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Headache Incidence Beyond Spinal Anesthesia of Caesarean Section

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Abstract

Background: A caesarean section (CS) is the delivery of a fetus through an abdominal incision and hysterotomy. The anesthesia method most often used for CS is spinal anesthesia (SA), the prevailing complication of SA is post-dural puncture headache (PDPH).

Aims of the study: To investigate the incidence of headache in SA in CS.

Methods: The study was conducted at Al-Sadder Teaching Hospital from the 1st of March 2023 till the 1st of March 2024. All women who attended the operation room for lower segment elective CS. Data were collected including age, educational level, job, parity, chronic diseases, past surgical and medical history. Then pre-operation assessment was done, including routine investigations, procedure explanation, and taking written informed consent.

Results: Totally 250 pregnant women who were subjected to a CS under SA. There was no statistical difference between the studied women regarding their socio-demographic characters. No statistical differences in clinical characters while the duration of anesthesia was prolonged ($p = 0.01$). There is no statistical difference in regard to headache at recovery time, 24 h, 48 h and a week postoperatively. However, 22% of women not complained.

Conclusion: There is no statistical difference between the studied women regarding their socio-demographic characters, and no statistical differences in clinical characters while the duration of anesthesia was prolonged. Headache postoperative at recovery time, 24 h, 48 h and a week is the same.

Keywords: Anesthesia, Spinal anesthesia, Caesarean section, Post-dural puncture headache, Pregnancy

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Introduction

CS is fetus delivery via an abdominal incision and a uterine incision (hysterotomy) [1]. The rates of CS range from 4% to 44% [2, 3]. In Iraq, higher rate was recorded as 45 - 60%, because of greatest percentage of women below 20 years underwent CS, low education, poorly wealth quintiles, and rural women [4]. With the improvement of anesthetic techniques, CS has become safer and more secure over time, but maternal and fetal mortality and morbidity are still significant [5].

Regional anesthesia, as SA, it is the best option for elective uncomplicated CS due to the airway avoidance, low risk of aspiration of gastric content and ease of administration [6], it is a safe and effective method, it is associated with complications such as hypotension, local anesthetic toxicity, PDPH, and nerve injury [7]. There were various methods to prevent and treat PDPH, including bed rest, good hydration, non-opioid analgesics, caffeine, codeine, and corticosteroids [8]. Several pharmacological therapies, including aminophylline, gabapentin/pregabalin, hydrocortisone, magnesium, ondansetron, dexamethasone and propofol, have been used for the prevention of PDPH in pregnancy [9].

Methods

Study design and setting

The study was conducted at Al-Sadder Teaching Hospital from the 1st of March 2023 till the 1st of March 2024. All women who attended the operation room for lower segment elective CS.

Inclusion criteria

- Age 21 - 45 years.
- Willingness to participate.
- Fitness for CS under SA.

Exclusion criteria

- Heart disease.
- Neurological diseases.
- Psychiatric problems.
- Vascular diseases.
- Systemic diseases.
- Pain killer and sedatives.
- Bad obstetric history (repeated scar, APH, and PPH).
- Drugs addict.
- Alcohol dependence.

Data collection

Data were collected including age, educational level, job, parity, chronic diseases, past surgical, and medical history. Then pre-operation assessment was done, including routine investigations, procedure explanation, and taking written informed consent. Other factors, including heart rate, blood pressure, and oxygen saturation were

recorded. At the operating room, peripheral oxygen saturation (SpO2), ECG, pulse rate (PR), and blood pressures were monitored.

Procedure

After the operation, in the first 24 h after, the average severity of headache was evaluated using the visual analogue scale (VAS) after recovery within the first hour, 24 h, 48 h and one week beyond the operation. Headache was diagnosed as occipital or frontal headache, aggravated by standup or sitting position, coughing, sneezing, and straining, and relieved by lying flat. A VAS is one of the pain rating scales used for measuring the intensity or frequency of various symptoms. The pain VAS is a unidimensional measure of pain intensity, used to record patients' pain progression, or compare pain severity between pains with similar conditions.

Statistical analysis

Data was entered using computerized statistical software; statistical package for social sciences (SPSS) version 24 was used. Quantitative data were presented as (mean ± SD) while qualitative data were presented as frequencies and percentages. The appropriate statistical tests were performed, a Chi-square test was used for categorical variables. The level of significance (p value) is set at ≤ 0.05.

Results and Discussion

Totally 250 pregnant women who were subjected to a CS under SA. There was no statistical difference between the studied women regarding their socio-demographic characters, as shown in table 1. Table 2 showed no statistical differences in clinical characters while the duration of anesthesia was prolonged (p = 0.01). Table 3 shows there is no statistical difference in regard to headache at recovery time, 24 h, 48 h and a week postoperatively. However, 22% of women not complained.

The anesthesia method most often used for CS is SA, which has a prevalence ranging from 80 - 95%. The prevailing complication of SA is headache, which arises from dural puncture and subsequent leakage of CSF [10]. The use of intravenous (IV) dexamethasone has been employed in an effort to diminish the occurrence and intensity of PDPH; however, the outcomes have been subject to debate [11].

The statistical analysis indicated that there was no significant difference in age. Age is considered a significant factor in the development of PDPH. The majority of research has shown a negative correlation between extremes of age and the occurrence of PDPH. Specifically, young cases between the ages of 18 and 50 years have been identified as having the greatest risk for PDPH, as reported by Khlebtovsky et al. [12] and Amorim et al. [13]. Younger cases typically have a thicker and more elastic dura mater compared to older men. The raised elasticity may contribute to a higher likelihood of CSF leakage after a lumbar puncture, leading to PDPH [14].

In order to mitigate potential bias, we ensured that the two groups were matched based on their body mass index (BMI) (p = 0.435). The existing body of research pertaining to the impact of BMI on the risk of PDPH yields inconsistent findings. Several studies have shown an elevated likelihood of PDPH in individuals with a BMI of 25 kg/m^2 or lower [15]. Conversely, a reduced risk of PDPH has been seen in obese patients (BMI ≥ 31.5 kg/m^2) after inadvertent dural puncture [16]. In contrast, previous study has shown that BMI does not have a significant impact on the occurrence of PDPH, as demonstrated by studies conducted by Gaiser [10], Khraise et al. [17], and Gaiser [18]. Obesity led to increased difficulty in accessing the intrathecal space which may lead to multiple attempts or a traumatic puncture, increasing the risk of CSF leakage and subsequent PDPH [19]. Also, obesity is often associated with alterations in cerebral blood flow and hemodynamics. Changes in blood flow dynamics may influence the likelihood and severity of PDPH by affecting the compensatory mechanisms that maintain normal CSF pressure [20].

Smoking, which contributes to reducing bias and enhancing the quality of data analysis. Nevertheless, the existing literature lacks substantial evidence about the correlation between tobacco consumption and headache. Nonetheless, a study conducted by Dodge et al. [21] revealed a significant decrease in the incidence of PDPH among smokers when compared to non-smokers.

Moreover, the state of having given birth several times, known as multiparity, has been linked to a heightened risk of PDPH during the postpartum period, as shown by the findings of Orbach-Zinger et al. [22] and Franz et al. [23]. With each pregnancy, changes occur in the spinal structures and surrounding tissues, including alterations in the epidural and intra-thecal spaces. These changes can affect the dynamics of CSF and may increase the likelihood of leakage following a lumbar puncture, leading to PDPH [24]. Multiparty has been associated with epidural fibrosis, a condition characterized by the development of fibrous tissue around the spinal nerves. Epidural fibrosis may make the dural puncture site less pliable and more prone to complications such as CSF leakage and subsequent PDPH [25].

In the present investigation, no statistically significant difference was seen in terms of the previous CS. There is a lack of documented evidence in the existing literature that evaluates whether a prior CS is a risk factor for an elevated incidence of headache. Nevertheless, according to Amorim et al. [13], pregnancy introduces an added susceptibility to headache, perhaps attributed to heightened cerebral vasodilation in reaction to CSF hypotension, which is associated with raised levels of

Table 1: Socio-demographic characters.

Demographic characteristics		Mean ± SD/no (%)	P value
Age (years)		25.5 ± 6.9	0.15
BMI (kg/m^2)		30.1 ± 4.7	0.5
Past surgical and medical history		85 (34)	0.1
Chronic disease		122 (48.8)	0.2
Job		101 (40.4)	0.35
Education level	Illiterate	77 (30.8)	0.9
	Primary	113 (45.2)	
	Postgraduate	60 (24)	
Parity	Primi	111 (44.4)	0.7
	Multi-para	139 (55.6)	

Table 2: Clinical characters.

Clinical characters		Mean ± SD/no (%)	P value
Previous CS	Yes	100 (40)	0.8
	No	150 (60)	
Surgery time (min)		55.8 ± 12.5	0.31
Duration of anesthesia (h)		5.1 ± 0.6	0.01
Gestational age	Preterm	12 (12.3)	0.1
	Term	80 (81.6)	
	Post-term	6 (6.1)	

Table 3: Comparison in regard to the headache.

Headache	No. (%)	P value
In recovery	88 (35.2)	0.1
24 h	52 (20.8)	
48 h	54 (21.6)	
One week	1 (0.4)	
No headache	55 (22)	

circulating estrogen. There is also a prevailing belief that increased CSF pressure during the labor process contributes to a greater occurrence of CSF leakage and an increased susceptibility to headache [26].

The length of anesthesia was found to be considerably longer. The potential presence of a confounding factor arises from the extended duration of anesthesia, which may result in the development of intracranial hypotension due to CSF leakage. This, in turn, may lead to the drooping of intracranial structures and the stretching of sensory intracranial nerves, ultimately resulting in the experience of pain and this was explained according to the evidence from Ljubisavljevic et al. [27].

There were no significant differences in gestational age. There is a lack of existing research that examines the correlation between gestational age and the likelihood of PDPH. There is no apparent correlation between the duration of sensory loss and the occurrence of PDPH. Other variables, such as the amount of CSF extracted and the length of bed rest after lumbar puncture, as well as the enhancement of hydration via increased fluid intake, have been identified as potential influencing factors [28].

The present study also observed that there was no statistically significant difference in the incidence of headache at various time points, including the recovery period within the first hour, 24 h, 48 h, and one week. The present investigation demonstrates that headache manifest at a rate of about 8 - 9% during the recovery period, increase to 9 - 10% on the first day, and thereafter decrease to around 4 - 5% by the second day. Notably, none of cases reported experiencing headaches beyond one week. The observed prevalence of PDPH in this study is notably lower compared to the published figures in existing literature. Previous research has documented a wide range of incidence rates for PDPH after SA, ranging from 0 - 42.6% [29-31]. Nevertheless, previous studies conducted by Khraise et al. [17], Oberhofer et al. [32], Mohammed et al. [33], and Ko et al. [34] have shown varying rates of PDPH among their various study populations, with incidences of 6.3%, 14.3%, and 15.8% seen, respectively. The results obtained by the researchers were in good agreement with our own findings.

Conclusion

There is no statistical difference between the studied women regarding their socio-demographic characters, and no statistical differences in clinical characters while the duration of anesthesia was prolonged. Headache postoperative at recovery time, 24 h, 48 h and a week is the same.

Acknowledgements

None.

Conflict of Interest

None.

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