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Comparison of Saddle Block Anesthesia with Three Different Sitting Times in Patients Undergoing Dilation and Curettage

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ABSTRACT

Background: The advantages of using saddle block anesthesia have been established in certain surgical procedures; however, its application in patients undergoing dilation and curettage (D&C) has not yet been thoroughly investigated. Given the urgent nature of this procedure, it was necessary to compare the patient's sitting time. Accordingly, the present study was conducted to compare saddle block anesthesia with three different sitting times in patients undergoing D&C.

Methods: The current randomized, double-blind clinical trial was conducted at Shahid Beheshti Hospital in the city of Isfahan in 2024. Forty-five patients were randomly allocated to three groups. In the first group, patients remained seated for 3 minutes; in the second group, for 4 minutes; and in the third group, for 5 minutes following the injection of Marcaine (bupivacaine). Data were collected using a checklist and analyzed using SPSS version 26.

Results: There were no significant differences among the three groups in terms of age, gestational age, length of hospital stay, and maximum sensory block level ($P > 0.05$). However, a significant difference was observed between gestational age and pain intensity among the three groups ($P < 0.05$). Blood pressure (systolic and diastolic) and heart rate showed no significant differences among the three groups ($P > 0.05$).

Conclusion: Sitting patients undergoing D&C after saddle block anesthesia for 3, 4, or 5 minutes had no significant effect on any of the measured variables, including pain, systolic blood pressure, diastolic blood pressure, and heart rate. Notably, according to the results, if a pregnant woman is beyond 15 weeks of gestation, it is advisable for her to remain seated for 5 minutes after the saddle block to minimize pain intensity, as shorter sitting times will culminate in greater pain intensity.

Introduction

Only 20% of the estimated 55.9 million abortions worldwide each year are spontaneous [1]. The traditional method of abortion in the 20th and 21st centuries was dilation and curettage (D&C). Healthcare professionals also used this procedure to diagnose and treat certain uterine conditions—such as heavy bleeding—or to clear the uterine lining following an abortion [2].

D&C is a surgical procedure in which the cervix (the narrow, lower part of the uterus) is dilated so that the uterine lining (endometrium) can be scraped with a curette [3].

Some studies have indicated that D&C may predispose individuals to adverse pregnancy outcomes in the future, including a higher rate of spontaneous abortion, incompetent cervix, preterm birth, premature rupture of membranes, perinatal mortality, and ectopic pregnancy. Other studies have even suggested that this procedure is associated with first-trimester bleeding, abnormal presentations, placental abruption, fetal distress, low

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birth weight, and major anomalies in subsequent pregnancies [4-6].

The choice of anesthesia for D&C is influenced by the surgical indication, the patient's comorbidities, and the preferences of the patient, anesthesiologist, and obstetrician-gynecologist [7]. Previous studies have reported that hospitalized patients who underwent general anesthesia experienced greater hemodynamic changes [8], blood loss, higher body mass index (BMI), and later gestational age compared to those receiving other anesthesia methods [9].

One anesthesia technique is the saddle block, which is indeed a type of spinal anesthesia [10]. This neuraxial technique targets the distal sacral dermatomes to block only the perineum by injecting a local anesthetic into the spinal canal. However, unlike traditional spinal anesthesia, the saddle block does not cause post-dural puncture headache (PDPH), a very distressing complication for patients [11], and it allows the patient to remain in a sitting position. Due to its additional advantages, such as rapid onset, dense block, early patient mobilization, and shorter hospital stays, the saddle block has become a preferred technique, particularly in high-volume ambulatory surgery centers [12].

Saddle block anesthesia is better than regular spinal anesthesia because it keeps the motor function of the lower limbs and has fewer side effects, such as low blood pressure. Moreover, evidence suggests that saddle block anesthesia can enhance operating room efficiency, reduce postoperative opioid consumption, and elevate overall patient satisfaction [13].

The present study aimed to identify the optimal method for achieving suitable anesthesia conditions in patients undergoing D&C, enabling the surgical procedure to be performed with limited anesthesia, thereby minimizing the likelihood of nausea and vomiting, the need for intravenous anesthetic agents, and hemodynamic fluctuations.

Methods

The current randomized, double-blind clinical trial was conducted at Shahid Beheshti Hospital in the city of Isfahan in 2023. Non-probability sampling was used, and patients were allocated to three groups using simple randomization. The sample size was determined using Epi-Info software, considering a 95% confidence interval, a type I error of 0.05, a power of 80%, a drop rate of 0, and allowing for a 10% dropout rate per group, resulting in 17 participants per group and a total sample size of 51. The patient recruitment flowchart is presented in (Figure 1).

The inclusion criteria included mothers of gestational age with acetylsalicylic acid (ASA) physical status classification I and II, the mother's inability to eat orally, and her willingness to participate in the study. The surgery was elective, allowing for conversion to general anesthesia in cases of inadequate response to saddle block anesthesia.

Intraoperative conversion to general anesthesia, cardiac arrest, severe hemodynamic instability, and decreased levels of consciousness were established as exclusion criteria.

The researcher found patients who were eligible after getting ethical approval (IR.MUI.MED.REC.1401.271), the Iranian Registry of Clinical Trials (IRCT) code (IRCT20231009059666N1), and all the other permissions they needed. Patients were kept nil per os (NPO) from the night before surgery, and all vital signs, such as blood pressure and heart rate, were recorded. The patient was then positioned sitting upright, and a spinal block was administered using the saddle block technique. This midline block was performed with a 27-gauge spinal needle.

Random allocation software was employed to allocate patients to each group, with 17 participants in each group. All three groups received local anesthesia using 2 cc of 0.5% Marcaine (bupivacaine).

In the first group, patients remained seated for 3 minutes after Marcaine (bupivacaine) injection. In the second group, patients remained seated for 4 minutes, and in the third group, for 5 minutes after Marcaine (bupivacaine) injection. According to previous studies, the patient's sitting times typically range from 3 to 10 minutes; however, the purpose of this study is to utilize saddle block anesthesia in emergency cases, and in emergency situations with severe bleeding, 10 minutes of sitting is considered a lengthy period.

Subsequently, the patient was prepared for surgery in the lithotomy position. Immediately after assuming the supine position, and then every 5 minutes for up to 20 minutes, the patient's vital signs were recorded again. The maximum sensory block level after assuming the supine position was assessed and recorded using the pinprick method.

In instances where saddle block anesthesia was ineffective, the anesthetic technique was modified, and the patient was transitioned to general anesthesia (using midazolam 2 mg, fentanyl 2 µg/kg, and propofol 50 µg/kg/min). If the patient experienced hypotension during or after the procedure, ephedrine was administered at a dose of 5 to 10 mg. In cases of bradycardia, 0.5 mg of atropine was administered. Moreover, if the patient reported pain or discomfort during the surgical procedure, midazolam was given at a dose of 1 mg.

Immediately after the patient's transfer to the recovery room, and then every 15 minutes for one hour, the patient's vital signs were assessed and recorded again. Data were collected using a checklist, and a visual analog scale (VAS) was employed to assess pain. Subsequently, the patients were compared across three groups.

Descriptive statistics, including mean and standard deviation, were used for quantitative data, and frequency distributions and percentages were used for qualitative data. The normality of the distribution of continuous variables was tested using the Shapiro-Wilk test. Data were analyzed using the Chi-square test, Fisher's exact test, and one-way analysis of variance (ANOVA) in SPSS version 26 at a significance level of less than 0.05.

Results

A total of 45 patients (Group 1 = 16 people, Group 2 = 15 people, and Group 3 = 14 people) were enrolled in the study (Figure 1).

(Table 1) presents the demographic and clinical characteristics of the patients. As shown, there were no significant differences in age, gestational age, length of hospital stay, or maximum sensory block level among the three groups ($P > 0.05$). Similarly, no significant differences in pain or nausea were observed among the three groups ($P > 0.05$).

(Table 2) presents the comparison of sitting times and clinical outcomes. As shown, there were no significant differences in pain levels, systolic and diastolic blood pressure, or heart rate among the groups ($P > 0.05$). However, pregnant women with a gestational age of more than 15 weeks in the 3-minute sitting group experienced higher pain levels ($P < 0.05$).

A significant difference was also observed between gestational age and pain intensity across the three groups ($P < 0.05$), so pain intensity in mothers with a gestational age greater than 15 weeks was significantly higher in the first group compared to the other two groups.

(Table 3) presents the vital signs recorded at the assessed time points. As indicated, no significant differences were observed in blood pressure (systolic and diastolic) and heart rate among the three groups ($P > 0.05$). Additionally, there were no significant differences in blood pressure (systolic and diastolic) and heart rate variables at each time point when compared to the preceding time point within the studied groups ($P > 0.05$).

Comparison of Sitting Times and Clinical Outcomes

In this study, three groups with different sitting times after Saddle Block anesthesia were analyzed. The results showed no significant differences in pain levels, systolic and diastolic blood pressure, or heart rate among the groups ($P > 0.05$). However, pregnant women with a gestational age of more than 15 weeks in the group with the shortest sitting time (3 minutes) experienced higher pain levels ($P < 0.05$). Therefore, to minimize pain in this patient group, sitting for 5 minutes after Saddle Block anesthesia is recommended.

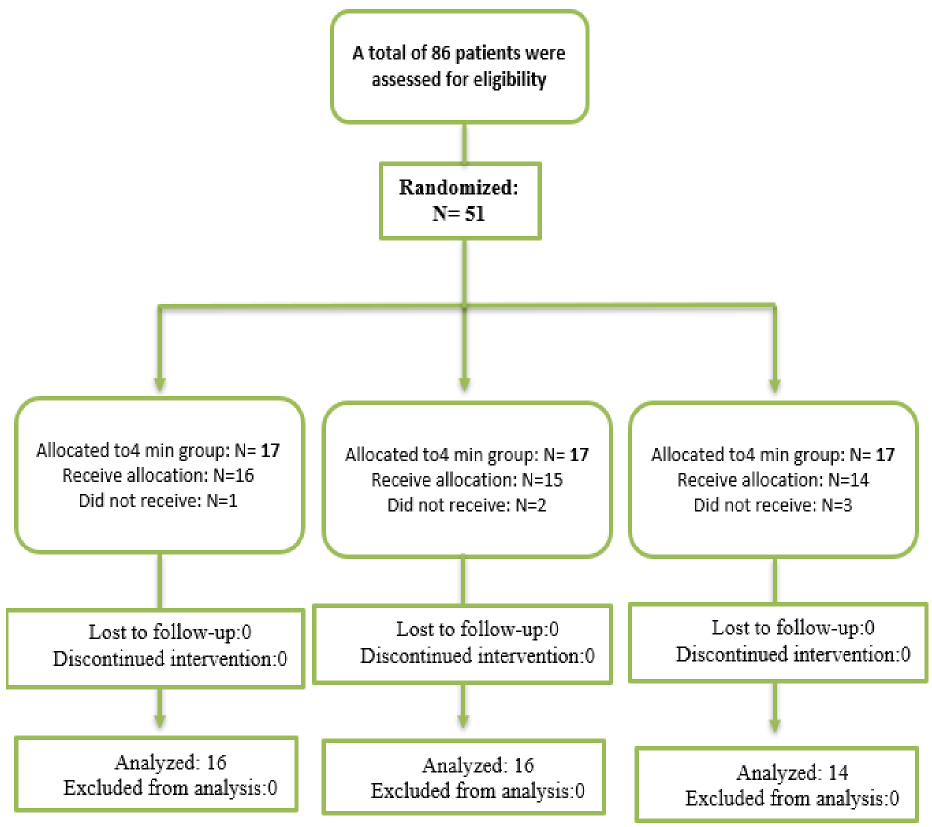

Figure 1- CONSORT flow diagram

Table 1- Demographic and clinical characteristics of the patient

Variables	Group 1 (n=16)	Group 2 (n=15)	Group 3 (n=14)	Significance Level
Age (mean ± SD)	32.43 ± 4.41	30.93 ± 4.69	33.07 ± 4.66	0.16
Gestational Age (weeks, mean ± SD)	14.12 ± 4.61	14.13 ± 4.59	14.35 ± 5.42	0.134
Duration of Stay (mean ± SD)	40± 14.02	40.33 ± 10.16	39.64 ± 10.82	0.988
Maximum Sensory Block Level (n, %)				
T10	0	3 (20%)	2 (14.3%)	
T11	9 (56.2%)	5 (33.3%)	9 (64.3%)	0.206
T12	7 (43.8%)	7 (46.7%)	3 (21.4%)	

Table 2- Frequency of pain intensity, nausea at gestational ages less than and more than 15 weeks

Variables	Group 1 (n=16)	Group 2 (n=15)	Group 3 (n=14)	Significance Level
Pain (n, %)	5 (31.2%)	7 (46.6%)	2 (14.2%)	0.103
Pain Intensity (mean ± SD)	2.21 ± 3.41	2.16 ± 2.63	0.85 ± 2.25	0.352
Nausea (n, %)	7 (43.8%)	6 (40%)	9 (64.3%)	0.060
Gestational Age < 15 weeks (mean ± SD)		2.11 ± 1.25	2.09 ± 1.87	0.768
Gestational Age > 15 weeks (mean ± SD)		1.08 ± 1.21	1.13 ± 1.33	0.001

Table 3- Vital signs before and after surgery

Variables	Group 1 (n=16)	Group 2 (n=15)	Group 3 (n=14)	Significance Level
Systolic Blood Pressure (mean ± SD)				
Immediately after injection	125.06 ± 11.44	121.53 ± 12.55	128.5 ± 15.88	0.300
5 minutes after injection	120.43 ± 9.6	117.26 ± 16.56	125.78 ± 17.79	0.311
10 minutes after injection	119.25 ± 9.59	117.26 ± 10.17	120.07 ± 10.54	0.742
15 minutes after injection	117.25 ± 11.36	116.06 ± 10.66	118.21 ± 12.33	0.880
20 minutes after injection	117.62 ± 7.01	118.73 ± 10.53	119.64 ± 11	0.847
Immediately after recovery transfer	118.06 ± 9.91	119.6 ± 11.45	120.64 ± 13.42	0.829
15 minutes after recovery transfer	118.62 ± 6.81	119.93 ± 11.56	119.5 ± 12.51	0.939
30 minutes after recovery transfer	120.75 ± 6. 6	118.73 ± 10.05	121.07 ± 11.17	0.764
45 minutes after recovery transfer	121.06 ± 7.79	119.13 ± 9.93	122.07 ± 8.99	0.667
60 minutes after recovery transfer	121.00 ± 7.79	120.6 ± 7.06	121.92 ± 9.74	0.906
Diastolic Blood Pressure (mean ± SD)				
Immediately after injection	70.06 ± 9.96	77.26 ± 11.13	82.35 ± 19.57	0.064
5 minutes after injection	72.62 ± 11.11	73.6 ± 14.92	77.5 ± 14. 5	0.593
10 minutes after injection	73.56 ± 10.39	72.53 ± 10.28	73.28 ± 11.3	0.963
15 minutes after injection	71.37 ± 11.88	71.8 ± 11.05	73.92 ± 11.3	0.812
20 minutes after injection	72.68 ± 8.68	72.4 ± 10.56	74.35 ± 10.56	0.852
Immediately after recovery transfer	73.81 ± 9.78	75.53 ± 7.97	73.57 ± 11.24	0.836
15 minutes after recovery transfer	74.87 ± 7.64	74.93 ± 8.66	75.14 ± 9.48	0.996
30 minutes after recovery transfer	75.06 ± 7.41	74.13 ± 10.64	76.85 ± 10.57	0.742
45 minutes after recovery transfer	78.18 ± 6.35	76.2± 7.24	76.71 ± 10.75	0.784
60 minutes after recovery transfer	77.12 ± 5.51	77.26 ± 5.53	77.28 ± 8.5	0.997
Heart Rate (mean ± SD)				
Immediately after injection	99.87 ± 13.73	94.26 ± 16.83	91.64 ± 19.74	0.064
5 minutes after injection	99.87 ± 13.43	91± 19.25	91.78 ± 18.26	0.593
10 minutes after injection	98.68 ± 15.16	94 ± 13.8	90.5 ± 14.9	0.963
15 minutes after injection	99.87 ± 14.64	95± 11.05	73.92 ± 11.3	0.812
20 minutes after injection	99.81 ± 14.23	72.4 ± 13.37	96.5 ± 13.37	0.852
Immediately after recovery transfer	78.87 ± 10.22	78± 10.17	76.71 ± 7. 1	0.836
15 minutes after recovery transfer	78.37 ± 9.52	79.86 ± 10.37	77.14 ± 7.58	0.996
30 minutes after recovery transfer	79. 5 ± 7.87	79.33 ± 7.12	79.5± 6.63	0.742
45 minutes after recovery transfer	82.56 ± 5.34	86.8 ± 7.55	81.64 ± 5.45	0.784
60 minutes after recovery transfer	86.31 ± 4.58	84.26 ± 8.14	86.64 ± 5.24	0.997

Discussion

A single-shot injection of a low-dose local anesthetic into the intraspinal space is used for saddle block anesthesia. This numbs only the parts of the patient's body that would touch a saddle, like the perineum, perianal region, inner thighs, and medial areas of the legs [14–15]. The patient is then usually put in a sitting position within 3 to 10 minutes of the injection [14-15]. This technique was traditionally used for urological, anorectal, and postoperative analgesia. Over time, it has become increasingly popular for labor analgesia due to its ability to provide complete pain relief during childbirth with a low dose of medication. Additional benefits of this technique include rapid onset, dense block, early patient readiness, shorter hospital stay, preservation of lower limb motor function, and expedited recovery [16-17]. Patients needing a D&C because they are bleeding a lot often go to the operating room right away, without enough NPO time, which increases the risk of nausea, vomiting, and aspiration. A regional (spinal) technique can help reduce some complications, like low blood pressure, while still providing an effective way to numb the area. In the present study, patients undergoing D&C were divided into three groups and received saddle block anesthesia, with varying sitting times. The results revealed no significant differences in pain, systolic and diastolic blood pressure, or heart rate across the groups. Therefore, for surgical procedures, particularly short emergency surgeries, the shortest possible sitting time may be recommended for patients.

Numerous studies have been conducted on the use of saddle block anesthesia in outpatient surgeries, such as anorectal, prostate, hemorrhoidectomy, etc. Zengin [12] investigated 68 patients in Ankara, Turkey. The results demonstrated that saddle block anesthesia provided adequate anesthesia, and the rate of complications was limited. Unlike general anesthesia, saddle block can reduce postoperative cognitive dysfunction, nausea, and vomiting.

Peterson [18] investigated 859 anorectal patients in Wisconsin who underwent saddle block anesthesia. The median duration of anesthesia with a saddle block was 11 minutes; the surgical duration was 17 minutes; the total duration of anesthesia was 42 minutes; and the recovery duration was 91 minutes. Reported side effects also encompassed urinary retention, conversion to general anesthesia, post-spinal headache, hemodynamic instability, and injection site reaction. Ultimately, saddle block anesthesia presented as an effective method with a low rate of side effects. Bhattacharyya [19] examined 90 men aged 50 to 70 years with prostate issues in India. The results showed that transurethral resection of the prostate (TURP) with saddle block anesthesia led to stable blood pressure and a lower need for vasopressors.

Sikakulya [20] evaluated 58 patients undergoing open hemorrhoidectomy in Uganda. The results indicated that the saddle block technique demonstrated higher efficacy, along with lower costs and reduced operation time. In a systematic review, Yung [21] concluded that lower doses (less than 3 mg) of hyperbaric local anesthetics used in the saddle block technique were associated with a longer duration of effect and timely hospital discharge. Furthermore, Shahid [22] studied 60 patients with prostate conditions in Pakistan. The results showed that patients who received saddle block anesthesia had much smaller drops in systolic and diastolic blood pressure, pulse rate, and mean arterial pressure (MAP) than those who received spinal anesthesia. Additionally, the use of vasopressors in the saddle block group was significantly lower than in the spinal anesthesia group.

As observed, the studies conducted have primarily focused on the application or non-application of the saddle block technique and the dosages utilized. However, none of the studies have investigated the duration of the patient’s sitting time.

Conclusion

The results of this three-arm clinical trial demonstrated that there were no significant differences in pain levels, systolic and diastolic blood pressure, or heart rate among the groups. This indicates that having patients sit for 3, 4, or 5 minutes after spinal block anesthesia did not affect any of these variables. Hence, in surgical procedures, particularly emergency surgeries such as D&C, the shortest sitting time can be considered for the patient. It is noteworthy that, based on the results, if a pregnant woman is beyond 15 weeks of gestation, it is preferable for her to sit for 5 minutes after saddle block anesthesia to alleviate pain intensity, as the shortest sitting time may result in greater pain intensity.

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