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ORIGINAL ARTICLE

Effectiveness of Intrauterine Lignocaine in Addition to Paracervical Block for Pain Relief during Dilatation and Curettage, and Fractional Curettage

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About the Author

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Abstract

Purpose of Study Dilatation and curettage (D&C) and fractional curettage (F/C) are commonly performed gynecological procedures. Randomized controlled trials have concluded that topical anesthesia effectively reduces pain in endometrial sampling and hysteroscopy. Our study was aimed at investigating this modality of pain relief in setting of a developing country where, due to lack of resources, successful completion of these procedures in an outpatient setting is a necessity.

Methods This study was a prospective, randomized, placebo-controlled, double-blind study conducted in 84 patients. All patients received either intrauterine 2 % lignocaine or normal saline along with oral NSAID and paracervical block prior to the procedure. The pain was analyzed at three steps: at the time of curette, immediately post-procedure, and 30 min later using 10-cm visual analog score.

Results The patients in the experimental and control groups were well matched for age, parity, body mass index, menopausal status, and the indications for intervention. At all the three stages, pain perceived in the lignocaine group was significantly less as compared to that in placebo group. As compared to lignocaine group (55 %), significantly higher number of women in placebo group (88 %) perceived severe pain during endometrial curettage ($p = 0.001$).

Conclusions The present study indicates that two percent intrauterine lignocaine significantly decreases the pain perception during intrauterine gynecological procedures such as D&C and F/C. This is a simple, effective, inexpensive, and low-risk intervention which can potentially increase the patient acceptability and compliance with such procedures.

Keywords Intrauterine lignocaine · Pain relief · Gynecological procedures

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Introduction and Review

Dilatation and curettage (D&C) and fractional curettage (F/C) are two commonly performed gynecological procedures which were traditionally done in the Operation theatre (OT) but are now routinely performed in the outpatient department (OPD) because of increasing work load and relative lack of time. A major obstacle to the successful completion of outpatient gynecologic procedures is pain. Most patients can tolerate pain to complete necessary procedures but studies show that pain scores are often high. Cervical biopsy and cervical curettage are associated with visual analog scale (VAS) pain scores ranging from four to six on a 10-point scale [1, 2]. Endometrial biopsies have been reported to have VAS scores of five to seven [3, 4]. Pain with intrauterine device (IUD) insertion varies from two to seven, and pain scores during laminaria insertions with paracervical block range from five to seven [5, 6]. Recent Cochrane reviews have evaluated the existing literature regarding pain control for hysteroscopy, first trimester abortion, IUD insertion, and hysterosalpingography (HSG), and have concluded that optimal methods for pain control are unclear [7–9].

Several studies have explored methods of adequate pain relief during gynecological procedures. Although use of general anesthesia provides complete analgesia, amnesia, and a hypnotic effect, it carries higher mortality and morbidity risk than properly administered local anesthetics. Paracervical block has routinely been used for pain reduction during such procedures since 1925 but the pain intensity during paracervical block is still considered as moderate. This can be explained because of the existence of a different sensory nerve supply to the uterine body and cervix. Oral NSAIDs 30–60 min prior to the procedure, alone or in combination with paracervical block, are recommended by many clinicians. Studies have reported significantly lower intensity of pain in non-steroidal anti-inflammatory drugs (NSAID) group, in comparison to placebo, especially when used with paracervical block [10, 11].

In an endeavor to further alleviate pain during uterine instrumentation, the use of intrauterine topical application of anesthetic agents has been tested for different endometrial sampling procedures. The presumed mechanism of action of these agents is the local effect on the nerve endings within the endometrial mucosa. Randomized controlled trials have concluded that topical anesthesia effectively reduces pain in endometrial sampling and hysteroscopy. However, a few studies have shown no beneficial effect of intrauterine lignocaine in reducing pain during uterine procedures. The differences in the results of these studies may be due to differential use of tenaculum/dilator for cervical dilatation, different anesthetic agents in different concentrations, and different modes of administration. The overview of literature suggests that intrauterine lignocaine has the potential to provide pain relief over and above the traditional paracervical block though it needs to be studied further in different settings and in different populations. Our study was aimed at investigating this modality of pain relief in setting of a developing country where, due to lack of resources, successful completion of these procedures in an outpatient setting is a necessity.

Materials and Methods

This study was a prospective, randomized, placebo-controlled, double-blind study carried out at the Department of Obstetrics and Gynecology at Post Graduate Institute of Medical Education and Research (PGIMER), Chandigarh. The study was approved by the Institute's Ethics committee. Eighty-four patients attending the OPD duly assessed by the Gynecology consultants and found to have the requirement of either F/C or D&C were enrolled after their written informed consent. Patients with medical disorders, cerebrovascular disorders, previous surgery on cervix, prior pelvic radiotherapy, active pelvic inflammatory disease, endometrial polyps, submucous fibroids, uterine size more than 10 weeks, or a previous history of allergic reaction to either lignocaine or NSAIDs were excluded from the study. Patients were assigned to either control or experimental groups using computer-generated random numbers. A central independent agency, not involved with the study, produced experiment codes which were provided in sealed packets containing the drug for experimental as well as control groups. The placebo was similar in color, amount, and weight to the active drug. The packets were opened just before the procedure by a nurse not involved in the study. All the procedures and pain assessment were carried out by a single operator to avoid individual bias.

The standard protocol of the department for D&C/FC was followed in all patients. All patients received oral NSAID 1 h prior to the procedure. Paracervical block was administered to all as per the standard protocol. A total of 10 ml of 1 % lignocaine was injected through a 23 G disposable syringe at 3 and 9 o'clock positions of cervicovaginal junction at approximately 1 cm depth after prior aspiration to avoid intravenous injection. It was attempted to keep cervical manipulation to minimal to avoid imparting pain to the patient. Instillation of either 5 ml of 2 % lignocaine (experimental group) or 5 ml normal saline (control group) into the uterus was done using 8–12 Fr pediatric Foley catheter. The catheter was left in place for 2 min before withdrawing to limit the backflow and allow contact time for the anesthetic to act. This was followed by uterine sounding, cervical dilatation (if found necessary), and uterine curettage in the usual manner.

Each patient made three assessments of the severity of pain using a visual analog scale. Immediately after the procedure was over, the pain score during the point of curettage and at the end of the procedure was evaluated by asking the participants to rate their pain levels on a 10-cm VAS where 0 signified no pain and 10 described worst-ever, agonizing unbearable pain. The pain was reassessed in a similar way half an hour after the procedure. The pulse rate was recorded immediately after the procedure.

The primary outcome measures of this study were the severity of the pain perceived by the patient, whereas the secondary outcomes were the complications associated with the procedure, the adverse effects of the drugs being used, and the effect on the yield of the specimen.

Data were analyzed by SPSS 15. Before comparing the groups, each variable was tested for normality distribution. The data were processed using the student t test and the Chi-square test whichever was appropriate.

Results

The patients in the experimental and control groups were well matched for age, parity, body mass index, menopausal status, and the indications for intervention as shown in Table 1.

Table 1 Demographic profile and indication of procedure

	Lignocaine ($n = 42$)	Placebo ($n = 42$)	p value
Mean age (years)	41.07 ± 8.01	44.81 ± 6.46	0.021
Mean BMI	25 ± 5.5	24.3 ± 3.8	0.78
Parity			
0–1	8	2	0.102
2–3	27	29	
4 or more	7	11	
Previous vaginal births			
0	8	3	0.106
1 or more	34	39	
Menopausal status			
Premenopausal	38	33	>0.05
Postmenopausal	4	9	
Indication			
Menorrhagia	12	11	
Irregular bleed	20	13	
Polymenorrhea	5	6	
Postmenopausal bleed	3	9	
Simple hyperplasia	2	1	
Others (secondary amenorrhea, suspected genital TB)	0	2	

Two nulligravida women underwent these procedures. One was a 24-year-old lady with primary infertility with bleeding on and off for 7 weeks, not responding to hemostatics. The second woman was a 26-year-old lady with irregular cycles.

The most common medical disorders were obesity and hypertension. All subjects had well-controlled blood pressures at the time of procedures. There were 5 patients with thyroid disorders, 4 hypothyroid and 1 hyperthyroid. All of them were under treatment with well-controlled disease.

The necessity of cervical dilation depended on the cervical condition, which was assessed at the time of the procedure. Eighty-eight percent of the patients in both the groups had a multiparous cervix. Overall ten patients in lignocaine group and thirteen in placebo group required cervical dilation.

Pain perceived was assessed by the VAS during, immediately after, and 30 min after the procedure. At all the three stages, pain perceived in the lignocaine group was significantly less as compared to that in placebo group as depicted in Tables 2 and 3.

The pain score was found to be independent of the parity of the patients. The mean pain score between vaginal multiparous and vaginal nulliparous women was not statistically different in both lignocaine and placebo groups (VAS 5.44 and 5, respectively, in lignocaine group with p value 0.39; VAS 6.96 and 5.67, respectively, in placebo group with p value 0.15).

In each group, pain scores were assessed depending on menopausal status. Pain perceived was similar irrespective of whether a woman was premenopausal or postmenopausal (VAS 5.37 and 5.25, respectively, in lignocaine group with p value 0.86; VAS 6.94 and 6.33, respectively, in placebo group with p value 0.26).

Complications

Excessive pain score was defined as pain score of more than 6. As compared to lignocaine group ($n = 23$, 55 %), significantly higher number of women in placebo group (88 %) perceived severe pain during endometrial curettage ($p = 0.001$).

The increment in heart rate was significantly more in placebo group which may suggest a more intense sympathetic response to the greater magnitude of pain perceived in placebo group.

The procedure was successfully completed in all the patients. A proliferative or secretory histology was seen in majority of patients (71 % in lignocaine group and 54 % in placebo group). Eight patients in lignocaine group had abnormal findings with seven showing hyperplasia and one showing polyp. Twelve patients in placebo group had abnormal findings with eleven showing hyperplasia and

Table 2 Pain score at three steps between two groups

	Lignocaine	Placebo	*p* value
During procedure	5.36 ± 1.2	6.81 ± 1.4	0.00
Immediate post-procedure	3.7 ± 1.2	5.12 ± 1.3	0.00
After 30 min	2.14 ± 1.1	3.05 ± 1.4	0.002
Pain when cervical dilatation required	4.6 ± 1.07	6.69 ± 1.95	0.03
Pain when cervical dilatation not required	5.59 ± 1.26	6.86 ± 1.15	0.08

Table 3 Complications of the procedure

	Lignocaine group	Placebo group	*p* value
Increment in pulse	8.81 ± 4.73	11.12 ± 5.78	0.049
Vasovagal reaction	0	2	0.152
Inadequate specimen	4 (9 %)	7 (16 %)	0.336
Excessive pain (VAS > 6)	23 (54.8 %)	37 (88 %)	0.001

one showing malignancy. Samples were inadequate in four patients (9 %) in lignocaine group in comparison to seven (16 %) in placebo group; however, this association was not significant. The analysis of specimens by pathologists blinded to lignocaine or saline revealed no histological effect on the ability to interpret endometrial biopsies.

No serious complications were observed during the procedures; however, two patients in the placebo group had vasovagal reaction. Their respective VAS scores were 7 and 8; both recovered rapidly on being put to rest in supine position with their pulse rates and blood pressures picking up within 10 min. This complication was not seen in any patient in lignocaine group but this result was not statistically significant.

Discussion

Abnormal uterine bleeding (AUB) accounts for one-third of total outpatient gynecological consultations and around 70 % of all consultations by women in premenopausal and postmenopausal age group. Endometrial evaluation is required for all women with AUB in this age group and also for women more than 35 years with a history suggestive of unopposed estrogen exposure. In a developing country like India, all such procedures cannot be performed in OT because of lack of resources and infrastructure. Hence most of the patients need to undergo the procedures on an OPD basis. The technique of endometrial sampling may vary depending on patient's age, menopausal status, clinical suspicion of malignancy, availability of instruments, etc. In the present times, D&C has largely been replaced by non-invasive instruments like Pipelle or Vibra vacuum aspirator. The efficacy of these instruments for diagnosis of endometrial hyperplasia and carcinoma has been proven in multiple studies over last 2 decades. However, it has been seen in these studies that these devices are superior for diagnosing malignancy as compared to benign diseases. Also, these devices are ideal for postmenopausal women where suspicion of malignancy or its precursors is high. For premenopausal women, where the cause of AUB is expected to be benign, Pipelle may prove to be less efficacious. Studies have shown that the sensitivity of Pipelle in diagnosing polyps and endometritis is 57–60 %. Also, in countries like India where tubercular endometritis is still prevalent, instruments like Pipelle which sample only 4 % of the endometrial surface may not be ideal. Pipelle is not freely available in this part of the country, and its disposable nature also increases the cost of the procedure. Considering all these factors, endometrial sampling is routinely done in our institute using Novak's uterine curette. This makes the procedure painful. Studies have found that 60–80 % of patients who did not receive anesthesia experienced moderate to severe pain. Patient acceptability and compliance might be difficult; therefore, adequate measures for pain relief are necessary before performing these procedures.

The present study indicates that two percent intrauterine lignocaine significantly decreases the pain perception during intrauterine gynecological procedures such as D&C and F/C. This is a simple, effective, inexpensive, and low-risk intervention which can potentially increase the patient acceptability and compliance with such procedures. In this study, a combination of intrauterine lignocaine and paracervical block was compared with intrauterine placebo and paracervical block. The combination may have synergistic effects because of different neural pathways of uterus and cervix. Major autonomic nerves arise from S2 to S4 roots and innervate uterus in the lower portion of broad ligament as the Frankenhauser plexus. The basis of paracervical block is the interruption of this dense plexus. However, the uterus and cervix receive nerve supply from other sources as well. Sympathetic innervation from T10 to L1 roots enters the uterus following the anastomosis of the uterine artery. Also well-defined nerve plexuses lie in the endometrium and along the mucosal surface of the cervix which are fed by both the ascending and descending roots. The

limited efficacy of paracervical block is likely due to its inability to block these nerves. Hence it is expected that intrauterine anesthesia, which may reach these nerves more effectively, will provide more global anesthesia, especially in conjunction with paracervical block.

Studies in the last two decades have evaluated the use of intrauterine topical anesthesia with combined hysteroscopy and endometrial biopsy; most of the studies did not find a significant difference between case and placebo groups in patient-reported pain experience. This was probably because hysteroscopy also involves uterine distention which might be less responsive to topical anesthetic. Trolice et al. were the first to evaluate efficacy of intrauterine topical anesthesia specifically for endometrial biopsy and found encouraging results in both premenopausal and postmenopausal women, regardless of parity. Intrauterine instillation of lignocaine resulted in significant reduction in pain scores; median pain scores being 4.7 versus 9.9 in experimental and placebo groups, respectively. However, they did not combine this modality of pain relief with any other modality.

Rattanachaiyamont et al. [12] carried out a double-blinded, randomized, placebo-controlled trial in 66 patients with abnormal uterine bleeding undergoing F/C with sims curette. All patients received paracervical block in conjunction with either intrauterine lignocaine or saline. They observed statistically significant difference in the pain profile between the two groups (pain score 2.3 vs. 4.7). However, there was no difference in the profiles of pulse rate and mean arterial blood pressures. We found that in our patients, the increment in heart rate was significantly more in placebo group which may suggest a more intense sympathetic response to the greater magnitude of pain perceived in this group.

Another randomized, double-blind controlled trial in 200 patients by Hui et al. [13] found that the use of intrauterine lignocaine reduced pain during suction curettage in endometrial sampling (pain score 2.1 vs. 4.2). However, this study differed from ours as it excluded postmenopausal women, used vacuum aspirator for endometrial sampling, and did not combine any other modality of pain relief in the form of paracervical block or NSAID. This could also be the reason why these authors did not find any difference in pulse and blood pressures in the two groups. The role of NSAIDs also cannot be underestimated as their systemic effect of inhibiting prostaglandin synthesis acts in synergy with local anesthesia to provide the best possible analgesia to the patient. This was also proven by Dogan et al. in a randomized, double-blind, placebo-controlled study in 120 patients undergoing endometrial biopsy using Pipelle device [14]. The mean pain scores in NSAID only and lignocaine only groups were not significantly different compared with placebo group. However, the pain score in lignocaine plus NSAID group showed significant reduction (4.6 vs. 7.1).

Adequacy of the histopathological sample was one of the important secondary outcomes of our study as it indicates the comfort level of the patient during the procedure translating into better co-operation. Only 4 patients in lignocaine group had an inadequate sample in comparison to seven in placebo group. Although this result was not statistically significant, it might be an additional reflection of less pain perception in lignocaine group.

One of the major concerns in the use of anesthetic agents is the safety of the drug used. Lignocaine can be associated with adverse effects ranging from mild toxicity such as perioral numbness and dizziness to convulsion and respiratory arrest. The safety of this modality of pain relief has been proven in various studies. Rousseau et al. measured plasma lidocaine concentrations following insertion of 2 % lidocaine gel into the uterine cavity after uterine balloon thermal ablation. They injected 11 ml of 2 % lidocaine gel into the uterine cavity at the end of the procedure. Blood samples were taken at 5, 15, 30, and 60 min after insertion, and lidocaine concentrations were measured using high-performance liquid chromatography. The authors concluded that there was minimal systemic absorption of lidocaine from the uterus following uterine balloon thermal ablation. Measured concentrations were well below the toxic plasma concentration for lidocaine. Even with the use of 4 % lignocaine, the highest serum lidocaine level recorded was 4.0 μg/ml which is well below the known toxicity level of 8 μg/ml. This was also proven by Edelman et al. in a randomized, double-blind, placebo-controlled trial of 80 women undergoing first trimester abortion [15]. Due to this wide gap between pharmacological and toxicity levels, we did not measure the serum lignocaine in our patients. However, a strict watch was kept on any adverse event during and after the procedure. The procedures were, in general, well tolerated, however, two patients in placebo group had vasovagal reaction. Both the patients recovered rapidly on being put to rest in supine position with their respective pulse rates and blood pressures picking up within 10 min.

The present study as well as the review of literature on this subject shows that there is good evidence to support use of intrauterine lignocaine for endometrial biopsy and curettage.

Compliance with Ethical Requirements and Conflict of Interest The manuscript has not been submitted to more than one journal for simultaneous consideration. The manuscript has not been published previously (partly or in full). A single study has not been split up into several parts to increase the quantity of submissions and submitted to various journals or to one journal over time. No data have been fabricated or manipulated. Consent to submit has been received explicitly from all co-authors, as well as from the

responsible authorities—tacitly or explicitly—at the institute/organization where the work has been carried out, before the work is submitted. Authors whose names appear on the submission have contributed sufficiently to the scientific work and therefore share collective responsibility and accountability for the results. This article is in compliance with the ethical standards as per the journal guidelines. Prior to conducting the study, approval was obtained from the institute's ethical committee; which is DCGI registered. The study was conducted after written informed consent obtained from patients. There are no potential conflicts of interest/any funding.

References

1. Naki MM, Api O, Acioglu HC, et al. Analgesic efficacy of forced coughing versus local anesthesia during cervical punch biopsy. Gynecol Obstet Investig. 2011;72:5–9.
2. Crane JCC, Dawson L, O'Grady T, et al. Randomized trial of oral misoprostol before endometrial biopsy. J Obstet Gynaecol Can. 2009;31(11):1054–9.
3. Leclair CM, Zia JK, Doom CM, et al. Pain experienced using two different methods of endometrial biopsy: a randomized controlled trial. Obstet Gynecol. 2011;117(3):636–41.
4. Hubacher D, Reyes V, Lillo S, et al. Pain from copper intrauterine device insertion: randomized trial of prophylactic ibuprofen. Am J Obstet Gynecol. 2006;195(5):1272–7.
5. Dijkhuizen K, Dekkers OM, Holleboom CA, et al. Vaginal misoprostol prior to insertion of an intrauterine device: an RCT. Hum Reprod. 2011;26(2):323–9.
6. Tangsiriswatthana TS, Sangkomkamhang US, Lumbiganon P, et al. Paracervical local anaesthesia for cervical dilation and uterine intervention. Cochrane Database Syst Rev. 2009. doi: 10.1002/14651858.CD005056.pub2.
7. Ahmad DD, Duffy J, O'Flynn H, et al. Pain Relief in hysterosalpingography. Cochrane Database Syst Rev. 2007. doi: 10.1002/14651858.CD006106.pub2.
8. Allen RH, Bartz D, Grimes D, et al. Interventions for pain with intrauterine device insertion. Cochrane Database Syst Rev. 2009. doi:10.1002/14651858.CD006106.pub2.
9. Renner RM, Jensen JT, Nichols MD, et al. Pain control in first-trimester surgical abortion: a systematic review of randomized controlled trials. Contraception. 2010;81(5):372–88.
10. Manyou B, Phupong V. Prospective randomized, double-blinded, placebo-controlled trial of preoperative etoricoxib for pain relief in uterine fractional curettage under paracervical block. Eur J Obstet Gynecol Reprod Biol. 2008;140(1):90–4. doi: 10.1016/j.ejogrb.2008.02.017 Epub 2008 Apr 8.
11. Phittayawechwiwat W, Thanantaseth C, Ayudhya NI, et al. Oral etoricoxib for pain relief during fractional curettage: a randomized controlled trial. J Med Assoc Thail. 2007;90(6):1053–7.
12. Rattanachaiyanont M, Leerasiri P, Indhavivadhana S. Effectiveness of intrauterine anesthesia for pain relief during fractional curettage. Obstet Gynecol. 2005;106(3):533–9.
13. Hui SK, Lee L, Ong C, et al. Intrauterine lignocaine as an anaesthetic during endometrial sampling: a randomised double-blind controlled trial. BJOG. 2006;113(1):53–7.
14. Dogan E, Celiloglu M, Sarihan E, et al. Anesthetic effect of intrauterine lidocaine plus naproxen sodium in endometrial biopsy. Obstet Gynecol. 2004;103(2):347–51.
15. Edelman A, Nichols MD, Leclair C, et al. Intrauterine lidocaine infusion for pain management in first-trimester abortions. Obstet Gynecol. 2004;103(6):1267–72.