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Efficacy of Vaginal Misoprostol for Missed Abortion Management: A Retrospective Case Series

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ABSTRACT

Background: Misoprostol is widely used for the medical management of missed abortion, but response rates vary across settings. We evaluated the efficacy of 800 mcg vaginal misoprostol for first-trimester missed abortion at Rabia Balkhi Hospital, Kabul, Afghanistan.

Methods: This retrospective case series included 492 women diagnosed with first-trimester missed abortion and treated with 800 micrograms of vaginal misoprostol between April 2014 and March 2015. Data were collected on maternal age, gravidity, dosing interval, and treatment outcomes. The primary outcome was treatment success, defined as resolution of the missed abortion without the need for dilation and curettage (D&C), including cases that required evacuation and curettage (E&C) for incomplete expulsion. Treatment failure was defined as requiring D&C.

Results: Of 492 patients, 470 (95.5%) had successful medical management without the need for D&C. Treatment failure occurred in 22 women (4.5%). Among non-responders, most were aged 30–38 years (40.9%) and multigravida (90.9%). In the failure group, 45.5% had received misoprostol every 8 hours and 54.5% every 3 hours. No complications such as hemorrhage, infection, or uterine rupture were recorded. The observed failure rate (4.5%) was lower than those reported in studies from Mumbai (8.7%) and Pakistan (10%).

Conclusion: Vaginal misoprostol demonstrated high efficacy and an excellent safety profile for the management of first-trimester missed abortion at Rabia Balkhi Hospital. The effectiveness observed in this cohort exceeds that reported in regional studies. Further research is warranted to optimize dosing protocols and identify factors associated with treatment failure in similar resource-limited settings.

Keywords: Missed abortion, Misoprostol, Medical management, Afghanistan

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Introduction

A missed abortion, or delayed miscarriage, is a specific type of early pregnancy loss characterized by the in-utero death of an embryo or fetus before the 20th week of gestation without concurrent expulsion of the products of conception (1). Patients often present with an absence of fetal cardiac activity on ultrasound while lacking the typical symptoms of miscarriage, such as cramping or heavy vaginal bleeding, which can delay diagnosis and treatment (2). This condition is a significant clinical concern in reproductive health, complicating approximately 10–20% of all clinically recognized pregnancies worldwide (3, 4). The retention of nonviable pregnancy tissue poses substantial risks to maternal health. Without timely intervention, it can become a nidus for infection, leading to septic abortion, a critical condition associated with sepsis and mortality (5).

Another major risk is life-threatening hemorrhage, which can necessitate emergency surgical intervention and blood transfusion (6). Perhaps the most severe complication is the development of Disseminated Intravascular Coagulation (DIC), a catastrophic disorder of the coagulation system that can be triggered by the release of thromboplastic material from the necrotic fetal tissue (7). Furthermore, while surgical management is effective, it carries iatrogenic risks, including uterine perforation, cervical trauma, and the development of intrauterine adhesions (Asherman's syndrome), which can lead to menstrual disturbances and future infertility (8, 9).

The management of missed abortion has evolved to include three primary strategies: expectant management, surgical evacuation, and medical treatment. Surgical evacuation, typically via dilation and curettage (D&C), has been the historical standard, offering immediate resolution but requiring skilled providers, operating theater facilities, and carrying inherent surgical and anesthetic risks (10). Expectant management, while avoiding these risks, is often associated with unpredictable and prolonged waiting times, significant patient anxiety, and a higher risk of incomplete expulsion and emergency presentation (11). Medical management with prostaglandin analogs, particularly misoprostol, presents a compelling alternative. As a stable, inexpensive, and widely available drug, misoprostol promotes cervical ripening and induces uterine contractions, facilitating the expulsion of pregnancy tissue. Its efficacy and safety profile have led the WHO to recommend it as a first-line option for the medical management of missed abortion, especially in low-resource settings where access to safe surgery is constrained (12, 13).

The healthcare landscape in Afghanistan presents profound challenges that amplify the importance of effective medical treatments. The country contends with one of the highest maternal mortality ratios (MMR) globally, driven by a complex interplay of factors including conflict, poverty, malnutrition, and critically limited access to skilled birth attendants and emergency obstetric care (9, 13). In this context, surgical procedures like D&C are often not readily accessible, especially in rural areas, due to a scarcity of trained surgeons, equipped facilities, and reliable infrastructure. This makes a safe, effective, and non-invasive treatment option like misoprostol not just preferable but essential. However, the efficacy of medical protocols can be influenced by local patient demographics, practices, and healthcare delivery systems. Despite the widespread use of misoprostol, there is a stark lack of robust local data from Afghan hospitals to validate its effectiveness and guide optimized, context-specific treatment protocols (12).

Generating local evidence is therefore critical to strengthening obstetric care and reducing pre-

ventable maternal morbidity and mortality in Afghanistan. A detailed analysis of outcomes from a major tertiary care facility can provide invaluable insights for clinicians and policy-makers.

We aimed to fill this evidence gap by evaluating the real-world efficacy and safety of vaginal misoprostol for the management of first-trimester missed abortion at Rabia Balkhi Hospital, a key referral center in Kabul, Afghanistan. Furthermore, we wanted to identify specific demographic and clinical factors such as maternal age, gravidity, and dosing interval—that are associated with treatment failure. The findings from this research will contribute to the development of optimized clinical guidelines, ultimately improving the standard of care and health outcomes for women experiencing this common obstetric complication in Afghanistan.

Materials and Methods

Study Design

This study was a retrospective, descriptive case series conducted at Rabia Balkhi Hospital, a major tertiary obstetric referral center in Kabul, Afghanistan. Medical records of all women diagnosed with first-trimester missed abortion and managed with misoprostol between April 1, 2014, and March 31, 2015, were reviewed.

Study Population and Sampling

A universal sampling strategy was employed. All women meeting the diagnostic criteria for first-trimester missed abortion during the study period were included. No sampling or selection procedures were applied.

Inclusion and Exclusion Criteria

Women were eligible for inclusion if they were diagnosed with first-trimester missed abortion at a gestational age of ≤13+6 weeks, based on the last menstrual period and confirmed by ultrasonography. The diagnosis of missed abortion was established according to standard sonographic criteria, defined as the absence of fetal cardiac activity in an embryo with a crown–rump length of at least 7 mm or an anembryonic gestation with a mean gestational sac diameter of 25 mm or greater. Only patients who received vaginal misoprostol as the initial method of management were enrolled. Patients presenting with incomplete abortion, inevitable abortion, or septic abortion were excluded. Women with known coagulation disorders or documented hypersensitivity to prostaglandins were also excluded to ensure patient safety and diagnostic consistency with WHO–endorsed criteria for early pregnancy loss (13).

Treatment Protocol

All included patients received an initial dose of 800 micrograms of misoprostol administered vaginally. During the study period, two dosing regimens were used in the obstetric unit: either three doses administered at 3-hour intervals or four doses administered at 8-hour intervals. The use of these regimens reflected differences in attending physicians' clinical preferences. At the time of treatment, both dosing schedules were considered acceptable within the institution and consistent with prevailing regional practice.

Observation Period and Definition of Treatment Outcome

Patients were observed for up to 24 hours following misoprostol administration to assess treatment response. Treatment success was defined as resolution of the missed abortion without the need for dilation and curettage (D&C). This included both complete spontaneous expulsion and cases in which evacuation and curettage (E&C) was performed only to remove minor retained products of conception after expulsion had already begun. In this clinical context, E&C was regarded as a minor follow-up procedure rather than a primary surgical intervention and was therefore not classified as treatment failure. Treatment failure was defined

as the absence of uterine evacuation after completion of the prescribed misoprostol regimen, necessitating D&C.

Data Collection

Data were collected retrospectively from inpatient medical records, ultrasound logs, and hospital registries using a standardized data abstraction form. Extracted variables included maternal age, gravidity, gestational age, misoprostol dosing interval, treatment outcome, type of follow-up procedure performed, and any documented complications such as hemorrhage, infection, or uterine rupture. All patient identifiers were removed prior to data analysis to ensure confidentiality.

Data Analysis

Data were analyzed using Microsoft Excel. Descriptive statistics (frequencies, percentages, means, and ranges) were used to summarize patient characteristics and outcomes. Associations between maternal age, gravidity, dosing interval, and treatment failure were explored descriptively due to the small failure subgroup (n=22), which limited statistical power for inferential testing.

Ethical Considerations

Permission to access medical records was granted by Rabia Balkhi Hospital Administration. Ethical approval was obtained from the Ghalib University Research Ethics Committee (Approval Code: Af-Gh.U.H-R.E.C.2025_0033). As this was a retrospective study using anonymized records, informed consent was waived.

Results

Study Population and Baseline Characteristics

During the one-year study period, 21,616 gynecological patients presented to the Outpatient Department of Rabia Balkhi Hospital, of whom 5,037 (23.3%) were admitted. A total of 492 women met the inclusion criteria for first-trimester missed abortion and received misoprostol management. The mean maternal age for the full cohort was 28.5 ± 5.2 years. Consistent with the demographic characteristics of the hospital's patient population, the majority of women in the cohort were multigravida, as reflected in the gravidity profile of the treatment failure subgroup. A summary of patient distribution relative to total admissions is presented in Table 1.

Table 1: Gynecological Patient Admissions and Missed Abortion Cases

Category	*Number (n)*	*Percentage (%)*
Total OPD Visits	21,616	100
Total Admissions	5,037	23.3
Missed Abortion Cases Treated	492	2.27 of OPD; 9.8 of Admissions

Primary Outcome: Efficacy of Misoprostol

Of the 492 patients treated with vaginal misoprostol, 470 (95.5%) achieved treatment success, defined as resolution of missed abortion without the need for dilation and curettage (D&C). Treatment failure occurred in 22 patients (4.5%)**,** all of whom required D&C (Table 2).

Treatment success consisted of two categories

Complete spontaneous expulsion occurred in 67 patients (13.6%). In the remaining 403 patients (81.9%), misoprostol induced uterine expulsion followed by evacuation and curettage (E&C).
E&C was performed only to remove minor retained products after the onset of expulsion and was not classified as treatment failure, as miso-

prostol successfully initiated uterine evacuation.

Table 2: Response to Vaginal Misoprostol (800 mcg)

Outcome	*Number (n)*	*Percentage (%)*
Successful Medical Management	470	95.5
Treatment Failure (Required D&C)	22	4.5
Total	492	100

Factors Associated with Treatment Failure: Descriptive comparisons were conducted to explore associations between patient characteristics and treatment failure. Inferential statistical testing was not performed due to the small size of the failure group (n = 22), which limits statistical power.

Among the 22 patients who experienced treatment failure, 31.8% were aged 20–28 years, 40.9% were aged 30–38 years, and 27.3% were aged 40 years or older (Table 3). Of the treatment failures, 2 patients (9.1%) were primigravida, while 20 patients (90.9%) were multigravida (Table 4). Regarding the misoprostol dosing schedule among failed cases, 10 patients (45.5%) had received misoprostol at 8-hour intervals, whereas 12 patients (54.5%) had received misoprostol at 3-hour intervals (Table 5). These descriptive patterns indicate a higher proportion of treatment failures among multigravida women and those aged 30–38 years.

Table 3: Treatment Failure by Maternal Age Group (n=22)

Age Group (Years)	*Number (n)*	*Percentage (%)*
20-28	7	31.8
30-38	9	40.9
≥40	6	27.3
Total	22	100

Table 4: Treatment Failure by Gravidity Status (n=22)

Gravidity	*Number (n)*	*Percentage (%)*
Prime Gravida (PG)	2	9.1
Multi Gravida (MG)	20	90.9
Total	22	100

Table 5: Treatment Failure by Dosing Interval (n=22)

Dosing Interval	*Total Doses*	*Number (n)*	*Percentage (%)*
Every 8 hours	4	10	45.5
Every 3 hours	3	12	54.5
Total		22	100

Across all 492 patients**,** no major complications including hemorrhage, uterine rupture, or infection were documented in the medical records. Among the 22 patients who underwent D&C following failed medical management, no complications were reported (Table 6). Mild expected effects of misoprostol (e.g., cramping, light bleeding) were not categorized as complications.

Table 6: Complications in Treatment Failure Group (n=22)

Complication	*Number (n)*	*Percentage (%)*
None Recorded	22	100
Hemorrhage	0	0
Infection	0	0

Table 7 summarizes the final clinical outcomes following misoprostol administration. Treatment success was defined as resolution of the missed abortion without the need for D&C. This included both complete spontaneous abortion and incomplete abortion managed with E&C, a minor follow-up procedure performed after misoprostol-induced expulsion had begun. In contrast, treatment failure was defined solely as the need for D&C, which was performed only when misoprostol failed to initiate uterine evacuation.

Table 7: Final Management Outcomes Following Misoprostol Administration (Success = Avoidance of D&C)

Outcome	*Number (n)*	*Percentage (%)*
Complete Abortion	67	13.6
Evacuation and Curettage (E&C)	403	81.9
Dilation and Curettage (D&C) for Failure	22	4.5
Total	492	100

Table 8: Comparison of Findings from Rabia Balkhi Hospital with Published Literature

Variables	*Rabia Balkhi Hospital*	*Literature*
Number of patients treated with misoprostol	492 patients	Mumbai: 160 patients; Pakistan: 80 patients
Percentage of patients with missed abortion who did not respond to misoprostol	4.47% (22 patients)	Mumbai: 8.7%; Pakistan: 10% Our failure rate is lower, possibly due to demographic differences, adherence to protocol, or earlier gestational age at presentation.
Percentage of patients who did not respond to misoprostol based on maternal age	Ages 30–38: 40.9% of failures	No research reported; our study provides new data on age-specific response.
Ineffectiveness of misoprostol in Prime Gravid vs. Multi Gravid patients	Higher in MG patients (90.9% of failures)	No research reported; our study adds new evidence on gravidity as a factor in treatment failure.
Percentage of patients based on drug administration intervals	Every 8 hours: 45.5%; Every 3 hours: 54.5%	Mumbai: Regimen typically 3 doses at 8-hour intervals Our study provides additional insight into dosing interval comparisons.
Method of drug administration	Vaginal route	Vaginal route

Discussion

This retrospective case series evaluated the efficacy of 800 mcg vaginal misoprostol for managing first-trimester missed abortion at Rabia Balkhi Hospital. The primary outcome demonstrated that 95.5% (470/492) of patients avoided D&C, indicating that misoprostol was effective in initiating uterine evacuation in the vast majority of cases. However, only 13.6% (67/492) achieved complete spontaneous expulsion without any procedural assistance. The remaining successful cases (81.9%) required E&C to remove residual products of conception after expulsion had already begun. Thus, the 95.5% success rate reflects avoidance of D&C, rather than completion of management without any procedural intervention.

Treatment failure occurred in only 4.5% (22/492) of patients, all of whom required D&C. Among the failure group, most were multigravida (90.9%) and fell within the 30–38-year age group. No major complications were recorded. Collectively, these findings support the role of vaginal misoprostol as a highly effective and safe first-line approach for reducing the need for D&C in this setting. The overall success rate of 95.5% in our study compares favorably with rates reported in similar international studies. For instance, research from Mumbai and Pakistan reported higher failure rates of 8.7% and 10%, respectively (10-13). The superior efficacy observed in our cohort may be attributed to differences in patient demographics, strict adherence to a standardized protocol, or variations in gestational age at presentation (Table 8).

A significant contribution of this study is the analysis of factors associated with treatment failure, which have been less frequently reported in previous literature. We found that multigravidity was a prominent characteristic among non-responders, with 90.9% of failures occurring in MG patients. This finding suggests that obstetric history may influence uterine responsiveness to prostaglandins, a factor not extensively discussed in the studies from Mumbai or Pakistan (10-13). Similarly, we described the age distribution of non-responders, identifying those women aged 30-38 accounted for the largest proportion (40.9%) of failures. While the biological rationale for this is unclear and may be confounded by gravidity, it highlights a potential demographic for closer monitoring. The dosing regimen in our study (800 mcg vaginally, repeated every 3 or 8 hours) aligns with the WHO recommendations and previously published protocols (12, 13). The similar failure rates across the two interval groups (3-hour vs. 8-hour) in our non-responders suggest that the total dose or individual patient factors may be more critical to success than the interval alone, though this requires further prospective investigation.

The high efficacy and excellent safety profile of misoprostol demonstrated in this study support its role as a cornerstone of medical management for missed abortion. It offers a non-invasive alternative to D&C, thereby avoiding risks such as uterine perforation, cervical trauma, hemorrhage, and anesthesia-related complications (8, 9). This is particularly advantageous in resource-limited settings like Afghanistan, where surgical capacity and access may be constrained.

The identification of multigravidity as a potential predictor of failure has direct clinical implications. It suggests that MG patients may benefit from enhanced pre-treatment counseling regarding the possibility of requiring additional doses or surgical intervention. This allows for better management of patient expectations and preparedness. The primary strength of this study is its contribution of robust local data from a major Afghan hospital, filling a significant evidence gap. The use of a universal sample over a one-year period provides a comprehensive picture of real-world clinical outcomes.

Limitations

This study has several limitations inherent to its retrospective design. The analysis depended on the completeness and accuracy of medical records, which may have resulted in minor data omissions. Additionally, although the overall sample size was large, the number of treatment failures (n = 22) was relatively small. This limited our ability to conduct robust statistical analyses or identify independent predictors of treatment failure. As a result, characteristics observed more frequently among non-responders—such as multigravidity—should not be interpreted as definitive predictors, but rather as potential factors or common features observed within the failure group. Future studies with larger failure cohorts and multivariable analyses are needed to determine whether such characteristics represent true associations. Another limitation is the absence of long-term follow-up data, which prevented assessment of future fertility outcomes or late complications such as intrauterine adhesions. Furthermore, this study was conducted in a single tertiary hospital in Kabul, which may limit the generalizability of the findings to other healthcare settings in Afghanistan or beyond. Despite these limitations, the study provides important real-world evidence from a major clinical center and highlights areas in need of further research.

Conclusion

Vaginal misoprostol is a highly effective and safe treatment for first-trimester missed abortion at Rabia Balkhi Hospital, with a success rate exceeding 95%. This study provides crucial local evidence to guide clinical practice and policy in Afghanistan. Future prospective studies with larger sample sizes are warranted to confirm the associations between multigravidity, age, and treatment failure. Research should also investigate optimal, patient-tailored dosing regimens and incorporate long-term follow-up and patient-centered outcomes, such as satisfaction and psychological impact, to further optimize care.

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Competing Interests

The authors declare that they have no competing interests relevant to this study.

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