Comparative study between paracervical block and general anesthesia for pain control in first-trimester surgical abortion

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Introduction Pain perception is a complex phenomenon that impacts the selection of analgesia. The majority of first-trimester surgical abortions in United States are performed with a paracervical block (PCB). Satisfactory pain control for women undergoing surgical abortion is important for patient comfort and satisfaction.

Aim of the work The aim of this study was to estimate the pain related to first-trimester abortion under local or general anesthesia.

Patients and methods A hundred female patients (American Society of Anesthesiologists)(ASA) I-II undergoing dilatation and curettage were randomly allocated into two equal groups. Group A (n=50): they received a PCB with 5 ml of 2% lidocaine injected into each side of cervix at the 3 and 9 o'clock positions. Group B (n=50): they received general anesthesia with intravenous bolus of 2.5 to 4 mg/kg propofol and 1 μg/kg fentanyl, and maintained anesthesia by 1 mac isoflorine in oxygen as inhalational anesthesia by face mask.

Results The study showed that the most commonly prevalent type of pain by the visual analog scale is in group A during aspiration, curettage, and immediately postoperatively as 41; 27 and 48 patients felt mild pain, respectively; while during dilatation increase incidence of moderate pain as 26 (52%) patients felt moderate pain.

Conclusion The PCB is more preferred than general anesthesia under condition that we wait a few minutes before beginning the procedure as it insures the satisfaction of the patient while avoiding the side effects of general anesthesia and is also not as expensive.

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Introduction

Abortion is pregnancy termination before alive birth is possible; it can occur spontaneously or by induction [1].

Ten percent of clinics in Turkey use general anesthesia (GA), whereas 58% use local anesthesia (LA) with or without oral premedication and 32% use intravenous sedation with LA [2].

The majority of abortions in United States are performed using a paracervical block (PCB). PCB involves the injection of a LA around the cervix to numb the nearby nerves [3].

A skillfully performed abortion with LA is a procedure tolerated by most women and because it has been established that it carries a lower risk of complications and costs less, its use should be encouraged [4].

Aim of this work

This study aimed to estimate the pain related to first-trimester abortion under local or GA.

Patients and methods

This is a prospective comparative study carried out after approval of the hospital ethical committee in Al Zahraa University Hospital and Nabrouh Central Hospital and informed consent was obtained from all patients. This was carried out during the period from February 2018 to 30 August 2018 on 100 pregnant women who came for antenatal care with first-trimester abortion in outpatient clinic or prepared for D&C from emergency room.

Participants of the study

One hundred women ASA I-II who were diagnosed to have abortion by ultrasound presented for termination of pregnancy by suction and curettage; they fulfilled all the selection criteria (inclusion–exclusion criteria) and signed the study's informed consent. These women were selected from the outpatient clinic or emergency

department. Women were divided randomly into two equal groups.

Group A

Fifty women were randomized to receive a PCB 5 ml of 2% lidocaine (100 mg) injected into each side of the cervix at the 3 and 9 o'clock positions.

Group B

Fifty women received GA.

The GA was performed using 1 μg/kg of intravenous fentanyl along with an intravenous bolus of 2.5–4 mg/kg of propofol as an intravenous anesthetic. By using a face mask, we can also maintain anesthesia by one minimum alveolar concentration of isoflurane in oxygen as inhalational anesthesia.

Inclusion criteria

Age older than 18 years, ASA I (no history of medical diseases such as cardiac, renal, hypertension, or diabetes mellitus), gestational age less than 11 weeks by a certain date of the last menstrual period or by ultrasound (with missed abortion, blighted ovum, or inevitable abortion).

Exclusion criteria

Women who did not fulfill the inclusion criteria, with gestational age more than 11 weeks, and women with a history of a medical condition or allergy to medications were excluded.

Technique

The PCB technique was performed by an injection of 5 ml of 2% lidocaine (100 mg solution) into each side of the cervix using a spinal needle in the cervicovaginal junction at the 3 and 9 o'clock positions at a depth of 1 cm with intermittent aspiration before and during injection to ensure that paracervical blood vessels are not punctured.

A period of 4 min was allowed to pass between the injection of a LA and beginning the process of uterine evacuation, which was performed using vacuum aspiration and curettage. A bimanual pelvic examination was performed before placing a tenaculum vertically on the anterior lip of the cervix, and then dilators were used to perform dilatation, vacuum aspiration, and curettage. Dilators, corresponding to a maximum of no. 9 Hegar dilators, were used to dilate the cervix sufficiently to admit the flexible vacuum cannula and aspiration. A sharp curette was used to confirm that the uterus was empty.

The patient was followed up for 6 h postoperatively and during this period, assessment of postoperative pain (1 h postoperatively) was performed using a visual analog pain scale (VAS) and a verbal rating scale (VRS); then, the patient was discharged.

During the entire procedure, facilities including GA were available and the patient had the right to have GA if she asked for it.

The pain VAS is a one-dimensional measure of pain intensity. Pain level was determined using a 0–10 VAS.

In this scale, patients were asked the following question: '0' means no pain and '10' means worst pain you can imagine, what was it like during operation? How is it now?

The women were asked about the position of the pain intensity during the abortion and again 1 h later or using the VRS, the women were asked to assign one of the following six adjectives (absent, mild, moderate, severe, distressing, and exhausting) to describe the pain suffered during the procedure and after 1 h.

Outcome measures

Assessment of pain was performed by the patient at two points, intraoperatively and postoperatively (1 h), and these data were collected. Repeated postoperative local and general examination of the patient allowed the discovery of any adverse effects such as rash, rigors, shivering, fever, asthma, nausea, vomiting, dizziness, and drowsiness. Use of an appropriate statistical analysis can enable determination of the analgesic effect of PCB in uterine evacuation of abortion using vacuum aspiration and patients did not tolerate PCB and needed GA. All data were recorded and analyzed statistically.

Results

As regard to the demographic characteristics, the studied groups were comparable ($P>0.05$) in which it showed that the mean age group was 29.6±6.56 and 28.4±5.78 in group A and group B, the mean gestational age in weeks was 8.4 weeks (8.48±0.97) in both groups, the mean gravidity was 4.04±1.89 and 3.66±1.55 in both groups, respectively, and BMI was 27.98±2.39 and 27.74±2.38 in both groups, respectively (Table 1). This study showed that pain assessment during D&C in group A: PCB was most commonly moderate during dilatation and mild pain during aspiration and curettage (52, 82, and 54%, respectively), whereas immediately after the

Table 1 Comparison between groups according to the demographic characteristics

Sociodemographic data	Group A: paracervical block (*N*=50)	Group B: general anesthesia (*N*=50)	t/χ^{2a}	*P* value
Age (years)				
Mean±SD	29.66±6.56	28.40±5.78	1.038	0.311
Range	12-44	18-40		
Gravidity				
Median (IQR)	4 (3)	4 (2)	*Z*=0.491	0.214
Range	1-9	1-8		
Parity				
Median (IQR)	2 (2)	2 (1)	*Z*=0.741	0.397
Range	0-5	0-7		
BMI (kg/m^2)				
Mean±SD	27.98±2.39	27.74±2.38	0.261	0.610
Range	23-33	22.P 3-L 33.1		
GA (weeks)				
Mean±SD	8.48±0.97	8.44±0.99	0.596	0.442
Range	7-11	7-11		
Mode of delivery [*n* (%)]				
CS	21 (42.0)	29 (58.0)	2.560[a]	0.110
NVD	29 (58.0)	21 (42.0)		
Previous history of abortion and D&C [*n* (%)]				
No	33 (66.0)	36 (72.0)	0.421[a]	0.517
Yes	17 (34.0)	14 (28.0)		
Type of current abortion [*n* (%)]				
Blighted ovum	7 (14.0)	5 (10.0)	0.587[a]	0.746
Inevi C table	5 (10.0)	4 (8.0)		
Missed	38 (76.0)	41 (82.0)		

IQR, Inter quartile range. $\chi^{2,}$ χ^2 test *t* independent sample t test; *Z*, Mann-Whitney test. *P* value more than 0.05 (NS).

Table 2 Pain assessment during D&C using (verbal rating scale) among group A: paracervical block

Pain estimation during D&C (VRS)	No pain [*n* (%)]	Mild pain [*n* (%)]	Moderate pain [*n* (%)]	Severe pain [*n* (%)]
Dilatation	9[a] (18.0)	9 (18.0)	26 (52.0)	6 (12.0)
Aspiration	0 (0)	41 (82.0)	9 (18.0)	0 (0)
Curettage	0 (0)	27 (54.0)	17 (34.0)	6 (12.0)
Immediately after the procedure	0 (0)	48 (96.0)	2 (4.0)	0 (0)

[a]Nine patients had no pain as they were inevitable abortion. VRS, verbal rating scale.

Table 3 Visual analog scale assessment during D&C in group A: paracervical block

VAS during D&C	Range (mean±SD)
Dilatation pain score	0–7 (3.68±2.21)
Aspiration pain score	2–5 (3.34±0.72)
Curettage pain score	2–7 (4.04±1.01)
Immediately postprocedure pain	1–4 (2.64±0.66)

VAS, visual analog pain scale.

Table 4 Comparison between groups according to visual analog scale 1 h after D&C

VAS 1 h after D&C	Group A (*N*=50)	Group B (*N*=50)	*t* test	*P* value
Mean±SD	2.18±0.63	3.02±1.04	23.891	<0.001**
Range	1–4	1–6		

t, independent sample *t* test; VAS, visual analog scale. **P* value less than 0.001 highly significant.

procedure, 96% of the patients felt mild pain according to the VRS (Table 2).

However, using the VAS, pain assessment was range 0–7, the dilatation pain score was 3.68±2.21, the aspiration pain score was 3.34±0.72, the curettage pain score was 4.04±1.01, and immediately after the procedure, the pain score was 2.64±0.66 (Table 3).

This study showed that after 1 h, pain scores decreased in the sample under LA (2.18±0.63) than GA (3.02 ±1.04), with a highly statistically significant difference between both groups (*P*=0.001) (Table 4).

The most common complications that occurred in this study were nausea (6% in group A and 12% in group B), vomiting (2% in group A and 14% in group B), dizziness (3% in group A and 4% in group B), drowsiness (3% in group A and 5% in group B), and failure of anesthesia (2% in group A and 0% in group B), which is higher in GA group than LA with statistically significant difference according to vomiting, *P* value of 0.027. There were no reported cases of laryngeal spasm in both groups (Table 5).

Table 5 Comparison between the groups studied according to the side effects of anesthesia

Side effects of anesthesia	Group A (*N*=50) [*n* (%)]	Group B (*N*=50) [*n* (%)]	χ^2	*P* value
Nausea				
No	47 (94.0)	44 (88.0)	1.099	0.295
Yes	3 (6.0)	6 (12.0)		
Vomiting				
No	49 (98.0)	43 (86.0)	4.891	0.027*
Yes	1 (2.0)	7 (14.0)		
Drowsiness				
No	47 (94.0)	45 (90.0)	0.543	0.461
Yes	3 (6.0)	5 (10.0)		
Dizziness				
No	47 (94.0)	46 (92.0)	0.154	0.695
Yes	3 (6.0)	4 (8.0)		
Failure rate of anesthesia				
No	49(98.0)	50 (100.0)	1.010	0.315
Yes	1 (2.0)	0 (0.0)		
Laryngeal spasm	0.0	0.0	0.0	1.00

χ^2, χ^2 test. *P* value more than 0.05 (NS). **P* value less than 0.05 (S).

Table 6 Comparison between groups according to hemodynamic changes

	Group A: paracervical block	Group B: general anesthesia	*t* test	*P* value
Systolic blood pressure (mmHg)				
Before the procedure	109.80±9.27	108.20±9.19	0.873	0.385
During the procedure	116.53±9.85	99.44±8.42	9.364	<0.001**
Diastolic blood pressure (mmHg)				
Before the procedure	72.75±6.95	72.00±7.56	0.516	0.607
During the procedure	71.41±6.54	64.80±6.80	4.979	<0.001**
Heart rate (beat/min)				
Before the procedure	93.45±6.67	92.90±6.33	0.426	0.671
During the procedure	99.06±7.09	85.48±5.76	10.554	<0.001**

t, independent sample *t* test. *P* value more than 0.05 (NS). ***P* value less than 0.005 (HS).

Also, both groups had similar baseline systolic blood pressure (SBP), diastolic blood pressure (DBP), and heart rate (HR). During the procedure, all hemodynamic parameters (SBP, DBP, and HR) were significantly lower in group B (GA) than group A (PCB), *P* value of 0.001 (Table 6).

Discussion

PCB is a LA technique used widely worldwide for minor gynecological procedures. It involves the injection of lidocaine at the paracervical region using a safe technique to block the sensory nerves of the uterine cervix. The anesthetic effect of PCB allows cervical manipulation with considerable pain reduction [5].

PCB is most commonly used to provide analgesia during gynecological procedures involving cervical dilation or manipulation. Typical applications include pregnancy termination, hysteroscopy, and cervical ablation or excision [6].

Pain perception is a complex phenomenon with physical and psychosocial interactions that vary considerably among women [7]. Pain experienced during an abortion procedure is influenced by a complex interplay of physical, psychological, social, and medical factors [8].

In the current study, pain assessment during D&C by VRS in group A: PCB was most commonly moderate during dilatation and mild pain during aspiration and curettage, whereas immediately after the procedure, 96% of the patients felt mild pain.

This result is in agreement with the results of Donati *et al*. [4], who designed a study that aimed to estimate the pain related to first-trimester abortion under PCB and GA. PCB was performed using 15 ml of 2% mepivacaine at two equal doses at a depth of 1 cm at the 3 and 9 o'clock positions around the cervix. Over 50% of the women described the pain during the procedure as mild or moderate according to the VRS and declined within 60 min.

Also, Murray *et al*. [7] reported that the local paracervial anesthetic produced significantly less pain during dilation and aspiration as well as after the procedure, and this study agree with the current study.

These results are not in agreement with Gómez *et al.* [9] They used 5 ml lidocaine 1% at 0.5 cm depth and reported that PCB produced nonsignificant pain reduction; severe unaccepted pain occurred in almost half of the patients. However, none of the patients required GA for completion of the procedure.

In the current study, the intraoperative pain level corresponded to a range of 0–7 on the VAS, with increased incidence of mild pain on the visual scale in group A during curettage, aspiration, and immediately after the procedure, whereas during dilatation, there was an increase in moderate pain.

Chanrachakul *et al.* [10], in a randomized-controlled trial, used 10 ml of 1% lidocaine at a depth of 1 cm at the 3 and 9 o'clock positions of cervicovaginal reflection. Their results were also in agreement with those of the current study; they concluded that lidocaine is more effective for PCB during fractional curettage and reported that the mean pain score in the study was 4 on the VAS (range, 2–6).

Mankowski *et al*. [11], who used 20 ml of buffered lidocaine, injected equally at 3, 5, 7, 9 o'clock at the cervicovaginal junction and found that the mean pain score in dilation under PCB was 2.6 and 3.9 with curettage; this is in agreement with the current study. However, this study is not in agreement with Buppasiri *et al.* [12], who used 5 ml of 2% lignocaine injected into the lateral fornix at the 3 and 9 o'clock positions at a depth of 3 and 5 ml. They found that the mean pain score in the PCB group by the VAS was 2.5 during the dilatation phase and 6.5 during the suction phase of fractional curettage and about 40% of the patients in the PCB group required intraoperative sedation as they could not tolerate intraoperative pain. The higher pain scores in Buppasiri's study were mostly a result of the use of sharp curette, with more rough manipulation.

Renner *et al*. [3] also used 2 ml 1% buffered lidocaine injected at the tenaculum site, followed by a slow, deep injection of 18 ml into four sites (2, 4, 8, and 10 o'clock). Their results were not in agreement with those of our study and they reported significantly more pain during dilatation (the mean pain score was 4.2) and aspiration (the mean pain score was 6.3).

In the current study, after 1 h, the pain scores decreased in the sample under LA (2.18±0.63) than GA (3.02 ±1.04).

The results of Açmaz *et al*. [2] were in agreement with those of the current study; they reported that significant pain reduction was achieved for both intraoperative and postoperative periods by using PCB with ultracaine injected at the 5 and 7 o'clock positions at the cervicovaginal junction.

Donati *et al.* [4] noted that the pain scores were higher in the sample under GA than LA 1 h after D&C.

The most common complications that occurred in this study were nausea, vomiting, dizziness, drowsiness, and failure of anesthesia, which was higher in the GA group than the LA group, with a statistically significant difference according to vomiting, *P* value of 0.027. However, no case with laryngeal spasm has been reported.

The results of Buppasiri *et al*. [12] were in agreement with those of our study and reported that three (7%) out of 44 patients who received PCB complained of dizziness.

Vadhera *et al.* [13] reported that PCB with 10 ml of lignocaine 2% injected at the 3 and 9 o'clock positions on both sides of the cervix is an effective and safe method for surgical evacuation of early pregnancy and the technique was well tolerated by the patients, which is evident from the few cases who reported that the most common side effects of PCB were headache and vomiting.

Also, Wong *et al*. [14], who designed a study to evaluate the role of conscious sedation in pain relief during termination of first-trimester abortion by suction evacuation under LA with 10 ml of 1% lidocaine, found that use of conscious sedation significantly increased dizziness (P=0.015) and drowsiness (P=0.001).

This study is not in agreement with Gómez *et al.* [9], who did not report any postoperative complications including nausea and vomiting.

Both groups had similar baseline SBP, DBP, and HR. During the procedure, all hemodynamic parameters (SBP, DBP, and HR) were significantly lower in group B (GA) than group A (PCB), *P* value 0.001.

This is in agreement with Bümen *et al.* [15], who found that all hemodynamic parameters (SBP, DBP, and HR) were significantly lower in the (GA) group compared with the PCB group. PCB was performed using100 mg of prilocaine 2%.

Conclusion

We conclude that the PCB is more preferred than general anesthesia under condition that we wait a few minutes before beginning the procedure as it insures the satisfaction of the patient while avoiding the side effects of general anesthesia (nausea, vomiting , dizziness, drowsiness and greater hemodynamic changes) thus more safe and is also not as expensive.

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Conflicts of interest

There are no conflicts of interest.

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