthesia are peri-operative complications. The current findings revealed perioperative hypotension in 50% of subjects, bradycardia in 26.2% of subjects, nausea and vomiting in 13% of subjects, and dyspnea in 8.3% of subjects. In this regard, Juhani *et al*. (1993) suggested hypotension (42%) and nausea (14%) as the most prevalent postoperative complications of spinal anesthesia (Juhani *et al*., 1993).

In another study, the most prevalent postoperative complications of spinal anesthesia were nausea and vomiting (26.7%) and lumbar pain (20.1%) (Yakupoglu *et al*., 2015). Therefore, perioperative complications in the current research were similar to previous studies, except for postoperative lumbar pain, which was less prevalent in our study. Major reasons for patients' unwillingness to repeat spinal anesthesia include low back pain (related to the number of attempts to induce anesthesia), needle type (quincke with less favorable results than whitacre), and tingling sensation in the lower extremities immediately after anesthesia induction (Choi, 2003). In a previous study, variables such as extra attempts to induce anesthesia, pain during neuronal block, and postoperative urinary retention were related to dissatisfaction of spinal anesthesia. However, reasons for unwillingness to repeat spinal anesthesia in future surgeries included low body weight, perioperative nausea and vomiting, and lower satisfaction with the anesthetic method (Charuluxananan *et al*., 2003). Bhattarai *et al*. (2005) suggested that the main reasons for maternal dissatisfaction of spinal anesthesia were inability to move the lower extremities and dysesthesia in the upper extremities (Bhattarai *et al*., 2005). In the current study, a significant percentage of mothers complained of postoperative pain at the injection site, lumbar pain, and headache (40.5%, 29.8%, and 46.4%, respectively). In the current study, 28.6% of mothers were distressed about perioperative awareness, Although some studies have revealed the effect of patients' age on their satisfaction, age had no significant relationshipto choose the method again in our study. All participants with spinal anesthesia have no fever while few of general anesthesia

participants have fever; infections are extremely rare, so rare that it is not possible to give an accurate incidence. The anesthetist uses a sterile technique to insert the spinal. However, it is not possible to totally eliminate the risk of infection at the injection site or around the spinal cord (causing meningitis or an abscess) (Mancuso, 2010). A prolonged drop in maternal blood pressure has the potential to reduce blood flow to the baby. During the spinal anesthetic the blood pressure is monitored carefully by the anesthetist and treated readily to prevent potential problems for the baby. In this study decrease in blood pressure after operation was observed in some cases in both groups a and b, although there was no remarkable difference between the mean of systolic and diastolic blood pressure for both groups. Low back pain is common after spinal injection, but is expected to resolve within 2 weeks (Yegin, 2003). In this study, pain was observed in both groups. A specific type of headache, called a post spinal headache, can occur after spinal injection. This headache can be mild or severe and usually resolves spontaneously over 1-3 weeks (Solangi *et al*., 2012). Headache was observed in both groups a (general anesthesia) and b (spinal anesthesia), but increased in group b. This result proves that patients receiving general anesthesia are much easier to suffer headache than the patients receiving spinal anesthesia. It is also important to understand that there are many other causes of headache that are more common. It is also possible to experience temporary deafness following spinal anesthetic (Afolabi, 2012) In some patients in our study, they had it.

Conclusion

We should cautiously consider that general anesthesia may be associated with slightly increased in perioperative room time & hospital stay & may affect hematological parameters by decreasing hemoglobin concentration, and platelets count, in contrast, spinal anesthesia although it seems to be safer, has mild side effects such as vomiting, head ache and local pain in contrast general anesthesia, so it is highly recommended to leave the decision of type of anesthesia to the doctor upon patients' clinical condition.

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