ORIGINAL ARTICLE

Dilapan-S versus vaginal misoprostol for cervical preparation before diagnostic hysteroscopy: a prospective randomized controlled trial

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ABSTRACT

Objective. The difficulty entering the cervix accounts for almost half of all hysteroscopy complications. Proper preparation of the cervix before hysteroscopy can reduce these difficulties. Our study aimed to compare the effectiveness of Dilapan-S versus vaginal misoprostol in preparing the cervix to make diagnostic hysteroscopy procedures easier.

Patients and Methods. We conducted a prospective randomized controlled clinical trial in Ain Shams University Hospital. A total of 80 cases were assigned into two equal groups: Dilapan-S was inserted intracervical 4 hours before the hysteroscopic procedure. In contrast, 400 mcg of misoprostol was inserted into the posterior vaginal fornix 4 hours before the procedure in group II. Primary outcome measure(s): Ease of cervical entry (Likert scale), procedural time, and pain scoring (visual analog scale).

Results. A total of 80 cases were assigned at random to the following groups: Dilapan-S dilation (n =40) and 400-mcg Misoprostol dilation (n = 40), with no statistically significant difference between the two groups regarding age, body mass index (BMI), parity, complaint, and pain score (VAS-10). The ease of cervical entry in the Dilapan-S group was higher than the misoprostol group (4.0 ± 0.0 vs 3.0 ± 1.0, p = 0.006) with lower procedure duration among Dilapan-s group compared to the misoprostol group (47 ± 8 vs 95 ± 14, p < 0.001).

Conclusions. The synthetic osmotic dilator (Dilapan S) better facilitates ripening of the cervix and dilatation with less incidence of nausea, vomiting, and abdominal pain than vaginal misoprostol before diagnostic hysteroscopy.

Key words

Cervical ripening; Dilapan-S; misoprostol; diagnostic hysteroscopy.

Introduction

Hysteroscopy is a minimally invasive procedure used to examine the uterine cavity for various gynecological issues. It has evolved into a valuable diagnostic and therapeutic technique [1]. While generally safe and minimally invasive, hysteroscopy can potentially lead to complications such as cervical tear, uterine perforation, bleeding, and discomfort. These complications should be considered before undergoing the procedure [2].

Adequate preparation of the cervix before hysteroscopy may reduce these potential complications [3].

Cervical ripening agents encompass prostaglandins administered orally or vaginally, either in synthetic form (e.g., misoprostol) or natural form (e.g., dinoprostone). Vaginal osmotic dilators include naturally occurring options (e.g., laminaria) or synthetic ones. Dilapan-S and Dilasoft are synthetic hydrogel dilators with stems made from an anisotropic xerogel of AQUACRYL [3].

Numerous research papers have been released comparing the clinical effects of Laminaria and Dilapan-S. Dilapan-S has been noted to offer several benefits over Laminaria. These advantages mainly include quicker performance, enabling same-day procedures, and more effective dilation, necessitating nearly double the number of Dilapan-S tents compared to Laminaria [4].

Misoprostol is utilized for cervical softening, initiation of labor, postpartum bleeding, and termination of pregnancy. It may also be employed as a preparatory agent for the cervix before specific gynecological procedures. Typical side effects in non-pregnant women comprise mild stomach cramps, bleeding from the vagina, elevated body temperature, nausea, and diarrhea [5].

To the best of our understanding, there is a shortage of data comparing the efficacy of two methods for cervical ripening: vaginal misoprostol and a man-made osmotic dilator (Dilapan-S), in aiding cervical dilatation before diagnostic hysteroscopic procedures. Our study aimed to evaluate the effectiveness of Dilapan-S versus vaginal misoprostol in preparing the cervix to facilitate diagnostic hysteroscopy procedures.

Patients and Methods

Our study is a prospective randomized controlled clinical trial conducted in the Early Cancer Detection Unit at Ain Shams University Maternity Hospital from September 2022 to September 2023. Ethical approval was obtained from the Research Ethics Committee, Faculty of Medicine, Ain Shams University (MD 239/2022). Informed consent was obtained from participants. Confidentiality was considered as the published data were anonymously handled and used only for research purposes (all procedures complied with the Declaration of Helsinki). We declare that we follow the Quality and Transparency Of Health Research (EQUATOR) network guidelines and CONSORT guidelines for Randomized clinical trials.

Inclusion Criteria: The study included female patients of reproductive age who were in need of diagnostic hysteroscopy to investigate infertility or abnormal uterine bleeding. The patients were recruited from the Gynecology, Infertility, and Family Planning Clinics at Ain Shams University Maternity Hospital. To be eligible for the study, patients must be female, aged over 18 years, have a valid medical indication for hysteroscopy, a body mass index (BMI) below 30 kg/m2, and a history of previous cesarean section without a prior vaginal delivery.

Exclusion Criteria: Patients with a BMI of ≥ 30 kg/m2 were not included (due to the difficulty of hysteroscopy entry in obese patients). Pregnant patients were excluded from diagnostic hysteroscopy (as the procedure could lead to infection and abortion). Patients with cervical malignancy were not included (to avoid the dissemination of cancer cells into the peritoneal cavity due to the intrauterine pressure of the hysteroscopic procedure). Patients with pelvic inflammatory disease were excluded (to prevent the exacerbation of infection). Those with contraindications to any of the study drugs were excluded (such as previous allergic reactions or hypersensitivity to

prostaglandins, and those at risk for gastric ulcers due to non-steroidal use). Patients with a history of cervical surgery were not included (due to the disturbed anatomy leading to a false track or perforation). Patients with a bleeding tendency or those receiving anticoagulation were excluded (due to the fear of cervical injury during hysteroscopy). Patients on regular analgesic medication for any reason were not included (in order not to mask the pain felt by the patient during and after the procedure). Patients who refused to participate in the study were excluded (to ensure patient autonomy).

The Primary outcome was the ease of entering the cervix. To assess the feasibility of hysteroscopy entry, a 5-point Likert scale (ranging from very difficult = 1 to difficult = 2, fair = 3 to easy = 4, and very easy = 5) was employed.

The secondary outcome was the pain felt during the hysteroscopy. A 10-point visual analog scale (VAS)was used to determine the pain score among the studied cases.

Sample size justification: The sample size was determined using the STATA program, with the significance level set at 0.05 and the power at 0.9. A prior study conducted by Yu et al. in 2006 indicated that the spontaneous cervical dilatation in the osmotic dilator group (9.56±2.2cm) was significantly higher than in the misoprostol group (8.0 ± 1.8cm). Based on these findings, a sample size of 34 cases per group (68 total) was calculated. However, we included 80 cases (40 per group) for potential dropout and failure rates [6].

Randomization and allocation: Systematic random sampling was used, and women who fulfilled the inclusion criteria were randomly assigned to either group. Eighty opaque envelopes were numbered serially, and in each envelope, the corresponding letter, which denoted the allocated group, was placed according to the randomization table. Then, all envelopes were closed and put in one box. Randomization was done using a computer-generated randomization sheet using the MedCalc © version.

Our participants were split into two groups, with 40 individuals in each. The first group utilized Dilapan-S, which had been sterilized via irradiation. This product is produced in a facility certified under ISO 9001 and is fully CE-certified by the Medical Device Directive (EN46002). It has received approval from Health Canada for sale in Canada (license no. 71899) and is exclusively available from MEDISAFE DISTRIBUTION INC. A fixed size of Dilapan-S 3x55mm was administered to participants in this group 4 hours before undergoing hysteroscopic procedures. After the vagina was cleansed with an antiseptic solution and dilated using a speculum, the investigator inserted Dilapan-S into the cervix until it passed the internal os with the aid of a tenaculum.

In the second group, 400-mcg misoprostol (prostaglandin E1) produced by Pfizer company was introduced into the posterior vaginal fornix 4 hours before the procedure. Both cohorts underwent the hysteroscopy procedure employing a vaginoscope.

Data management and analysis: Data coding, processing, checking for quality, and data entry were performed using Statistical Package for Social Science (SPSS 26 for Windows). Data were summarized as mean and standard deviation for quantitative data and frequency and percentage for qualitative data. Clinical data were recorded in an investigative report form, and the Student's (t) test was used to compare means. A p-value of < 0.05 was considered significant.

Results

Table (1) presents selected demographic and medical characteristics of the two studied groups. There was no statistically significant difference between the two groups regarding age, Body Mass Index (BMI), and parity.

The mean and standard deviation and the range of the score of difficult entry were presented in Table (2) and Figure (1). There was a statistically significant difference between the mean of Ease

of entry score between the two groups with higher values in the Dilapan-S (4.0 ± 0.0) compared to the Misoprostol group (3.0 ± 1.0) with t-test =2.841 and p=0.006.

The mean and standard deviation, as well as the range of the VAS pain score, were not statistically significant (Table 2). The mean of VAS score values in the Dilapan-S (2.5 ± 1.5) was the same as in the Misoprostol group (3.0 ± 1.7), with t-test = 1.575 and p=0.119.

The mean and standard deviation and the range of the procedure duration in seconds. There was a statistically significant difference between the mean procedure duration with lower values in the Dilapan-S (47 ± 8) compared to the Misoprostol group (95 ± 14) with Fisher exact test = 18.598 and p<0.001 (Table 2).

Table (3) presents the proportion of different levels of difficulty in entry as perceived by the Gynecologist in both groups. There was a statistically significant difference between the two groups, with the Misoprostol group presenting a higher proportion with difficult entry (12.5%) compared to the Dilapan-S group (0%) with X^2 for trend (linear by linear association) using an Exact 2-sided test = 7.409, p = 0.01. The risk of having Fair entry compared to Easy entry in Misoprostol is 1.58, the risk in the Dilapan-S group, while the risk of having difficult entry compared to Easy entry in Misoprostol is 12.27, the risk in the Dilapan-S Group.

Table (4) presents the proportion of participants with pain in both studied groups. The significant cases reported mild pain were 65% in the Misoprostol group and 62.5% in the Dilapan-S group. There was no statistically significant difference between the two groups regarding pain.

Table (5) shows that nausea and abdominal pain were significantly higher among the Misoprostol group than the Dilapan-S group, where none of these side effects have been reported. However, there was no statistically significant difference in the proportion of vomiting between the two groups. Fever, Diarrhea, and vaginal bleeding were not detected among the studied groups.

Discussion

Hysteroscopy is a reliable diagnostic imaging tool in modern gynecology. It is often used to assess uterine problems, including bleeding disorders and infertility. Pain and anxiety are major concerns for patients undergoing office hysteroscopy [6-8].

The process of preparing the cervix is crucial for assisting with the procedure. In this study, we assessed the efficacy of Dilapan-S compared to vaginal misoprostol, administered at a 400-mcg dose, for priming the cervix 4 hours before diagnostic hysteroscopy without anesthesia.

During our study, misoprostol and Dilapan-S effectively dilated the cervix in all patients, suggesting the efficacy of these two methods. In the Dilapan-S group, gynecologists reported significantly easier cervical entry using a 5-point Likert scale compared to the misoprostol group, and no mechanical dilation was required in either group. These findings differ from those of a previous study by (Nair et al., 2023), which reported that 92% of women in the misoprostol group needed additional mechanical cervical dilatation. In contrast, only 36% of women in the Dilapan-S group required further dilatation (P < 0.05) [9]. Darwish and colleagues (2004) discovered that 200 mcg of intravaginal misoprostol and endocervical laminaria had equal efficacy in preparing the cervix before hysteroscopy in patients with confirmed intrauterine abnormalities. In the end, misoprostol might be more efficient because it is easy to use, less expensive, and better accepted by patients [10].

Liu and colleagues in 2023 did not report any adverse events like nausea, vomiting, or fever in the Dilapan-S group. Nevertheless, the 400 mcg Misoprostol group experienced significantly higher occurrences of nausea and abdominal pain than the Dilapan-S group, where none of these side effects were observed. Other potential side effects of misoprostol, such as diarrhea, fever, and bleeding, did not occur. However, these side effects are generally mild, temporary, and well-tolerated by patients. This study indicated that there was no statistically significant difference

between the two groups in terms of major complaints, including abnormal uterine bleeding, primary infertility, secondary infertility, missed intrauterine devices, pelvic pain, and recurrent miscarriage, suggesting the necessity of conducting a diagnostic hysteroscopy [11].

Contrastingly, Nair and colleagues (2023) observed the effectiveness of vaginal misoprostol compared to synthetic osmotic dilator (Dilapan-S) for cervical preparation before operative hysteroscopic procedures such as hysteroscopic myomectomy, hysteroscopic polypectomy, septal resection, and adhesiolysis - all of which require anesthesia and are not outpatient procedures [9].

Also, in our study, there is no need for additional mechanical cervical dilatation if vaginal misoprostol or dilapan-S didn't perform optimal ripening for fear of vasovagal attack as our study applied as outpatient diagnostic hysteroscopy without anesthesia.

In contrast to the findings of Nair et al. (2023), who observed a requirement for further mechanical dilatation determined by attempting to pass the 26F resectoscope directly, if the surgeon was unable to pass the resectoscope directly, cervical dilatation was performed using Hegar's dilators. [9].

The initial cervical diameter was assessed by the size of the Hegar's dilators entering the cervix without resistance; the surgeon recorded a subjective assessment of the ease of dilatation when inserting a 9-mm Hegar's dilator into the cervix using a 5-point Likert scale (1-very difficult & 5-very easy) as this study was conducted on an operative hysteroscopic procedure with anesthesia.

Our study showed a statistically significant difference between the two groups' mean ease of entry scores, with higher values in the Dilapan-S group (4.0±0.0) compared to the misoprostol group (3.0±1.0). The t-test was 2.841, and the p-value was 0.006.

In agreement with our study *Nair et al. (2023) regarding the effectiveness of dilapan-S over* vaginal misoprostol at ripening the cervix [9].

According to the manufacturer's instructions, Liu et al. (2023) supported our results, finding that insertion of Dilapan -S 2-4 hours before the procedure is equally effective for cervical dilatation as phloroglucinol [11]. However, it is associated with a higher incidence of vaginal bleeding & diarrhea & abdominal pain complication.

In contrast to *Nair et al. (2023),* who inserted Dilapan-S 12 hours before the procedure, this insertion was done on an outpatient basis using Cusco's self-retaining speculum [9].

After disinfecting the cervix with povidone-iodine, Dilapan-S was grasped at its end, where the string was attached, using ring forceps, and inserted into the cervical canal until the internal OS.

If insertion of Dilapan-S was difficult, the cervix was held with a tenaculum to facilitate it; local anesthetic was injected into the cervix's anterior lip before it was held with a tenaculum.

Our study showed that there was a statistically significant difference between the mean procedure duration with lower values in the Dilapan (47±8) compared to the misoprostol group (95±14) with Fisher exact test = 18.598 and P < 0.001. Similarly, *Nair et al. (2023)* found that the two groups also differed significantly from each other regarding the mean procedure duration (P< 0.01) [9].

A study by Urman et al. analyzed 227 patients with intrauterine adhesions (IUAs) over 11 years. The severity of adhesions was linked to the frequency of hysteroscopies and outcomes. Restoration of the uterine cavity decreased from Class 1 to Class 5. Clinical pregnancy and live birth rates also decreased with increasing severity of IUAs. The study concluded that classifying IUAs based on symptoms and imaging findings could help predict prognosis and fertility [12]. Using Dilapan can effectively reduce the operative time and the frequency of hysteroscopies.

A recent systematic review and meta-analysis conducted by Vitale et al. [13] examined the effectiveness of mechanical methods in preventing the reoccurrence of intrauterine adhesions,

assessing the impact on future fertility after hysteroscopic adhesiolysis, and ranking the available antiadhesive options. It included eleven studies involving 1596 women and found that using a copper intrauterine device with an intrauterine balloon or cross-linked hyaluronic acid gel effectively prevented intrauterine adhesion recurrence. The hyaluronic acid gel showed the highest pregnancy rates. Further research is needed to determine the most effective approach.

Another recent Li et al. 2024 [14] study developed and evaluated an artificial intelligence (AI) system using the DeepSurv architecture to predict fertility outcomes after hysteroscopic adhesiolysis for intrauterine adhesions (IUAs). The study included 555 IUAs treated with hysteroscopic adhesiolysis and 4,922 second-look hysteroscopic images from a clinical database. Four transfer learning models were built using the DeepSurv architecture, achieving high AUCs for one-year pregnancy prediction. An AI application was also developed to identify assisted reproductive technology (ART) candidates. Patients with lower natural conception probability indicated by the AI application had a higher ART benefit hazard ratio.

The strengths and limitations of the study

The strength of the present study is that all diagnostic hysteroscopy procedures were performed by well-qualified gynecologists who received training for at least one year in the early cancer detection unit at Ain Shams University maternity hospital; this eliminated single surgeon prejudice or prejudice to one method over the other and interobserver variability.

The study's limitations include the relatively small sample size, and another limitation of this study is using a subjective 5- 5-point Likert scale for measuring ease of dilatation instead of a cervical tonometer, as done by Ngai et al. (1999) [15]. The insertion of an osmotic dilator may pose challenges in women with cervical stenosis. In our study, none of the participants had cervical stenosis. The last limitation of our study is that it is a single-center study, which may carry a statistical bias.

Clinical implications of the study: The utilization of Dilapan-S in all hysteroscopic procedures can reduce patients' pain, anxiety, and discomfort. It is essential to teach the application of this method to all junior staff in Physician training programs, as demonstrated in the program outlined by Mazzon et al. in 2023, which detailed the "Arbor Vitae" technique for training in diagnostic hysteroscopy. Dilapan can facilitate the training process, particularly in inserting the hysteroscope, which is commonly viewed as a challenging step for beginners [16].

We also believe that reducing the operative hysteroscopy time makes the procedure easier to start. A recent comprehensive review and meta-analysis demonstrated that hysteroscopy is a safe and efficient method for treating type 3 myoma according to the FIGO classification[17].

Recommendation for further studies:

Comparing Dilapan-S and misoprostol in women with cervical stenosis, pelvic inflammatory disease, and vaginal infection is advised to assess cervical width, patient contentment, requirement for pain relief, and effectiveness. There is a requirement for larger-scale, multicenter studies in the future to delve deeper into safety issues.

Conclusion

The synthetic osmotic dilator (Dilapan S) better facilitates ripening of the cervix and dilatation with less incidence of nausea, vomiting, and abdominal pain than vaginal misoprostol before diagnostic hysteroscopy.

Authors' contribution,

M.F.M: Conceptualization, Data curation, Formal Analysis, Funding acquisition

R.M.A; Investigation, Methodology, Project administration, Software.

A.R.M: Supervision, Validation, Visualization

A.G.A: Writing – original draft, Writing – review & editing

M.E.D: participating in the revision.

M.E.M: participating in the revision

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Study registration:

The study was registered in Pan African Trial registry

Disclosure of Interest

The authors declare no conflict of interest.

Ethics Approval Following local regulations, the protocol gained

ethical and research approval from the local ethical scientific committee of the faculty of medicine (MD 239/2022)

Informed Consent: All patients gave informed consent after explaining the procedure. We Confirm that all methods were performed according to the relevant guidelines and regulations, as per the Declaration of Helsinki.

Data Sharing

The datasets used and analyzed during the current study are available from the corresponding author upon reasonable request.

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Not applicable.

References

1. 1-Nabi, S. Hysteroscopic Complications. European Journal of Medical and Health Sciences.2022; 4(3): 13-16. https://doi.org/10.24018/ejmed.2022.4.3.1312
2. Hua Y, Zhang W, Hu X, Yang A, Zhu X. The use of misoprostol for cervical priming prior to hysteroscopy: a systematic review and analysis. Drug Des Devel Ther. 2016 ; 6;10:2789-2801. doi: 10.2147/DDDT.S111625.
3. Abdelhakim AM, Gadallah AH, Abbas AM. Efficacy and safety of oral vs vaginal misoprostol for cervical priming before hysteroscopy: A systematic review and meta-analysis. Eur J Obstet Gynecol Reprod Biol. 2019;243:111-119. doi: 10.1016/j.ejogrb.2019.10.023.
4. Gavara R, Saad AF, Wapner RJ, Saade G, Fu A, Barrow R, et al. Cervical Ripening Efficacy of Synthetic Osmotic Cervical Dilator Compared With Oral Misoprostol at Term: A Randomized Controlled Trial. Obstet Gynecol. 2022 Jun 1;139(6):1083-1091. doi: 10.1097/AOG.0000000000004799.

5. Tanha FD, Salimi S, Ghajarzadeh M. Sublingual versus vaginal misoprostol for cervical ripening before hysteroscopy: a randomized clinical trial. Arch Gynecol Obstet. 2013;287(5):937-40. doi: 10.1007/s00404-012-2652-4.

6. Preutthipan S, Linasmita V. A prospective comparative study between hysterosalpingography and hysteroscopy in the detection of intrauterine pathology in patients with infertility. J Obstet Gynaecol Res. 2003;29(1):33-7. doi: 10.1046/j.1341-8076.2003.00068.x.

7. Palermo P, Serva A, D'Alfonso A, Colagrande I, Necozione S, Cofini V, et al.Role of vocal distraction analgesia on pain management in the office hysteroscopy procedure: a randomized controlled study **Ital J Gynaecol Obstet** 2022; 34(4): 302-309 doi: 10.36129/jog..24 .

8. Arcarese G, Falzone G, Pallotti F, Presti LL. Association between anxiety preceding the diagnostic hysteroscopy examination and the patient's baseline anxiety status, by Hamilton Anxiety Rating Scale (HAM-A). **Ital J Gynaecol Obstet** 2023;35 (S02) doi: 10.36129/jog.

9. Nair AK, Subbaiah M, Maurya DK. Comparison of Efficacy of Vaginal Misoprostol versus a Synthetic Osmotic Dilator (Dilapan-S) for Cervical Preparation before Operative Hysteroscopy: A Randomized Controlled Study. Gynecol Minim Invasive Ther. 2023; 7;12(4):225-229. doi: 10.4103/gmit.gmit_111_22.

10. Darwish AM, Ahmad AM, Mohammad AM. Cervical priming prior to operative hysteroscopy: a randomized comparison of laminaria versus misoprostol. Hum Reprod. 2004;19(10):2391-4. doi: 10.1093/humrep/deh397.

11. **Liu Z, Xu Y, Le A. Dilapan-S versus Phloroglucinol for Cervical Dilatation in Operative Hysteroscopy and Polyp Resection**: A Prospective Cohort Study. *Clinical and Experimental Obstetrics & Gynecology*. 2023 *50*(6),121. https://doi.org/10.31083/j.ceog5006121

12. Urman B, Yakin K, Ertas S, Alper E, Aksakal E, Riemma G, Angioni S, Vitale SG. Fertility and anatomical outcomes following hysteroscopic adhesiolysis: An 11-year retrospective cohort study to validate a new classification system for intrauterine adhesions (Urman-Vitale Classification System). Int J Gynaecol Obstet. 2024 May;165(2):644-654. doi: 10.1002/ijgo.15262. Epub 2023 Nov 27. PMID: 38013507.

13. Vitale SG, Riemma G, Carugno J, Perez-Medina T, Alonso Pacheco L, Haimovich S, Parry JP, Di Spiezio Sardo A, De Franciscis P. Postsurgical barrier strategies to avoid the recurrence of intrauterine adhesion formation after hysteroscopic adhesiolysis: a network meta-analysis of randomized controlled trials. Am J Obstet Gynecol. 2022 Apr;226(4):487-498.e8. doi: 10.1016/j.ajog.2021.09.015. Epub 2021 Sep 30. PMID: 34555319.

14. Li B, Chen H, Duan H. Artificial intelligence-driven prognostic system for conception prediction and management in intrauterine adhesions following hysteroscopic adhesiolysis: a diagnostic study using hysteroscopic images. Front Bioeng Biotechnol. 2024 Apr 4;12:1327207. doi: 10.3389/fbioe.2024.1327207. PMID: 38638324; PMCID: PMC11024240.

15. Ngai SW, Chan YM, Tang OS, Ho PC. The use of misoprostol for pre-operative cervical dilatation prior to vacuum aspiration: a randomized trial. Hum Reprod. 1999;;14(8):2139-42. doi: 10.1093/humrep/14.8.2139.

16. Mazzon I, Etrusco A, Laganà AS, Chiantera V, Di Angelo Antonio S, Tosto V, Gerli S, Favilli A. Training in Diagnostic Hysteroscopy: The "Arbor Vitae" Method. Medicina (Kaunas).

2023 May 24;59(6):1019. doi: 10.3390/medicina59061019. PMID: 37374222; PMCID: PMC10302144.

17. Etrusco A, Laganà AS, Chiantera V, Vitagliano A, Cicinelli E, Mikuš M, Šprem Goldštajn M, Ferrari F, Uccella S, Garzon S, Gerli S, Favilli A. Feasibility and Surgical Outcomes of Hysteroscopic Myomectomy of FIGO Type 3 Myoma: A Systematic Review. J Clin Med. 2023 Jul 27;12(15):4953. doi: 10.3390/jcm12154953. PMID: 37568356; PMCID: PMC10419844.

Table (1): Demographic characteristics of the studied groups

Variables		Dilapan-S (N=40)	Misoprostol (N=40)	Test	P-value
Age (years) Mean ± SD (Range)		35.0±10 (22.0-62.0)	38.0±10 (20.0-65.0)	t=-1.302	0.197
BMI, (kg/m^2) Mean ± SD (Range)		27.9 ±1.2 (25.2-29.7)	27.8 ± 1.2 (25.0-29.8)	t=.164	0.870
Parity No(%)	Nulli	9 (22.5%)	11 (27.5%)	X^2 =.311	0.856
	Primipara	6 (15.0%)	5(12.5%)		
	Multipara	25(62.5%)	24 (60.0%)		

Table (2) Ease of cervical entry, Pain score, and duration of the procedure among the studied groups

Aspect	Dilapan-S (N=40)	Misoprostol (N=40)	Two independent t-test	p-value
Ease of cervical entry (scale 1-5) Mean ± SD (Range)	4.0 ± 0.0 (3.0-4.0)	3. 0± 1 (2.0-4.0)	2.841	0.006
Pain score (VAS-10) Mean ± SD (Range)	2.5 ± 1.5 (0.00-7.0)	3.0 ± 1.7 (0.00-7.0)	1.575	0.119
Procedure duration (seconds) Mean ± SD (Range)	47 ± 8 (33-60)	95 ± 14 (67-118)	18.598	<0.001

Table (3): Physician assessment on cervical entry feasibility among the studied group *

Physician assessment on cervical entry feasibility	Dilapan-S (N=40) n (%)	Misoprostol (N=40) n (%)	Risk ratio (95% CI)	Risk difference (95% CI)
Easy**	27 (67.5%)	17 (42.5%)	1	0
Fair	13 (32.5%)	18 (45.0%)	1.582 (0.9125-2.774)	18.93% (-3.09%-40.9%)
Difficult***	0 (0.0%)	5 (12.5%)	12.27 (0.7086-212.8)	20.88% (2.64%-39.11%)

* X2 for trend (linear by linear association) using Exact 2-sided test = 7.409, p = 0.01

**Reference Group

***Zero was replaced by 0.5 to calculate the risk ratio and difference by comparing the Difficult entry group to the reference group (Easy entry).

Table (4): Pain levels among studied groups *

aaw	Dilapan-S (N=40) n (%)	Misoprostol (N=40) n (%)
No pain	3 (7.5%)	2 (5.0%)
Mild pain	25 (62.5%)	26 (65.0%)
Moderate pain	11 (27.5%)	10 (25.0%)
Severe pain	1 (2.5%)	2 (5.0%)

*X^2 for trend (linear by linear association) using Exact 2-sided test =.180, p =.780

Table (5): Side effects among studied groups

Side Effects	Dilapan-S (N=40) n (%)	Misoprostol (N=40) n (%)	Test	P value
Nausea	0 (0.0%)	15(37.5%)	X^2 =18.462	<0.001
Vomiting	0 (0.0%)	4 (10.0%)	Fisher exact test	0.116
Abdominal pain	0 (0.0%)	22 (55.0%)	X^2 =30.345	<0.001

*X^2 for trend (linear by linear association) using Exact 2-sided test =.180, p =.780

Figure 1. Error Bar chart for mean of Ease of cervical entry between studied groups.