Original Article

Medical Versus Surgical Methods for Termination of First Trimester Miscarriage: A Comparative Study

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ABSTRACT

Background: Worldwide, induced abortions are among the most frequently performed operations. Surgical abortion has been around for a while, but in the past 10 years, many new medical abortion treatments have emerged. Early miscarriages can be managed through medical or surgical methods. This study was set out to evaluate the efficacy of surgical evacuation versus vaginal misoprostol tablets in preventing miscarriage during the first trimester of pregnancy.

Methods: This comparative research was conducted on 180 patients, inevitable, incomplete and missed miscarriage. Most medically treated patients used different random doses and methods of administering misoprostol, often concluding treatment at home with follow-up phone calls. While in surgical group, patients received saddle anesthesia, and the size of their uterus was assessed via bimanual examination. After the surgery, patients were discharged within six hours and prescribed prophylactic antibiotics.

Results: The two groups' medical records differed significantly. There was a notable variation in the groups based on the type of labor. The effect of medical factors was significantly different for gestational age determined by last menstrual period. The type of intervention had a significant impact on endometrial thickness as measured by ultrasound and medical data, with a p-value less than 0.05. There were moderate significant differences between the effect of medical treatment with the response with a higher percentage of response in treatment oral +vaginal (92.2%) and (91.7%) in treatment vaginal +sublingual.

Conclusions: Surgical termination of first-trimester miscarriage is superior to medical termination (97.9%). The success of medical termination of first-trimester miscarriage is predictable with gestational age <10 weeks, normal Laboure, High dose of misoprostol and with missed abortion.

Key Words: First trimester miscarriage, medical, surgical, termination.

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INTRODUCTION

The majority of miscarriages happen during the first trimester of pregnancy, but they can happen at any point during the pregnancy[1,2].

For women who have regular menstrual cycles, this is the number of days or weeks since the first day of her last normal menstrual period (LMP). However, for women who have irregular cycles, a physical or ultrasound (US) examination may be necessary to determine the gestational age (GA)[3].

In this study, GA is defined in both weeks and days, aligning with its definition in the International statistical classification of diseases (ICD). The first trimester is typically thought to encompass the first twelve weeks of pregnancy, however some experts go as far as saying the first fourteen[4].

Approximately one-quarter of pregnancies end in abortion, and one-third of women will undergo this procedure at some point in their lives[5].

Missed abortion, inevitable abortion, and incomplete abortion are the most prevalent reasons to terminate a pregnancy in the first trimester[6].

If a pregnant woman presents with vaginal bleeding at an early stage, it is crucial to conduct a thorough evaluation of her medical history and perform any necessary tests to confirm the pregnancy's viability and location within the body. The most helpful tests in primary care include quantitative serum beta-human chorionic gonadotropin (HCG) and pelvic US[7].

Early miscarriage therapy has changed a lot in the last few years. Surgical uterine evacuation was the gold standard, but medicinal and expectant management are now being employed more and more[8,9].

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Current World Health Organization (WHO) guidelines recommend medical management with misoprostol as an outpatient procedure for first-trimester surgical miscarriages (up to 12 or 14 weeks) and medical miscarriages (up to nine weeks), the most recent treatment option[10].

The three main components of a medical abortion dosage form are the progesterone antagonist mifepristone, the synthetic prostaglandin E1 analogue misoprostol, and the prostaglandin E1 analogue Gemeprost[11].

Surgical termination involves

Aspiration (using an electric pump or a manual syringe), dilatation and evacuation (sometimes called dilation and curettage or D&E)[11].

Contrarily, surgical abortion is faster and can be done without consciousness using GA; nevertheless, medical abortion requires multiple visits and often has longer-lasting bleeding and pain[12].

This research aimed to compare the outcomes of miscarriage by vaginal misoprostol tablets and surgical evacuation in the first trimester of pregnancy.

PATIENTS AND METHODS

This comparative study research was conducted on 180 patients, inevitable miscarriage (dilated cervix and minimal vaginal bleeding), incomplete miscarriage (retained contents and severe bleeding) and missed miscarriage (anembryonic sac or blighted ovum and fetal demise). The research was done from January 2017 and January 2019 after approval from the Ethical Committee Assiut University Hospitals, Assiut, Egypt. An informed written consent was obtained from the cases.

Exclusion criteria were contraindications to misoprostol (e.g., asthma, glaucoma, mitral stenosis), allergy to misoprostol, intrauterine device in situ, known or suspected ectopic pregnancy, severe vaginal bleeding requiring immediate evacuation, hemodynamically unstable patients needing immediate termination and sepsis, pelvic infection, or fever (>37.6°C).

Full medical histories and physical examinations, US and laboratory investigations [β- HCG, blood group, rhesus factor (Rh) status, and hemoglobin concentration] were conducted on all individuals.

Misoprostol Group

During the initial visit, patients were assessed for any restrictions on prescribing misoprostol and whether they had received varying doses from private clinics. If patients had previously used misoprostol, details about the doses and routes were documented and followed up later via phone. If no prior misoprostol use was reported, 800µg misoprostol tablets were inserted into the posterior vaginal fornix. Alternatively, a regimen involving a combination of 2 tablets administered vaginally and orally, or 2 tablets administered vaginally and sublingually, was provided every 8 hours for a maximum of three doses. Additionally, comprehensive blood tests, urine analysis, and a vaginal US were conducted. For patients who continued their treatment at home, instructions were given to return if they experienced excessive vaginal bleeding or significant abdominal pain. If these symptoms did not occur, they were advised to revisit the clinic 72 hours after administering misoprostol for a vaginal US to ensure complete removal of the gestational sac. During the second visit, patients were asked about any discomfort or bleeding they may have experienced. On the eighth day, during the third visit, following the administration of misoprostol and expulsion of the uterine contents, outcomes were assessed via US to ensure no pregnancy tissues were left behind. If the remains measured 15 mm or more, a suction curettage was performed. If the uterine contents measured less than 10 mm, the procedure was deemed successful.

Surgical Group

During the surgical procedure, patients received saddle anesthesia, and the size of their uterus was assessed via bimanual examination. And dilatation was performed if needed followed by either suction or curettage. After the surgery, patients were discharged within six hours and prescribed prophylactic antibiotics. They were advised to notify the investigator if any vaginal bleeding occurred. The need for additional surgical evacuation, regardless of the cause, was considered a treatment failure. All patients were followed up six weeks later.

Post-treatment follow-up

Any side effects, intra-operative findings or complications, clinical success, bleeding duration and interval to menstrual return, time from misoprostol insertion to tissue mass passage (measured from the first dose), antibiotic treatment for presumed infection, duration of follow-up, and any severe bleeding or abdominal pain that led to readmission.

The primary outcome was complete evacuation of the uterus as detected by US after 6 weeks after termination. The secondary outcomes were postoperative bleeding, infection, perforation of the uterus, and medically related complications, and return of menstrual pattern.

Sample Size Calculation

Sample size calculated using G power program version 3.1.3, prevalence of 87 %, type one error (alpha) =0.05,

with confidence level 95 %, beta error =0.20; power 80%. According to successes rate of complete evacuation in surgical: 99% and medical: 87%. The difference is 12%.

Statistical analysis

Statistical analysis was conducted using SPSS v26 (IBMInc, Chicago, IL, USA). The quantitative variables, including mean and standard deviation (SD), were compared between the two groups using an unpaired Student's t-test. The qualitative variables, including frequency and percentage (%), were analyzed using either the Chi-square or Fisher's exact tests, depending on the type of variable. Statistical significance was determined by a two-tailed *P value* < 0.05.

RESULTS

One hundred and eighty-five pregnant ladies who are at least 14 weeks along in their pregnancies and are considering an abortion. Patients undergo either treatment with, 600 µg vaginal misoprostol on one side and on the other side by suction curettage or dilatation and curettage, About 65% of them live in rural areas, while the remaining 10% are educated; 90% of them are uneducated (Figure 1).

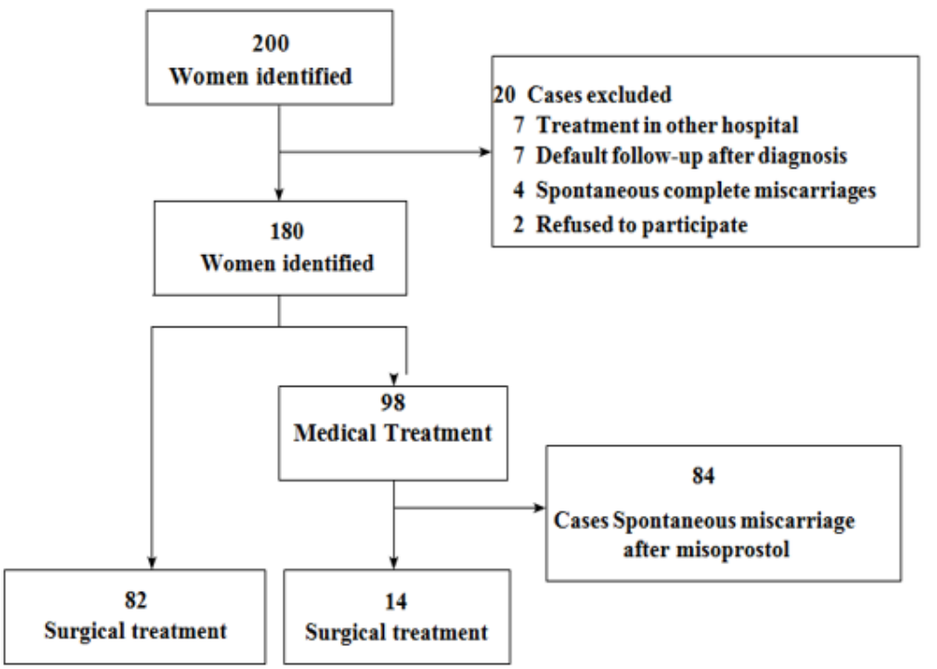

Fig. 1: Flowchart of the study

Personal and obstetrical data and return of menstruation were insignificantly different between both groups. Medical data were a significant different between both groups (Table 1).

Data for medical and surgical intervention were enumerated in this table (Table 2)

Age, BMI, other obstetric history, US findings and bleeding were insignificantly different between both groups. Groups differed significantly with respect to the type of labor. The impact of medicinal interventions was drastically different from GA by LMB (Table 3).

Endometrial thickness and the kind of intervention were significantly different by US and medical data according to the type of intervention (P<0.05). There were 47(48.0%) cases with the medical intervention that have 12- 24 hours between misoprostol and passage of tissue (Table 4).

The relationship between the impact of medical therapy and the reaction showed moderately significant differences (P<0.001) with a higher percentage of response in treatment oral +vaginal (92.2%) and (91.7%) in treatment vaginal +sublingual (Table 5).

Table 1: Personal, obstetrical and medical data and return of menstruation according to the type of intervention

		Medical intervention (n=98)	Surgical intervention (n=82)	*P*
Age (years)	< 25	33(33.7%)	22(26.8%)	0.351
	25 – 30	34(34.7%)	43(52.4%)	
	> 30	31(31.6%)	17(20.7%)	
BMI	Normal	75(76.5%)	61(74.4%)	0.739
	Overweight/ obese	23(23.5%)	21(25.6%)	
Obstetric Data				
Gravidity	1 – 2	28(28.6%)	20(24.4%)	0.427
	3 – 4	36(36.7%)	38(46.3%)	
	5 or more	34(34.7%)	24(29.3%)	
Parity	1 – 2	37(37.8%)	39(47.6%)	0.415
	3 or more	41(41.8%)	29(35.4%)	
Abortion	1	23(23.5%)	24(29.3%)	0.674
	2 or more	20(20.4%)	15(18.3%)	
Type of labor	Normal	61(78.2%)	45(66.2%)	0.104
	C.S	17(21.8%)	23(33.8%)	
No. of CSs	One	8(47.1%)	12(52.2%)	0.749
	2 or more	9(52.9%)	11(47.8%)	
Medical data				
GA by LMP (weeks)	< 8	40(40.8%)	29(35.4%)	0.011*
	8 - < 10	42(42.9%)	24(29.3%)	
	≥ 10	16(16.3%)	29(35.4%)	
US (indication of abortion)	Content (incomplete abortion)	39(39.8%)	74(90.2%)	0.000*
	IUFD	5(5.1%)	4(4.9%)	
	Missed ab	54(55.1%)	3(3.7%)	
	Visceral mole	0(0.0%)	1(1.2%)	
Bleeding (before intervention)	Mild	29(29.6%)	0(0.0%)	0.000*
	Moderate	37(37.8%)	3(3.7%)	
	Severe	0(0.0%)	79(96.3%)	
Return of menstruation (days)		35.93 ± 5.42	35.65 ± 5.06	0.730

Data are presented as mean ± SD or frequency (%). * Significant p value <0.05. BMI: body mass index, CS: Caesarean section, GA: gestational age, LMP: last menstrual period, US: Ultrasound, IUFD: Intrauterine fetal demise.

Table 2: Data for medical and surgical intervention

		N=98
Medical intervention		
Dose of misoprostol/ tab (1tab=200µg)	1 – 2	33(33.7%)
	3 – 4	65(66.3%)
Route	Oral	14(14.3%)
	Vaginal	12(12.2%)
	Sublingual	9(9.2%)
	Oral + vaginal	51(52.0%)
	Vaginal + sublingual	12(12.2%)
Rate (hours)	6 hours	22(22.4%)
	> 6 hours	76(77.6%)
Total dose (tab)	< 6	36(36.7%)
	6 – 8	51(52.0%)
	> 8	11(11.2%)
Effect of medical	Complete	84(85.7%)
	Incomplete	14(14.3%)
Endometrial thickness by US (mm) (72h.post intervention)	< 8	38(38.8%)
	8 – 10	46(46.9%)
	> 10	14(14.3%)
Surgical intervention		
Operative duration (min)	10 - < 15	30(31.3%)
	15 – 20	66(68.8%)
Blood transfusion		2(2.1%)
Complications		5(5.2%)
Post-evacuation endometrial thickness by US (mm)	< 6	22(22.9%)
	6 – 8	60(62.5%)
	> 8	14(14.6%)
Effect	Complete	94(97.9%)
	Incomplete	2(2.1%)

Data are presented as frequency (%). US: Ultrasound.

Table 3: Personal, obstetrical and clinical data of patients with complete and incomplete abortion in the medical treatment group

Complete (n= 84)		Effect of medical		*P*
		complete (n= 84)	Incomplete (n= 84)	
Age (years)	< 25	28(84.8%)	5(15.2%)	1.000
	25 – 30	31(91.2%)	3(8.8%)	0.367
	> 30	25(80.6%)	6(19.4%)	0.361
BMI	Normal	67(89.3%)	8(10.7%)	0.088
	Overweight/ obese	17(73.9%)	6(26.1%)	
Obstetric data				
Gravidity	1 – 2	24(85.7%)	4(14.3%)	1.000
	3 – 4	32(88.9%)	4(11.1%)	0.494
	5 or more	28(82.4%)	6(17.6%)	0.550
Parity	1 – 2	32(86.5%)	5(13.5%)	0.865
	3 or more	35(85.4%)	6(14.6%)	0.933
Abortion	1	21(91.3%)	2(8.7%)	0.509
	2 or more	16(80.0%)	4(20.0%)	0.475
Type of labor	Normal	56(91.8%)	5(8.2%)	0.011*
	C.S	11(64.7%)	6(35.3%)	
No. of CSs	One	6(75.0%)	2(25.0%)	0.620
	2 or more	5(55.6%)	4(44.4%)	
Medical data				
GA by LMP (weeks)	< 8	37(92.5%)	3(7.5%)	0.111
	8 - < 10	41(97.6%)	1(2.4%)	0.004*
	≥ 10	6(37.5%)	10(62.5%)	0.000*
US (indication of TOP)	Content	33(84.6%)	6(15.4%)	0.800
	IUFD	3(60.0%)	2(40.0%)	0.148
	Missed ab	48(88.9%)	6(11.1%)	0.320
Bleeding (before intervention)	Mild	28(87.5%)	4(12.5%)	1.000
	Moderate	26(89.7%)	3(10.3%)	0.546
	Severe	30(81.1%)	7(18.9%)	0.307

Data are presented as mean ± SD or frequency (%). * Significant *p value* <0.05. BMI: body mass index, CS: Caesarean section, GA: gestational age, LMP: last menstrual period, US: Ultrasound, IUFD: Intrauterine fetal demise.

Table 4: Relation between the type of intervention and endometrial thickness by US, interval between misoprostol and passage of tissue, medical data according to the type of intervention with the response

		Medical Intervention (n=88)	Surgical Intervention (n=82)	*P*
Endometrial thickness by US (mm)	< 8	38(38.8%)	17(20.7%)	0.032*
	8 – 10	46(46.9%)	51(62.2%)	
	> 10	14(14.3%)	14(17.1%)	
The interval between misoprostol and passage of tissue (hours)	< 12	26(26.5%)	--	--
	12 - < 24	47(48.0%)	--	
	≥ 24	25(25.5%)	--	
Complete response		84(85.7%)	94(97.9%)	0.002*
Incomplete response		14(14.3%)	2(2.1%)	

Data are presented as frequency (%). * Significant *p value* <0.05. US: Ultrasound.

Table 5: Effect of medical treatment in response according to the route of administration of misoprostol

Complete response		Effect of medical		*P*
		complete response	Incomplete response	
Route	Oral	12(85.7%)	2(14.3%)	1.000
	Vaginal	6(50.0%)	6(50.0%)	0.002*
	Sublingual	8(88.9%)	1(11.1%)	1.000
	Oral and vaginal	47(92.2%)	4(7.8%)	0.058
	Vaginal and sublingual	11(91.7%)	1(8.3%)	1.000

Data are presented as frequency (%). * Significant *p value* <0.05.

DISCUSSION

Our results corroborate those of prior research showing that intravaginal misoprostol is an effective medical modality for the treatment of first-trimester miscarriages, with a success rate of 85.7%[13].

Compared to surgical abortion treatment, the success rate of monotherapy regimens employing misoprostol in this trial was about 86%, while in the study by Zhang *et al*. the success rate was about 84%[14].

Within this study, a mere 3% of surgical abortions and 16% of medical abortions were unsuccessful. Prasad S, Kumar A, Divya[15] conducted a study comparing the success rate of abortion with suction curettage and single-dose misoprostol 800 micrograms. The results showed that surgical abortion had a success rate of 95%, while the misoprostol regimen had a rate of approximately 94%.

Abortions were also performed in this trial with 800 micrograms of misoprostol administered vaginally[15].

Other studies found that 800 micrograms of vaginal misoprostol was effective in terminating pregnancies with a gestational age (GA) of fewer than 6 weeks, with an abortion success rate of 87%. But in Zargar M. *et al*.[16] the medical group had a success rate of 79%. Part of the reason for the lower success rate in this study could be the lack of a proper protocol for medicine abortions. As a result, in this group, there were cases where the pregnancy was terminated by suction-curettage after one dose, in the event that the first dose failed.

Success rates for misoprostol in ectopic pregnancy termination were almost 86% in this study, which is comparable to or higher than the aforementioned study. A high success rate in medical abortion was also found in the current study. The results did show, however, that a major benefit of medical abortion is that it spares women the dangers of surgery and anesthesia[17].

Secondary outcome analysis revealed that medical care was more preferred by nulliparous women, after controlling for potential demographic confounders. This finding was similar to Bugalho A, Bique C, *et al*.[18] and Zargar M. *et al*.[16] that reported previously.

In one study on misoprostol, the majority of patients were satisfied with the medical treatment and recommended it to friends in a similar situation. Women who failed were not satisfied, but 85.7% of patients were willing to recommend it.

One patient (1.9%) in the surgical evacuation group experienced severe bleeding and needed a blood transfusion, while five cases had other complications such as infection, cervical laceration, and perforation. These positive outcomes demonstrate the safety of the medical method, which is in part due to the presence of experienced physicians, as previous studies have shown. No cases of post-abortion infection or blood transfusion were found in the medical group[17,19]. But in different with Zargar M. *et al*.[16] found that surgical termination was less in complications.

Medical treatment is being used more and more as an alternative to the traditional methods of miscarriage management. The effectiveness of this treatment varies greatly, ranging from 13% to 96%. It is more effective for incomplete miscarriages than silent ones. Several studies have tried to find the best course of treatment, but no one has come to a consensus yet[20].

There have been reports of success rates ranging from 74% to 84% when surgical evacuation is performed on day 8, following a first 800 µg vaginal dose on day 1 in cases where the miscarriage is still incomplete. The majority of studies have shown that this method is effective and has fewer side effects[14,21].

Completion rates of evacuation in our study were 85.7%, which is in line with previous reports.

The study limitations, its retrospective nature, this study relied on evaluating outpatient and inpatient case records, which may or may not provide sufficient documentation of clinical facts.

CONCLUSIONS

Surgical termination of first-trimester miscarriage is superior to medical termination (97.9%). Medical termination is also successful in (85.7%) of cases, with less complication, less cost, and more acceptable and convenient by the patients. The success of medical termination of first-trimester miscarriage is predictable with GA <10 weeks, normal Laboure, High dose of misoprostol and with missed abortion.

CONFLICT OF INTERESTS

There are no conflicts of interest.

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