Analgesic effect of lidocaine in paracervical block in women undergoing colposcopy and cervical biopsy: a randomized clinical trial

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Abstract

Objective: To investigate the effect of lidocaine in paracervical block in women undergoing colposcopy and cervical biopsy.

Methods: This a triple-blind randomized controlled trial (July-September 2020) was conducted on women who were candidate for the colposcopy and cervical biopsy with American Society of Anesthesiologists classification Class I or II. They were randomly allocated to receive a single dose of lidocaine hydrochloride 2% or injectable sodium chloride 0.9% paracervical block, and then, cervical biopsy was done. The pain score was asked and intra-procedural and 5-minutes post-procedural in both groups, using the VAS tool. Also, patients' satisfaction after the procedure and complications were recorded.

Results: Totally, 74 patients (37 in each groups) were enrolled, with the mean±SD age of 35.91±8.10 years. The mean±SD of pain score intra-procedural was statistically higher in patients in the treatment group (0.92±1.53 vs. 2.73±2.34, P<0.001), as well the pain score 5-minutes post-procedural (0.27±0.65 vs. 0.95±1.15, P=0.003). Also, the mean±SD of patients' satisfaction score was higher in the treatment group (4.65±0.82 vs. 4.05±1.41, P=0.03). Dizziness were observed only in the treatment group, statistically (P<0.001).

Conclusion: Paracervical block using lidocaine could reduce the intra-procedural and 5-minutes post-procedural pain. Also, it can increase the patients' satisfaction with the procedure.

Introduction

Cervical cancer is the fourth most common malignancy in women globally and the third in the United States (1, 2). It is the next common cancer after the endometrial and ovarian cancers. This malignancy is still a serious global health problem. Due to the lack of screening programs, cervical cancer is one of the leading causes of malignancy-related death among women in some underdeveloped countries. However, the global prevalence of the invasive type of this cancer is decreasing because of the early diagnosis that can increase survival (2). In Iran, this cancer is the fifth most common malignancy (3), and its incidence varies in different regions. Despite the lower cervical cancer-related mortality rate in Iran than in other geographical regions of the world, the risk factors related to this cancer are not lower in this country. This might lead to an increased prevalence in recent years. Therefore, this cancer still needs specific attention (4, 5).

Cervical Intraepithelial Neoplasia (CIN), induced by Human Papillomavirus (HPV) infection, is a preneoplastic lesion that leads to cervical cancer. These epithelial changes can be detected using cytological screening or HPV testing. When a patient has abnormal results in the primary screenings, she will be referred for further evaluation by colposcopy. In this method, tissue changes are evaluated using a special light microscope, and a biopsy is done (6).

Currently, colposcopy is the gold standard method for diagnosis and follow-up of these cases (7). Most patients are well aware of the colposcopy's importance; however, the related pain and discomfort often lead to fear and anxiety. This fear may subsequently affect the patients' presentation for colposcopy and the procedure's effectiveness. Moreover, anxiety can increase pain perception. Finally, these factors together may

prevent the colposcopist from obtaining suitable specimens (8). Therefore, there have been studies on various pharmacological and non-pharmacological techniques, with different and controversial results, to reduce the pain felt during colposcopy and cervical biopsy (9).

Studies showed that oral ibuprofen, topical benzocaine gel or spray, and topical xylocaine gel or spray have no significant effects on pain reduction compared to placebo (10–12). In addition, other studies on forced coughing during cervical biopsy to reduce pain and discomfort in women had controversial results (9, 13, 14). Also, some other studies investigated the effect of local anesthesia using lidocaine on pain during the cervical biopsy, but the evidence was not sufficient (15–17).

The present study investigated the effect of the paracervical block using lidocaine on the analgesia made in the patients undergoing cervical biopsy intra-procedural and 5-minutes post-procedural, as well as the rate of patients' satisfaction.

Materials And Methods

Study design and setting

The current study was designed as a triple-blind randomized controlled trial (RCT), which was conducted in Obstetrics and Gynecology Clinic of Yazd Shahid Sadoughi Hospital, affiliated by Yazd Shahid Sadoughi University of Medical Sciences, one of the main biggest and referral hospital in Center of Iran.

Participants

The participants were women who were referred to this clinic, and they were candidate for colposcopy and cervical biopsy from July to September 2020. The inclusion criteria were women with the age of 18–60 years, American Society of Anesthesiologists classification (ASA) Class I or II, and were candidate for the colposcopy and cervical biopsy including; 1. Abnormal cervical cytology; 2. Abnormal cervix appearance; 3. HPV infection or genital warts; 4. Positive history of cervical intraepithelial neoplasia (CIN); 5. Post coital bleeding (PCB); and 6. Resistant vaginal infection. The pregnant patients, as well as women with positive history of addiction to drug abuse, or using psychotropic or psychiatric drugs, or taking painkillers from the day before the procedure, severe systemic diseases (cardiac, renal, etc.), positive history of allergy to anesthetics, or dissatisfaction with the study were excluded.

Sample size and sampling method

Using Medcalc software version 13.0 for Windows, with considering a 2-tailed α of 0.05, 80% power, standard deviation (SD) of 2.6, and to detect a 1.8 point or greater mean in two groups (18), a sample size of 66 patients (33 in each group) was calculated. With 10% loss, 37 patients in each group, and a total of 74 people were considered.

Randomization

In the current study, the included participants were divided to two groups using block randomization method. Each block size was 2 by 2, and in total 19 blocks were considered. The acceptable sequences for packages within each block were: 1) AABB, 2) ABAB, 3) BBAA, 4) BABA, 5) ABBA, and 6) BAAB. Then each were marked from 1 to 6 as above. After that the packages within blocks were sequentially numbered from 1 to 74.

Participant were consecutively numbered from 1 to 74, based on the time of admission and hospital registration code (19).

Allocation was performed by blindly matching the patients' number and package. Randomization sequence and concealment were performed [RSM]. Also, allocation and matching of the participants' number to the package number in order to receive the intervention was performed [RSM].

Blinding

Two sets of 74 sterile, colorless and ready to inject $10cm^3$ syringes were prepared and were labeled A (lidocaine hydrochloride 2%) and B (injectable sodium chloride 0.9%) before concealment [the third party], and were delivered to the physician [FN]. According to block randomization, each patient received A or B treatment. The patients, the medical student and the physician who administrated were blinded and they did not know which patients received the drug A or B. Hence, the patients, physicians, as well as data analyzer were blinded to the type of analgesic.

Study interventions

At first, the purpose and process of the study were explained to eligible patients by the researchers [FN, RSM] according to inclusion and exclusion criteria. The participants were then selected and asked them to sign the written informed consent.

At first, all the patients received a 100 mg diclofenac rectal suppository [Aboureyhan Pharmaceutical Company, Tehran, Iran] 30 minutes pre-procedure for matching and reducing the pain of the local anesthesia needle. The patients were positioned in the lithotomy position on a gynecologic examination table, and a vaginal speculum (22 cm long, sterile, and nonpyogenic) [Almasoom Company, Iran] was placed in the vagina.

Then, they were randomly allocated to receive a 10 cc of lidocaine hydrochloride 2% [LIDOCAINE HCL 2% 50 mL polypropylene vials, Shahid Ghazi Pharmaceutical Company, Tabriz, Iran] as treatment group, or a 10 cc sodium chloride 0.9% [injectable SODIUM CHLORIDE 0.9% 1 liter, Shahid Ghazi Pharmaceutical Company, Tabriz, Iran] as placebo group.

The physician then performed the paracervical block using the drugs A and B by a 23 gauge needle (0.6*0.32 mm) at the 3 and 9 o'clock positions in the cervicovaginal junction. The syringe was aspirated before the injection to avoid intravascular injection. Then, a piece of cotton soaked in 3% acetic acid was applied to the cervix for acetowhitening. The physician waited for a maximum of 2 minutes to allow the drug to reach the maximum efficacy (17). Then, the colposcopy was performed. Using a Tischler biopsy forceps, the biopsy was done from the suspected cervical lesions. The maximum size of the specimens was 3–4 mm. Patients with suspected lesions in the cervical canal under the microscopic view underwent endocervical curettage using a Novak curette. The patients were explained about the procedure steps, including anesthetic injection, biopsy, and curettage. Patients with post-biopsy heavy bleeding received silver nitrate for chemical cauterization. Finally, 3 sterile gauzes were inserted into the vagina longitudinally for vaginal tamponade. Necessary post-procedural recommendations were given to the patients, including the emphasis on the tampon removal a few hours after the procedure, explaining the possibility of mild pain or bleeding in the

next few days that could be alleviated with analgesics and anti-inflammatory drugs, recommendation to visit the emergency department in case of heavy bleeding, and avoiding vaginal intercourse and strenuous activity for the next 2 weeks.

Outcomes evaluation

The pain score was asked and recorded by stopwatch at baseline and 5 minutes after the beginning of administration in both groups, using the VAS tool. In this scale, a straight, horizontal line is used with a fixed length of 100 mm was considered, while the end of the line is the final limit of the parameter. The recommended points for the assessment using VAS include: without pain (0–4 mm), mild pain (5–44 mm), moderate pain (45–74 mm), and severe pain (75–100 mm). VAS can be completed in less than 1 minute. It is a free and available tool, needs little training and score, and is acceptable to the patients (20).

The vital signs including systolic blood pressure (SBP) (mmHg), heart rate/minute (HR), and respiratory rate/minute (RR) were also recorded before and after the procedure. The adverse events such as decreased SBP (SBP < 90mmHg), bradycardia (HR < 60/minute), tachycardia (HR > 120/minute), as well as faint, dizziness, and tinnitus were assessed and recorded after the procedure [RSM]. Moreover, the patients satisfaction (score of 0–5) were asked and recorded. All the process was supervised by the Obstetrics and Gynecology attending physician [FN] and anesthesia attending physician [SB].

Data collection

All data were collected using a data gathering form, which included the patients' demographic information such as age, weight, height, being an indigenous, number and type of child delivery, number of live children and abortions, history of colposcopy, HPV, intraepithelial neoplasia (CIN), abnormal cytology and appearance of the cervix, resistant vaginal infection, post coital bleeding (PCB), vital signs, procedure adverse events, VAS score, and the patients' satisfaction. Then all these data were entered to the analytical software.

Statistical Analysis

All statistical analyses were performed with the Statistical Package for Social Sciences (SPSS Inc., Chicago, IL, USA) version 23.0 for Windows through descriptive and analytical tests, such as independent sample *t*, Mann-Whitney, and Pearson Correlation tests for the quantitative variables, and Chi-square and Fisher's exact tests for qualitative ones. The distribution of variables was assessed with Kolmogorov-Smirnov test. Results are presented as mean ± SD for continues variables, and were summarized in number (percentage) for categorical ones. Two-sided P value < 0.05 was considered to be statistically significant.

Ethical consideration

The current study was approved by Islamic Azad University-Yazd Branch, as well as the Ethics Committee (IR.IAU.YAZD.REC.1399.030). Also, it was registered and approved by Iranian Registry of Clinical Trials (IRCT) (IRCT20180526039854N1at http://www.irct.ir in 02/11/2020). To consider ethical issue, the collected data were not revealed to anyone, except for the researchers. All participants signed a written informed consent. All methods were performed in accordance with the relevant guidelines and regulations.

Results

Out of the 91 patients assessed for eligibility, 9 patients did not meet the inclusion criteria (one pregnant woman, one patient with positive history of drug abuse, four patients with positive drug history of psychiatric drugs, and three patients took painkillers from the day before the procedure), and 7 individual refused to participate because of dissatisfaction with the procedure in the clinic and they desired to be admitted and receive general anesthesia due to fear and anxiety of the procedure. Thus, the final number of patients being randomized into two study groups was 75 (37 patients as group A and 38 patients as group B). One patient in lidocaine group was excluded from the final analysis due to side effect of lidocaine (seizure-like movements) and cessation of the procedure. Finally, 74 patients were enrolled. Figure 1 shows the CONSORT flowchart of the studied patients. It should be considered that all the patients received only one dose of drug, and all of them response to it, and there was no need to maintenance dose.

As was shown in Table 1, the mean ± SD of age was 35.91 ± 8.10 years. All participants in two groups were the same in the age, weight, height, body mass index, being an indigenous, number and type of child delivery, number of live children and abortions, number of biopsy specimens, performing ECC, and the cause of colposcopy, except PCB (P = 0.005). Totally, the most common causes of current colposcopy were abnormal cytology of the cervix (55.4%), positive HIV (24.3%), and abnormal appearance of the cervix (23%), which were the same in both groups, statistically. But, the type of abnormal cervical cytologies were different between groups (P = 0.034).

Table 1
Baseline characteristics of the study patients

Variables	Total (n = 74)	Group A (Treatment) (n = 37)	Group B (Placebo) (n = 37)	P-value (95% confidence interval)
Age (mean ± SD)	35.91 ± 8.10	34.49 ± 7.45	37.32 ± 7.56	0.133 (-0.88, 6.56)
Weight (Kg) (mean ± SD)	66.33 ± 9.55	65.72 ± 9.43	66.95 ± 9.75	0.583 (-3.22, 5.68)
Height (Kg) (mean ± SD)	1.61 ± 0.06	1.62 ± 0.05	1.60 ± 0.07	0.170 (-0.05, 0.01)
Body mass index (BMI) (mean ± SD)	25.61 ± 3.75	25.01 ± 3.34	26.22 ± 4.09	0.172 (-0.54, 2.94)
Number of gravid (mean ± SD)	2.57 ± 1.70	2.70 ± 1.81	2.43 ± 1.59	0.497 (-1.06, 0.52)
Number of live children (mean ± SD)	2.12 ± 1.30	2.16 ± 1.09	2.08 ± 1.50	0.791 (-0.69, 0.53)
Number of abortions (mean ± SD)	0.32 ± 0.55	0.35 ± 0.59	0.30 ± 0.52	0.676 (-0.31, 0.20)
Number of normal deliveries (mean ± SD)	2.58 ± 1.55	2.54 ± 1.74	2.62 ± 1.39	0.869 (-0.82, 0.97)
Number of cesarean deliveries (mean ± SD)	1.54 ± 0.65	1.65 ± 0.70	1.33 ± 0.50	0.247 (-0.86, 0.23)
Being an indigenous (%)	38 (55.9)	20 (52.63)	18 (47.37)	0.625
Having a normal delivery (%)	50 (60.7)	20 (40)	26 (52)	0.804

* Statistically significant

Variables	Total (n = 74)	Group A (Treatment) (n = 37)	Group B (Placebo) (n = 37)	P-value (95% confidence interval)
Having a cesarean delivery (%)	26 (35.1)	17 (65.38)	9 (34.62)	0.087
The cause of colposcopy (%)	6 (8.1)	5 (83.33)	1 (16.67)	0.199
Positive history of colposcopy	41 (55.4)	25 (60.98)	16 (39.02)	0.061
Abnormal cytology of the cervix	17 (23)	8 (47.06)	9 (52.94)	0.782
Abnormal appearance of the cervix	18 (24.3)	11 (61.11)	7 (38.89)	0.278
Positive Human Papillomavirus (HPV)	7 (9.5)	6 (85.71)	1 (14.29)	0.107
Positive history of cervical intraepithelial neoplasia (CIN)	8 (10.8)	4 (50)	4 (50)	1.0
Resistant vaginal infection	8 (10.8)	0 (0)	8 (100)	0.005*
Post coital bleeding (PCB)				
Types of abnormal cervical cytologies (%)	34 (45.9)	22 (64.71)	12 (35.29)	0.034*
Atypical Squamous Cells of Undetermined Significance (ASC-US)	2 (2.7)	2 (100)	0 (0)	
Atypical Squamous Cells, cannot exclude a high grade squamous intraepithelial lesion (ASC-H)	2 (2.7)	1 (50)	1 (50)	
High grade Squamous Intra-epithelial Lesion (HSIL)	3 (4.1)	0 (0)	3 (100)	
Low grade Squamous Intra-epithelial Lesion (LSIL)				
Number of biopsy specimens (mean ± SD)	2.43 ± 1.59	3.78 ± 1.03	3.87 ± 0.92	0.720 (-0.37, 0.53)
Performing endocervical curettage (ECC) (%)	39 (52.7)	22 (56.41)	17 (43.59)	0.244
Pain score during the procedure (mean ± SD)	1.82 ± 2.17	0.92 ± 1.53	2.73 ± 2.34	< 0.001* (0.89, 2.73)
* Statistically significant				

Variables	Total (n = 74)	Group A (Treatment) (n = 37)	Group B (Placebo) (n = 37)	P-value (95% confidence interval)
Pain score 5-minutes after the procedure (mean ± SD)	0.61 ± 0.99	0.27 ± 0.65	0.95 ± 1.15	0.003* (0.24, 1.11)
Patients' satisfaction score (mean ± SD)	4.35 ± 1.19	4.65 ± 0.82	4.05 ± 1.41	0.03* (-1.13, -0.06)
Systolic blood pressure before the procedure (mean ± SD)	115.81 ± 11.79	114.46 ± 12.23	117.16 ± 11.34	0.328 (-2.76, 8.17)
Systolic blood pressure after the procedure (mean ± SD)	115.88 ± 10.99	115.27 ± 10.93	116.47 ± 11.17	0.637 (-3.90, 6.34)
Heart rate before the procedure (mean ± SD)	82.37 ± 4.74	82.30 ± 4.97	82.43 ± 4.56	0.903 (-2.08, 2.35)
Heart rate after the procedure (mean ± SD)	85.16 ± 4.22	85.30 ± 4.12	85.03 ± 4.36	0.785 (-2.24, 1.70)
Respiratory rate before the procedure (mean ± SD)	15.55 ± 0.50	15.59 ± 0.50	15.51 ± 0.51	0.49 (-0.31, 0.15)
Respiratory rate after the procedure (mean ± SD)	15.68 ± 0.53	15.68 ± 0.58	15.68 ± 0.47	1.0 (-0.25, 0.25)
* Statistically significant				

The results showed that the mean ± SD of pain score intra-procedure was statistically higher in patients in the treatment group (0.92 ± 1.53 vs. 2.73 ± 2.34, P < 0.001), as well the pain score 5-minutes post-procedural (0.27 ± 0.65 vs. 0.95 ± 1.15, P = 0.003). Also, the mean ± SD of patients' satisfaction score was higher in the treatment group (4.65 ± 0.82 vs. 4.05 ± 1.41, P = 0.03). Using Paired-t test, the intra-procedural pain score and 5-minutes post-procedural pain score were compared. The mean ± SD of SBP, HR and RR before and after the procedure were similar in both groups.

As was shown in Table 2, dizziness (12/37) and tinnitus (4/37) as the adverse events were observed only in the treatment group, but merely both groups were different in occurring dizziness, statistically (P < 0.001).

Table 2
Comparing the incidence of adverse events between groups

Variables	Total (n = 74)	Group A (Treatment) (n = 37)	Group B (Placebo) (n = 37)	P-value
Dizziness (%)	12 (16.2)	12 (100)	0 (0)	< 0.001*
Tinnitus (%)	4 (5.4)	4 (100)	0 (0)	0.115
Faint (%)	0 (0)	0 (0)	0 (0)	-
Decreased blood pressure (SBP < 90 mmHg) (%)	0 (0)	0 (0)	0 (0)	-
Tachycardia (heart rate > 120) (%)	0 (0)	0 (0)	0 (0)	-
Bradycardia (heart rate < 60) (%)	0 (0)	0 (0)	0 (0)	-
* Statistically significant				

Comparing SBP, HR and RR during and 5-minutes after the procedure in each group, using Paired sample t test showed that HR in both groups were increased, statistically. But the significant increasing of RR was observed only in placebo group (P = 0.012) (Table 3).

Table 3
Comparing the vital signs before and after the procedure in each group

Variables	Total (n = 74)	Group A (Treatment) (n = 37)	Group B (Placebo) (n = 37)
Systolic blood pressure before and after the procedure (P-value with 95% confidence interval)	0.951 (-2.25, 2.11)	0.61 (-4.04, 2.42)	0.66 (-2.40, 3.75)
Heart rate before and after the procedure (P-value with 95% confidence interval)	< 0.001* (-4.07, -1.52)	0.003* (-4.90, -1.10)	0.006* (-4.39, -0.80)
Respiratory rate before and after the procedure (P-value with 95% confidence interval)	0.028* (-0.23, -0.01)	0.373 (-0.26, 0.10)	0.012* (-0.29, -0.04)
* Statistically significant			

As was shown in Table 4, no association were found between pain score during and 5-minutes after procedure, as well as patients satisfaction score and other factors such as age, number of biopsy specimens, being an indigenous, and performing ECC.

Table 4
Association between pain score during and 5-minutes after procedure, as well as patients satisfaction score and other factors in the patients of both groups

Variables		Group A (Treatment) (n = 37)			Group B (Placebo) (n = 37)		
		Pain score during the procedure	Pain score 5-minutes after the procedure	Patients' satisfaction score	Pain score during the procedure	Pain score 5-minutes after the procedure	Patients' satisfaction score
Age	r	-0.257	-0.280	0.011	0.017	0.213	0.111
	P-value	0.125	0.094	0.951	0.921	0.206	0.513
Number of biopsy specimens	r	0.094	0.098	0.072	-0.017	0.019	-0.166
	P-value	0.58	0.599	0.674	0.918	0.910	0.327
Being an indigenous	P-value	0.335	0.161	0.406	0.914	0.193	1.0
Performing endocervical curettage (ECC)	P-value	0.795	0.978	0.771	0.438	0.982	0.17

Discussion

The present study aimed to investigate the effect of a paracervical block using lidocaine on the analgesia level in patients undergoing cervical biopsy during colposcopy. Two groups of patients were compared in the study. According to the results, the intra-procedural and 5-minutes post-procedural pains were significantly lower in the lidocaine group than the placebo group, which was compatible with other studies (11, 13, 15, 17). Moreover, the patients' satisfaction with the procedure was significantly higher in the lidocaine group than in the placebo group. However, this factor had not been investigated in the studies before, which is one of the present study's strengths. The present study had other advantages over similar studies, including investigating the relationship between the pain level and other factors, such as age, being indigenous, number of biopsies, and ECC. Also, we recorded the pre-procedural and post-procedural vital signs.

Oyama et al. (2003) investigated the effect of local anesthesia using lidocaine on pain reduction during the colposcopic biopsy in 56 patients. The results showed a significant reduction in the intra-procedural and

post-procedural pain in the local anesthesia group. However, the reported mean pain was higher in the mentioned study than in the present study (15). This difference can be explained by the smaller sample size or lower drug dose (0.5 ml of lidocaine 10%) in the mentioned study.

A randomized clinical trial by Chanrachakul et al. (2001) compared the effect of lidocaine and normal saline injections on pain alleviation in 140 patients undergoing fractional curettage. The pain was measured using the VAS scale during speculum placement, during curettage, immediately after curettage, and then 30 minutes later. According to the results, 20 ml of lidocaine 1% was more effective in pain alleviation during fractional curettage than normal saline (17). The mentioned study was similar to the present study in the lidocaine and normal saline doses, use of normal saline as placebo, injection sites at the 3 and 9 o'clock positions, use of a 23 gauge needle, duration between injection and procedure initiation, and pain assessment using the VAS scale. However, the two studies were different in the procedure type, sample size, and repetition of anesthesia according to their patients' need.

Carroll et al. (2005) evaluated the effect of the paracervical block using 10 ml of lidocaine 1%on 58 patients undergoing an endometrial biopsy. They reported no difference between the drug and control groups in the pain levels at the following times: immediately before the procedure, immediately after the procedure, 5 minutes post-procedure, and 10 minutes post-procedure (16). Our study was similar to the mentioned study in the type of drug used. However, the studies were different in the sample size, procedure type, anesthetic injection sites (2, 4, 8, and 10 o'clock at the ectocervix in the mentioned study), and use of tenaculum and cervical dilator if necessary.

Another study by Naki et al. (2011) compared the analgesic effects of forced cough and local anesthesia during the cervical biopsy. One-hundred and fourteen patients were randomly divided into 3 groups: a group received pre-procedural local anesthesia using 1 ml of lidocaine 1%, another group was instructed to have forced coughs during the biopsy, and the last one was the control group that did not receive any intervention. According to the results, local anesthesia could significantly reduce the pain during cervical biopsy compared to forced cough. However, it seemed that forced cough could only reduce the procedure duration (13). Our study was similar to the mentioned study in using lidocaine for local anesthesia and VAS for pain assessment. However, the studies were different because the mentioned study used a larger sample size, different doses of injected drugs, and a 27 gauge needle. In addition, the anesthetic injection was performed next to the biopsy site, and the duration between drug injection and biopsy was shorter (1 minute). Also, they compared the pain in 3 groups of patients.

Schimid et al. (2008) compared the effects of forced cough and local anesthesia using 0.5 ml of lidocaine 1% on the pain during a cervical biopsy in 68 patients. They found no difference between the local anesthesia and forced cough groups in the intra-procedural and post-procedural pains, which was incompatible with our study. They reported that the only advantages of forced cough were decreased procedure duration and lack of pain due to anesthetic injection (9). The mentioned study was different from our study in the form and dose of the drug, use of a 27 gauge needle, and smaller sample size.

Moreover, Oz et al. (2015) compared the effect of 50 mg of topical lidocaine spray (5 puffs) with placebo in pain alleviation during colposcopy in 214 patients. Both groups had the same pain level following biopsy and

ECC (21). In a similar study, Wongluecha et al. (2017) investigated the effect of 40 mg of lidocaine 10% spray (4 puffs) during colposcopy and cervical biopsy in 200 patients. According to the results, the intra-procedural and post-procedural pains were not different between the intervention and control groups. However, the mean difference between the baseline pain (pain during speculum placement) and pain during biopsy was higher in the control group. The mean post-procedural pain was also higher. The authors do not consider the mentioned study's results reliable due to the lack of placebo use in the control group and lack of full blindness of the patients and colposcopist (22). Our study was different from these two studies in the drug form and dose and larger sample size. Moreover, the study by Wongluecha et al. was different from our study in the lack of placebo use and full blindness (22), and the study by Oz et al. used the Wong-Baker Faces scale for pain assessment (21).

Wong et al. (2008) compared the effect of topical lidocaine gel with placebo in pain reduction during colposcopy and cervical biopsy in 90 patients. They found equal pain levels in the drug and placebo groups during different procedure steps, including speculum placement, acetic acid use, biopsy, and general post-procedural pain (12). Moreover, Church et al. (2001) investigated the effect of oral ibuprofen and topical benzocaine gel in pain reduction during colposcopy in 238 patients. They classified the patients into 4 groups, including concurrent ibuprofen and benzocaine gel, ibuprofen and topical placebo, and benzocaine gel and oral placebo, as well as concurrent oral and topical placebos. They reported the same pain level during cervical biopsy and ECC (10). However, the mentioned studies were different from our study in the larger sample size and different drug types.

Kiviharju et al. (2017) compared the pain perceived during colposcopy and cervical biopsy with and without local anesthesia using prilocaine and felypressin on 204 patients. The results showed a significant reduction in the pain perception in the local anesthesia group. However, the mean intra-procedural pain perception was lower than in the present study (11). This can be explained by the larger sample size, the type of drug used, anesthetic injection at the 4 quarters of the cervix, and use of a 27 gauge needle in the mentioned study.

In the present study, the frequency distribution of the procedure's complications in the two groups showed that among all the complications, dizziness was significantly more common in the lidocaine group compared to the placebo group. Moreover, the tinnitus was only observed in lidocaine group. Other complications such as hypotension, tachycardia, bradycardia, and faint were not observed in the patients. Arora et al. (2016) investigated the effect of concurrent intrauterine lidocaine and paracervical block on the pain reduction during cervical dilation and curettage, as well as fractional curettage. They did not find any complications related to lidocaine injection (23).

In the present study, the mean vital signs of the participants were not different in both groups. However, intra-group comparison of the mean vital signs pre- and post-procedure showed significant intragroup differences in mean HR in both groups. Moreover, there was a significant intragroup difference in the mean RR in the placebo group. Other vital signs did not show a significant change before and after the procedure in both groups. Also, the results of present study showed that intra-procedural and 5-minutes post-procedural pains and patients' satisfaction with the procedure were not significantly correlated with age, nativity, the number of biopsies, and ECC in the groups.

A study by Wong et al. (2008) also did not find a significant relationship between the number of biopsies and intra-procedural pain, which was compatible with our study (12). It is worth mentioning that the study by Wong et al. (2008) and another study by Church et al. (2001) investigated the relationship between intra-procedural pain and a history of dysmenorrhea. Both studies found a significant relationship between these two variables in the patients (10–12). However, this factor was not investigated in the current study.

Also, this study had some limitations. Seven patients that preferred hospitalization and general anesthesia were excluded from the study. The pain was not assessed separately during speculum placement, acetic acid application, and ECC. Moreover, a small number of patients were non- indigenous or illiterate, and could not communicate in Persian. There were patient companions who could interpret the conversations; however, this factor may have affected the accurate pain measurement using the VAS scale. Therefore, it is recommended to perform multi-central studies on larger populations and with longer durations. Also, it is suggested to perform similar studies without pre-procedural diclofenac suppository use or with lower doses of lidocaine in the paracervical block to evaluate the results obtained by minimum drug use.

In conclusion, the results of present study showed that paracervical block using lidocaine could reduce the intra-procedural and 5-minutes post-procedural pain compared to the placebo. Also, this intervention increased the patients' satisfaction with the procedure.

Declarations

Ethics approval and consent to participate

The current study was approved by Islamic Azad University-Yazd Branch, as well as the Ethics Committee (IR.IAU.YAZD.REC.1399.030). Also, it was registered and approved by Iranian Registry of Clinical Trials (IRCT) (IRCT20180526039854N1at http://www.irct.ir in 02/11/2020). To consider ethical issue, the collected data were not revealed to anyone, except for the researchers. All participants signed a written informed consent. All methods were performed in accordance with the relevant guidelines and regulations.

Consent for publication

Not applicable

Availability of data and materials

The datasets used and/or analyzed during the current study available from the corresponding author on reasonable request.

Competing interests

All the authors have no conflicts of interest to disclose.

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Authors' contributions

FN, and SB: get the idea and designed, FN, SB and RSM: data acquisition, RSM and RSM: data analysis, FN and SB: supervised the study. RSM, and RSM: wrote the original manuscript version. FN, SB, RSM and RSM had contributions in the interpretation of data and manuscript editing. All authors have read and confirmed the final draft.

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Figures

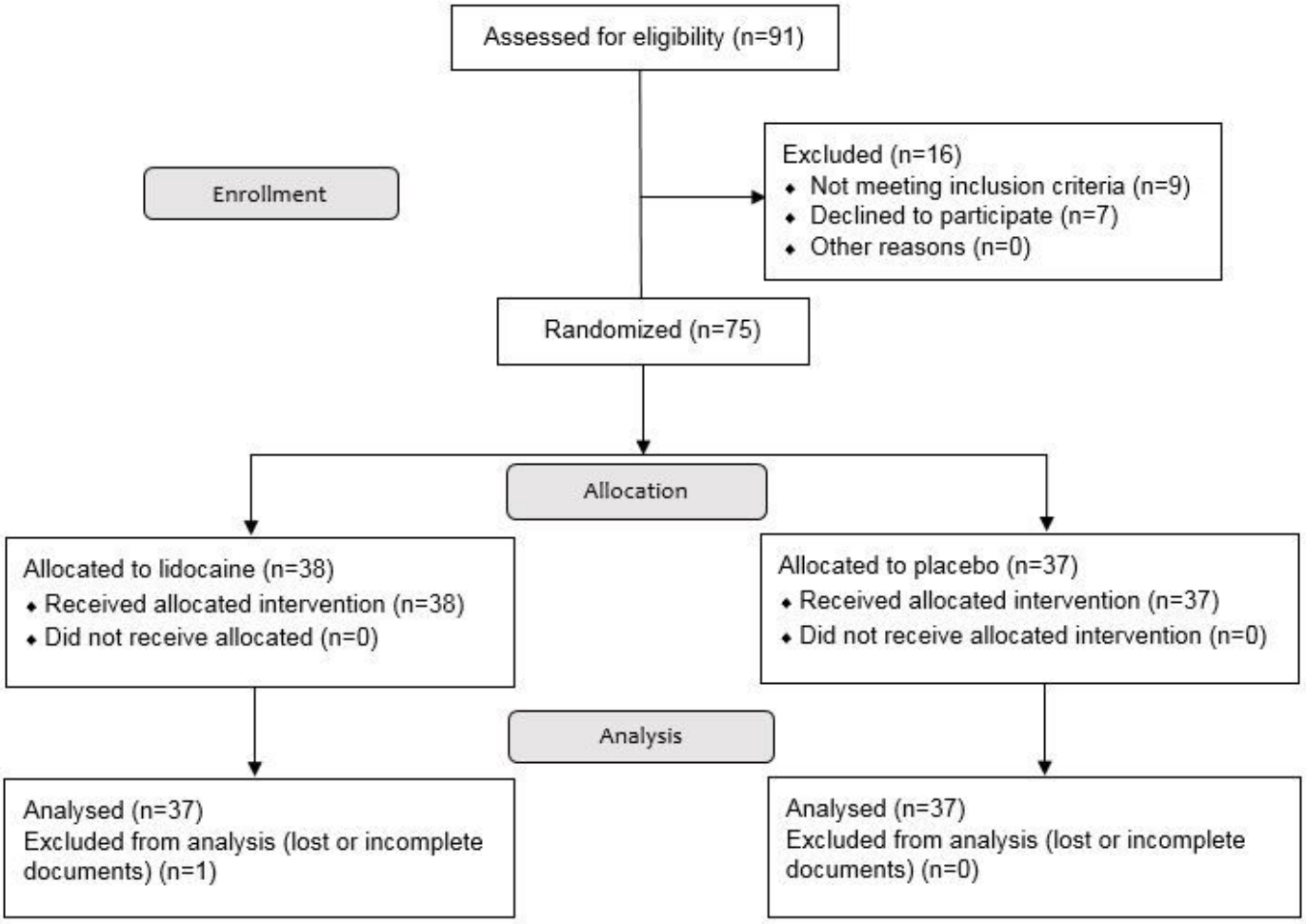

Figure 1

The CONSORT flowchart of the studied patients