

Efficacy Analysis of Misoprostol Tablets for Painless Abortion

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Abstract: *Objective:* To analyze the application value of misoprostol tablets in painless abortion. *Methods:* 40 patients who received painless abortion from January 2022 to August 2023 were randomly divided into two groups; those who received misoprostol tablets before the operation were included in group A, and those who did not use misoprostol tablets before the operation were included in group B. Differences in cervical laxity, cervical dilatation time, uterine aspiration time, surgical blood loss, complications, and satisfaction were recorded. **Results:** The excellent and good rate of cervical dilation in group A was higher than that in group B ($P < 0.05$); the dilatation time, uterine suction time, surgical blood loss, and other indicators in group A were better than those in group B ($P < 0.05$); the complication rate after abortion in group A was lower than that of group B ($P < 0.05$); satisfaction rate in group A was higher than that of group B ($P < 0.05$). *Conclusion:* Oral administration of misoprostol tablets before painless abortion can relax the cervix, shorten the dilation time of the cervix, reduce intraoperative bleeding, and have higher patient satisfaction.

Keywords: Painless abortion; Misoprostol tablets; Efficacy

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1. Introduction

Artificial abortion performed under intravenous anesthesia is painless as the patients fall asleep during the operation. During the painless abortion, anesthesia is given 10 minutes before the operation, and the patients are awake after the operations have been completed, hence it is suitable for patients with fear of pain, re-pregnancy after cesarean section, first pregnancy, or high mental stress^[1]. However, during painless abortion, it is difficult to dilate the uterus due to the tightness of the patient's cervix. Therefore, cervical dilation drugs can be given before the operation to reduce the complication risks. Misoprostol tablets can soften the cervix and stimulate uterine contractions, reduce uterine tension and pressure, increase the amplitude of uterine contractions, and ensure the safety of induced labor. This article reported 40 patients who underwent painless abortions from January 2022 to August 2023 to explore the therapeutic value of misoprostol tablets.

2. Materials and methods

2.1. General information

A total of 40 patients who underwent painless abortions from January 2022 to August 2023 were randomly divided into two groups. There was no difference in the data of patients undergoing painless abortion between groups A and B ($P > 0.05$), as shown in **Table 1**.

Table 1. Data analysis of patients undergoing painless abortion

Group	Age (years)		Pregnancy (times)		Gestational age (weeks)	
	Range	Average	Range	Average	Range	Average
Group A ($n = 20$)	21–44	28.14 ± 2.46	1–4	2.41 ± 0.33	5–8	7.28 ± 0.51
Group B ($n = 20$)	21–45	28.16 ± 2.51	2–5	2.43 ± 0.36	5–9	7.31 ± 0.53
χ^2 / t		0.0254		0.1831		0.1824
P		0.9798		0.8557		0.8562

2.2. Inclusion and exclusion standards

The inclusion criteria included patients who underwent ultrasound confirming intrauterine pregnancy, had indications for painless abortion, signed informed consent, and pregnancy of 5–10 weeks.

The exclusion criteria included patients with contraindications to painless abortion, patients with organ dysfunction, patients with cardiovascular diseases, and patients with mental disorders.

2.3. Treatment methods

No food or water was given to the groups 6 hours before surgery, and intravenous anesthesia was performed.

Group A took misoprostol tablets (China Resources Zizhu Pharmaceutical Co. Ltd.) orally, 1–3 hours before the operation, at a dose of 600 μg . After administration, the operation time was determined based on the actual situation of the patients.

Group B was not given misoprostol tablets, and the remaining abortion procedures were the same as group A.

2.4. Observation indicators

The observation indicators in this study included:

- (1) Cervical dilation: If the uterus and cervix were completely relaxed, uterine dilatation was not required during the operation, and the insertion of the no. 8 dilator was smooth, then graded as excellent; if the uterus and cervix were relaxed, the insertion of the no. 7 dilator was smooth but there was resistance in the insertion of the no. 8 dilator, then graded as good; if the uterus and cervix were not relaxed, the dilation of the uterus was difficult, and the insertion of dilator no. 5 and below was difficult, then graded as poor.
- (2) Surgical indicators: Record the cervical dilation time, uterine aspiration time, surgical bleeding volume, and other indicators.
- (3) Surgical complications: Record infections, abortion syndrome, missed aspiration, and incomplete aspiration.
- (4) Surgical satisfaction: Utilize self-made painless abortion satisfaction scale evaluation.

2.5. Statistical analysis

The data of patients undergoing painless abortion were processed with SPSS 21.0, the count data of patients

undergoing painless abortion was recorded as % and the χ^2 test was used, the measurement data of patients undergoing painless abortion was recorded as mean \pm standard deviation (SD) and the *t*-test was used. There is a statistical difference if $P < 0.05$.

3. Results

3.1. Analysis of cervical dilation

Table 2 shows the rate of cervical dilation graded as excellent and good in group A was 95.00%, which was higher than in group B (55.00%; $P < 0.05$)

Table 2. Comparison of cervical dilation [*n* (%)]

Group	Excellent	Good	Poor	Excellent rate
Group A (<i>n</i> = 20)	14 (70.00)	5 (25.00)	1 (5.00)	95.00
Group B (<i>n</i> = 20)	7 (35.00)	4 (20.00)	9 (45.00)	55.00
χ^2	-	-	-	8.5333
<i>P</i>	-	-	-	0.0035

3.2. Analysis of surgical indicators

The cervical dilatation time of 17.08 ± 0.41 s, uterine aspiration time of 1.39 ± 0.32 min, and surgical bleeding volume of 15.25 ± 1.25 mL were recorded in group A patients who underwent painless abortion, which all values were better as compared to those in group B ($P < 0.05$), as shown in **Table 3**.

Table 3. Comparison of surgical indicators (mean \pm SD)

Group	Cervical dilation time (s)	Suction time (min)	Surgical blood loss (mL)
Group A (<i>n</i> = 20)	17.08 ± 0.41	1.39 ± 0.32	15.25 ± 1.25
Group B (<i>n</i> = 20)	70.36 ± 1.36	2.68 ± 0.49	27.88 ± 2.36
<i>t</i>	167.7455	9.8577	21.1500
<i>P</i>	0.0000	0.0000	0.0000

3.3. Analysis of surgical complications

Table 4 shows the complication rate of abortion in group A was 5.00%, which was lower than in group B (30.00%, $P < 0.05$).

Table 4. Comparison of surgical complications [*n* (%)]

Group	Infection	Abortion syndrome	Leak suction and empty suction	Insufficiency of uterine aspiration	Incidence rate
Group A (<i>n</i> = 20)	0 (0.00)	1 (5.00)	0 (0.00)	0 (0.00)	5.00
Group B (<i>n</i> = 20)	1 (5.00)	2 (10.00)	0 (0.00)	3 (15.00)	30.00
χ^2	-	-	-	-	4.3290
<i>P</i>	-	-	-	-	0.0375

3.4. Analysis of surgical satisfaction

The surgical satisfaction rate of abortion in group A was 100.00%, which was higher than in group B (80.00%, $P < 0.05$), as shown in **Table 5**.

Table 5. Comparison of surgical satisfaction [*n* (%)]

Group	Satisfied	Generally satisfied	Not satisfied	Satisfaction rate
Group A (<i>n</i> = 20)	12 (60.00)	8 (40.00)	0 (0.00)	100.00
Group B (<i>n</i> = 20)	6 (30.00)	10 (50.00)	4 (20.00)	80.00
χ^2	-	-	-	4.4444
<i>P</i>	-	-	-	0.0350

4. Discussion

Painless abortion is an effective remedy for contraceptive failure. It is suitable for treating patients within ten weeks of pregnancy and termination through intravenous anesthesia, including superconducting visual abortion, double-chamber decompression abortion, and microtube visual abortion, with the advantages of high safety, short onset of effect, and low risk of side effects. It can reduce the pain caused by abortion operations and relieve patients' physical and mental stress. When carrying out a painless abortion, the anesthetic dose is determined based on the patient's weight and height. The patient can be awakened within 3 minutes after the operation, and the risk of side effects is low. However, due to the individual differences of abortion patients and external factors, some patients require increased anesthesia. Unable to fall asleep after taking an increased dose may result in limited surgical operation and increased intraoperative bleeding. Therefore, the choice of drugs for complete anesthesia remains a hot topic in clinical research and directly affects the efficacy of surgery [2]. Currently, propofol is mainly used as an anesthetic drug in clinical practice. It has central sedative and hypnotic effects. When administered intravenously, it can exert its effects continuously and stably. After administration, it can cause patients to enter deep sleep and relax the muscles. However, propofol has no cervical dilation effect, so for patients with great difficulty in dilatation and poor cervical conditions, cervical dilation drugs need to be given before surgery to ensure the smooth progress of the surgery. In addition, the following side effects may occur during propofol anesthesia: (1) transient apnea and hypotension, which can be relieved by adjusting the propofol administration rate during the maintenance period; and (2) local pain, which can be relieved by giving lidocaine intravenously.

The key to ensuring the orderly advancement of painless abortion is to dilate the cervix. If no corresponding drugs are given before the operation, and only a dilator is used to perform the uterine dilation operation, it can increase the patient's pain and cause cervical lacerations. Therefore, this study chose misoprostol tablets to complete cervical dilation. Misoprostol tablets are prostaglandin E1 derivatives, which are suitable for stimulating cervical ripening and anti-early pregnancy treatment. They can exert specific effects in the uterus and cervical area and continue to stimulate cervical connective tissue, increasing protease release, and promoting the degradation of collagen fibers, leading to the dilation of the cervix. In addition, oral administration of misoprostol tablets can stimulate uterine smooth muscle, strengthen uterine contraction, and dilate the cervix based on exciting uterine muscles. Relevant literature reports that the high blood concentration of misoprostol after oral administration can stimulate uterine contraction and shorten the cervical ripening time, which is helpful for patients to complete induction of labor and abortion successfully [3].

From a pharmacological perspective, misoprostol tablets are synthetic prostaglandin I derivatives that inhibit the body's secretion of gastric acid. It also has the pharmacological effects of prostaglandins, which can regulate intrauterine pressure, stimulate cervical contraction, and soften the cervix [4]. In addition, giving mifepristone based on misoprostol tablets can increase the frequency of uterine contractions, expand the

amplitude of uterine contractions, and have the effect of terminating early pregnancy^[5]. Compared with carboprost methylate and thiopentone, misoprostol is safer, has milder adverse reactions, a higher absorption rate of active ingredients, and a higher rate of binding to plasma proteins. Based on the pharmacokinetic analysis of misoprostol tablets, the blood concentration reaches the peak 15 minutes after administration, and the active ingredients can be fully absorbed 1.5 hours after administration. Based on clinical practice analysis, misoprostol has a protein binding rate of 80%–90% and a clearance half-life of 20–40 minutes, making it suitable for cervical dilation treatment before painless abortion^[6].

Based on the data analysis in this article, the excellent and good rate of cervical dilation in group A patients undergoing abortion was 95.00%, which was higher than that in group B (55.00%, $P < 0.05$), thus suggesting that giving misoprostol tablets before a painless abortion can enhance the cervical dilation effect. Conventional abortion treatment has the disadvantages of a high complication rate, long operation time, and poor postoperative recovery, which can increase the medical expenses of abortion patients. During routine abortion, it is difficult to dilate the cervix, so it takes a long time to suck out the embryo completely, and the slow dilatation of the cervix increases the difficulty of the operation^[7]. In addition, the female cervix has abundant smooth muscles, blood vessels, elastic fibers, nerves, and other structures. If the cervix is not ripened, and the dilator is directly used for surgery, it can cause vagus nerve excitement, increase the secretion of acetylcholine in the human body, and cause pale complexion, chills, miscarriage syndrome such as night sweats, and even secondary uterine perforation, cervical tearing, and other complications, causing severe pain to the patient and affecting the smooth progress of the operation. Similarly to first-time pregnancy, the risk of secondary cervical-related complications is low when the cervix is dilated during abortion, so the cervix should be ripened in advance to reduce the difficulty of cervical dilation and ensure the success of negative aspiration^[8]. The results in this article showed that misoprostol has excellent medicinal effects of dilating the cervix, stimulating uterine contraction, and relaxing the cervix.

Preoperative administration of misoprostol can reduce the difficulty of abortion. Another set of data showed that the cervical dilation time was 17.08 ± 0.41 s, uterine suction time was 1.39 ± 0.32 min, surgical blood loss was 15.25 ± 1.25 mL, and other indicators of abortion patients in group A were better than those in group B (70.36 ± 1.36 s, 2.68 ± 0.49 min, 27.88 ± 2.36 mL, respectively, $P < 0.05$). This indicated that giving misoprostol tablets before surgery can reduce bleeding during abortion and shorten the time of mechanical stimulation of the uterine cavity. Oral administration of misoprostol tablets can stimulate cervical fibroblasts, promote collagen fibers' degradation, change collagen fibers' order, and achieve efficient cervical dilation. Another set of data showed that the complication rate of abortion in group A was 5.00%, which was lower than that in group B, which was 30.00% ($P < 0.05$), hence indicating that giving misoprostol tablets before surgery can reduce surgical complications. As misoprostol is administered orally, the local drug concentration is high. In addition, the drug has high bioavailability, and its effect is not affected by fasting, hence it can rapidly dilate the cervix with low operation difficulty^[9]. Moreover, for those without a history of vaginal delivery, giving misoprostol before surgery can promote the separation of the embryo from the uterine wall, thereby reducing the difficulty of negative pressure suction and reducing the damage to the uterine wall. Therefore, the postoperative complication rate is low^[10]. The last data set shows that group A's satisfaction rate for abortion is 100.00%, which was higher than group B's (80.00%, $P < 0.05$). It shows that preoperative misoprostol tablets ripen the cervix and can enhance patient satisfaction with abortion. The reason is that misoprostol tablets have vigorous pharmacological activity and can play a similar role as E prostanoids. When administered orally, the active ingredients are well absorbed and can ripen the cervix. Therefore, it can be used before abortion to reduce the pain of abortion as well as avoid postoperative complications such as cervical injury, adhesion, and

uterine perforation^[11]. Nevertheless, giving misoprostol tablets before a painless abortion may cause symptoms of lower abdominal distension and pain, but most patients can tolerate it and generally do not need special treatment.

In summary, administering misoprostol before a painless abortion can relax the uterine wall, promote embryo exclusion, and reduce cervical and uterine wall damage, thereby improving the safety of painless abortion, which has promotional value.

Disclosure statement

The author declares no conflict of interest.

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