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Anesthesia Care for Second Trimester Procedures: A Retrospective Study Comparing Three Different Cervical Blocks

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Abstract

Objective: The study was conducted to compare the efficacy of three different paracervical blocks used during dilatation and evacuation.

Study Design: This was a historical cohort study comparing three paracervical blocks using 4 units of vasopressin alone (block A), 20 cc of 0.5% lidocaine with 4 units of vasopressin (block B) and 30 cc of 0.5% lidocaine with 6 units of vasopressin (block C). Primary outcome measures were the length of procedure, quantity of intra-operative pain medications, post-operative pain scores and post-operative recovery time. For assessment of post-operative pain scores a visual analog scale and/or a 0-10 numeric pain scale was used.

Results: There were significant differences between post-operative pain score at 5, 10, and 15 mins between block A and block B and C (P values of <0.001, <0.001 and <0.001 for block B *vs.* A and 0.052, 0.020 and 0.009 for block C *vs.* A). There was also a significant difference between the median surgery times between the blocks (P-value of 0.0021). There was no significant difference in the total recovery time between the blocks or intra-operative anesthesia given.

Conclusion: There was a significant difference in total operative time between block A and B/C. There is a significant difference in post-operative pain score between blocks B/C and block A. No significant difference in need for intra-operative anesthesia or recovery time.

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Introduction

Of the 1.2 million terminations done per year in the United States, 11% of these are done in the second trimester [1]. The most common method of abortion in the second trimester is Dilatation and Evacuation (D&E) [1]. Given the need for greater dilatation and introduction of forceps into the uterine cavity, adequate anesthesia is a paramount concern for D&E procedures. Pain management options in second trimester abortions range anywhere from a local cervical block with or without oral pain medications, "light" IV sedation, Monitored Anesthesia Care (MAC), in which agents such as propofol and/or fentanyl are added for deeper sedation, to general anesthesia with complete sedation and ventilatory support [2]. Paracervical blocks are a mainstay of pain management in 1st and 2nd trimester terminations, with the exception of procedures under general anesthesia, which has shown to have no difference in post-operative pain scores with or without a paracervical block [3].

Given the common use of paracervical blocks in pregnancy termination procedures, many studies have evaluated effectiveness of both location and agent used for control of post-operative pain. Glantz et al. [4] demonstrated improved post-operative pain control after 1st trimester termination procedures in women randomized to receive paracervical blocks with 1% chloroprocaine *vs.* saline. Likewise, different analgesics within blocks have been studied in 1st trimester terminations, demonstrating equivalence between lidocaine and ropivocaine, as well as possible improved pain control with the addition of keterolac [5-6]. While studied extensively in 1st trimester termination analgesia, there are currently no studies evaluating different preparations of paracervical blocks given in second trimester abortions and their effects on pain control, recovery time and need for additional intra-operative anesthesia.

Given the paucity of literature on paracervical block techniques in D&E procedures, our study evaluated the difference in post-operative pain from second-trimester dilatation and evacuation

Table 1: Demographics of patients undergoing second trimester terminations at a large urban abortion provider in southern California.

Race	Number (%)
American Indian	3
Black	96
Chinese	5
Hispanic	186
Japanese	1
Korean	4
Native Hawaiian	3
More than one	5
Other	14
Other Asian	14
White	65

Table 2: Demographics of patients undergoing second trimester terminations at a large urban abortion provider in southern California.

Paracervical Block	A (N=123)	B (N=209)	C (N=83)	P-value
Age (years)	24.2	24.5	24.5	0.9181
Gestational Age (weeks)	20.8	20.5	20.2	0.2136
Height (feet)	5.32	5.33	5.27	0.1309
Weight (pounds)	150.2	154.2	147.3	0.3084
Gravity	3.13	2.77	2.77	0.8341
Live Births	1.11	1.02	0.92	0.7312
Preterm Births	1.02	0.75	0.85	0.4514
Abortions	1.02	0.75	0.85	0.4513
Live Children	1.10	1.01	0.93	0.8096

comparing three paracervical block preparations used at a large urban abortion provider in southern California. We hypothesized that there would be significantly less post-operative pain in preparations using lidocaine. Secondary outcomes included intra-operative anesthesia used, total operative time, and total post-operative recovery time.

There are 15,000 terminations done at this particularly large urban abortion provider in southern California, 23% of which are done in the second trimester. It is a referral center for many outlying clinics, which contributes to its higher rate of second trimester abortions, which makes our study location unique in that it has some very notable differences in demographics compared to the national population.

Materials and Methods

This is a historic cohort study, which consisted of a review of anesthesia and procedure records kept for all second trimester abortions done at a large urban abortion provider in southern California location, from January to September 2010. The Institutional Review Board at University of California, Los Angeles as well as the abortion center approved the study.

Charts of all women undergoing a second trimester abortion during the aforementioned time period were evaluated. The procedure took two days, day one for placement of laminaria for cervical ripening and digoxin administration; day two for the D&E procedure. The paracervical block used was surgeon specific. From January to September 2010 there were three main surgeons using specific local blocks in combination with IV sedation. Block A consisted of 5 cc of normal saline with 4 units of vasopressin placed at the 12 o'clock location on the cervix, block B was 20 cc of 0.5% lidocaine with 4 units of vasopressin with deep cervical placement and given at multiple locations and block C was 30 cc of 0.5% lidocaine with 6 units of vasopressin also with deep cervical placement and given at multiple locations. The surgeon either worked alone or with family planning fellows in training.

The demographic data collected was related to our primary and secondary outcomes. More specifically, patient's age, gravity, parity, gestational age, height, weight, previous drug use, psychiatric history, prior cesarean section, and prior cervical surgery. Intra-operative and post-operative data collected included type of block (A, B or C), complications, total surgery time, total recovery time, post-operative pain scores at 0, 5, 10, 15 minutes, surgeon, and anesthesiologist.

Women were excluded from the study if they presented in labor prior to the procedure, were active drug abusers, were receiving post-abortal intrauterine devices or implants or had post-surgical complications such as cervical lacerations, suspected uterine perforation, hemorrhage or atony.

For assessment of post-operative pain scores, a Visual Analog Scale (VAS) and/or a 0-10 numeric pain scale was used. Total recovery time was defined as the time the patient was taken to the recovery area to the time of discharge from clinic. Total surgery time was measured from the time the speculum was placed to when it was taken out. Intra-operative anesthesia requirements were defined as the total quantity of propofol and fentanyl given by anesthesia during the procedure.

For assessing pain scores, parametic repeated measure Analysis of Variance (ANOVA) model or the nonparametric Friedman analog for comparing mean/median post-operative pain scores on the appropriate scale over time during recovery up to 15 min. In addition, we computed a cumulative pain score per unit time (average score per hour) for each patient over the recovery period and used the ANOVA or Kruskal-Wallis methods above to make comparisons. We also used ANOVA or Kruskal-Wallis methods to compare mean/median recovery time across the three groups.

We determined if the groups were comparable on important covariates/potential confounders such as gestational age at time of procedure, prior drug use, prior length of stay, prior procedures (cesarean section, cervical surgery), amount of anesthesia used, and provider skill/training level. We used Fishers exact test to compute p values for comparing categorical or binary variables and report proportions and use ANOVA or Kruskal-Wallis for comparing continuous variables such as gestational age. We also used the Kruskal-Wallis method to compare ordinal covariates.

Results

From January to September of 2010, a total of 620 charts were reviewed, with 180 patients meeting exclusion criteria. Of the patients that met exclusion criteria, a majority of them were for the placement of long acting reversible contraception and very rarely was it because of a surgical complication. Of the remaining 440 patients, 25 received a block other than the previously described block A, B or C, which left us with a total of 415 patients for the study. 123 patients received block A, 209 patients received block B and 83 patient received block C. While group size varied between groups, patient demographics in

Table 3: Primary outcomes of the three different paracervical blocks.

Paracervical Block	A (N=123)	B (N=209)	C (N=83)	P-value
Length of Procedure (mins)	8.2	7.1	8.2	0.0021
Amount of propofol used (mg)	266.3	243.0	260.6	0.1498
Amount of fentanyl used (mcg)	76.8	79.3	84.3	0.3738

each cohort were identical.

Demographics

Of the women undergoing second trimester procedures at PPLA -Bixby, 23% self identify as Black, 47% as Hispanic and 16% as white (Table 1). Demographics were similar between the three groups in regards to age (mean age 24.37 with SD 6.71), gestational age (20.54 weeks with SD of 2.02), height (5.31 feet, SD 0.24), weight in pounds (151.64, SD 36.42), gravity (2.87, SD 2.10), live births (1.03, SD 1.30), preterm births (0, SD 0.05), abortions (0.85, SD 1.36) and term births (1.02, SD 1.29) (Table 2).

Primary outcome

At time zero, there was no statistically significant difference in mean pain scores for blocks A, B, and C (0.04, 0.13 and 0) respectively. At 5 min, post-operative pain scores for blocks A, B and C were 1.07, 0.55, and 0.71, respectively. There was a significant difference between blocks A and B ($p<0.001$), while no significant difference between A and C ($p=0.52$) or B and C, ($p=0.217$). At 10 min, post-operative pain scores for blocks A, B, and C were 1.13, 0.57, and 0.75, respectively. At this point, post-operative pain with Block A was significantly greater than Block B ($p<0.001$) and Block C ($p=0.02$), while there was no significant difference between Blocks B and C ($p=0.242$). At 15 min, post-operative pain scores Blocks A, B, and C were 0.80, 0.41, 0.42, respectively. Post-operative pain scores were significantly greater for Block A *vs.* Block B ($p<0.001$) and Block C ($p=0.009$), while there was no significant difference in pain scores for Block B *vs.* Block C ($p=0.254$).

Secondary outcomes

There was a statistically significant difference between median surgery times between blocks A, B and C (7.0 minutes, 6.0 min and 8.0 min respectively, with a P-value of 0.0021).

There was no statistically significant difference in total recovery time between blocks A, B and C (1.0, 0.90 and 0.98 with P-values for A *vs.* B of 0.071, 0.807 and 0.178).

All patients in the study received a combination of propofol and fentanyl in order to achieve deep sedation. There was no statistical difference between the amount of intra-operative anesthesia (propofol mg/fentanyl mcg) given in Block A (266.3/ 76.8), Block B (243.0/79.3) and Block C (260.6/84.3) with a P-value for propofol of 0.1498 and 0.3728 for fentanyl).

Comments

There have been no studies to date looking at different preparations of paracervical blocks in combination with deep IV sedation during second trimester D&E. In our study there was a statistically significant difference in post-operative pain scores between block A compared to blocks B and C. Block A had the highest frequency of patients reporting pain compared to other blocks. We did not find a significant difference in intra-operative anesthesia used or recovery time. These findings are consistent with Glantz et al. in demonstrating less reported post-operative pain following termination procedure when local anesthetic is added to the paracervical block preparation.

Table 4: Primary outcomes of the three different paracervical blocks (con't).

Paracervical Block	A (N=123)	B (N=209)	C (N=83)	P-value A *vs.* B	P-value A *vs.* C	P-value B *vs.* c
Recovery Time (hrs)	1.0	0.90	0.98	0.071	0.807	0.178
Pain at 0 minutes	0.04	0.13	0.00	0.11	0.414	0.076
Pain at 5 minutes	1.07	0.55	0.71	<0.001	0.052	0.17
Pain at 10 minutes	1.13	0.57	0.75	<0.001	0.020	0.242
Pain at 15 minutes	0.80	0.41	0.42	<0.001	0.009	0.254

Limitations to our study include the fact that this is a historic cohort study, patients received specific blocks based on the surgeon who was performing procedures on the day of presentation, and blocks were applied to different areas of the cervix. To strengthen this finding of differences in pain control, a double-blinded study randomizing patients to a block with only saline and vasopressin *vs.* a block containing lidocaine and vasopressin applied to similar points on the cervix would need to be done. Also, statistical difference does not necessarily translate into clinical difference; our actual numerical differences between pain scores were not large. In order to see if this makes a clinical difference, future studies could possibly include same-day or next-day patient satisfaction surveys in regards to pain control, as well as staff satisfaction intra-operatively and/or in the recovery room.

Strengths include, the fact that historic cohort studies provides a clear temporal sequence of exposure and outcome of interest. The demographics of the study population are similar to that represented in the national data, which makes our study easy to generalize national [1]. Furthermore, despite the presence of training personnel, data still shows statistically significant differences.

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