

Management of Missed Miscarriages in a Maternity Hospital: Experience and Outcomes at Les Orangers Maternity Hospital, Rabat

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Abstract

Background: Missed miscarriage is a common reason for presentation to gynecological emergency departments and represents a major therapeutic and organizational challenge, requiring effective, safe, and patient-centered management.

Objective: To evaluate the implementation of a dedicated care pathway for the management of missed miscarriage in a maternity hospital by analyzing patients' clinical characteristics and the effectiveness of the therapeutic strategies used.

Methods: A retrospective study was conducted between January and December 2024 in the Department of Obstetrics and Gynecology at Les Orangers Maternity and Reproductive Health Hospital (HMSRO), Rabat, Morocco. A total of 181 women with ultrasound-confirmed non-expelled missed miscarriage were included. Data were extracted from medical records and analyzed using Microsoft Excel and Jamovi software.

Results: The mean age was 33 years (range, 18–45 years). Most patients were married (98%) and had a middle socioeconomic status (91%). The main associated factors were maternal age ≥ 35 years, overweight (38.7%) or obesity (12.7%), and a history of previous miscarriage (28.7%). Expectant management was offered as the first-line approach to 100 patients, resulting in a spontaneous miscarriage rate of 79%. The remaining 21 patients achieved complete uterine evacuation after administration of misoprostol. As first-line medical management, 67 patients received misoprostol, with a success rate of 80.6% after the first dose and 97.4% after the second dose. Uterine aspiration was required in only 25 patients (13.8%), mainly because of immediate clinical indications or failure of medical management. At the 15-day follow-up, 83.4% of patients had complete uterine evacuation, with no major complications reported.

Conclusion: The structured care pathway implemented at HMSRO enabled effective, safe, and predominantly conservative management of missed miscarriage. It substantially reduced the need for surgical intervention while improving care coordination and patient satisfaction.

Keywords: Missed miscarriage; Misoprostol; Uterine aspiration.

Introduction

Missed miscarriage is defined as a non-viable intrauterine pregnancy characterized by cessation of embry-

onic or fetal development before fetal viability. It is one of the most common complications of the first trimester and represents a major reproductive health concern because of its medical, obstetric, and psychological consequences. It may lead to complications such as hemorrhage or infection and may reveal underlying risk factors for recurrent pregnancy loss that require further evaluation. Early pregnancy loss is also experienced as a significant bereavement, often causing substantial emotional distress for both the woman and her partner.

The exact incidence of missed miscarriage remains difficult to determine because many pregnancy losses occur before clinical recognition. However, advances in early pregnancy assessment have highlighted the high frequency of these events. Its etiology is multifactorial, with chromosomal abnormalities—particularly those associated with advanced maternal age—representing the leading cause. Other contributing factors include endocrine, immunological, anatomical, infectious, and environmental disorders.

The diagnosis is primarily based on transvaginal ultrasonography in combination with serial measurements of serum β -human chorionic gonadotropin (β -hCG). Strict application of standardized ultrasound diagnostic criteria is essential to avoid diagnostic errors,(1) particularly the inadvertent termination of a viable intrauterine pregnancy or failure to diagnose an ectopic pregnancy. Management options include expectant, medical, and surgical approaches, depending on gestational age, the patient's clinical condition, ultrasound findings, and the woman's preferences. Regardless of the selected approach, the primary objectives are to ensure patient safety, minimize complications, and preserve future fertility.(2)

In Morocco, variations in clinical practice and the absence of standardized national guidelines underscore the need to evaluate local management protocols. The present study aimed to analyze the clinical decision-making and therapeutic pathway for the management of missed miscarriage implemented at Les Orangers Maternity and Reproductive Health Hospital (HMSRO), assess its consistency with current evidence-based recommendations, and evaluate its impact on the overall quality of medical care and psychosocial support provided to patients.

Materials and Methods

Study Design and Setting

This retrospective descriptive and analytical study was conducted in the Department of Obstetrics and Gynecology at Les Orangers Maternity and Reproductive Health Hospital (HMSRO), Rabat, Morocco, over a 12-month period (January–December 2024). A total of 181 women presenting with ultrasound-confirmed non-expelled missed miscarriage were included.

Study Objectives

The primary objective was to evaluate the implementation of a dedicated care pathway for the management of missed miscarriage. Secondary objectives were to identify associated risk factors, assess the effectiveness of the different management strategies (expectant, medical, and surgical), and evaluate patients' adherence to the proposed care pathway.

Study Population and Data Collection

The study population consisted of all consenting, asymptomatic women diagnosed with ultrasound-confirmed non-expelled missed miscarriage. Women with an ongoing or complete miscarriage, acute

symptoms (severe pelvic pain or heavy vaginal bleeding), pregnancy of uncertain viability, pregnancy of unknown location, or refusal to participate were excluded.

The collected data included sociodemographic characteristics (age, marital status, and socioeconomic status), medical and obstetric history, as well as family and environmental risk factors. Clinical and ultrasound findings at admission were recorded, together with the management strategy implemented (expectant management, medical treatment with misoprostol, or surgical management by uterine aspiration). Post-treatment follow-up included clinical outcomes, ultrasound assessment of uterine evacuation, length of hospital stay, treatment-related complications, and adherence to post-miscarriage contraception.

Data Collection and Statistical Analysis

Data were extracted from the 2024 missed miscarriage registry and individual medical records. When necessary, missing information was completed through telephone follow-up. Data were entered into Microsoft Excel and analyzed using Jamovi® software. Descriptive statistics were used to summarize patient characteristics and clinical outcomes. Comparative analyses were performed using appropriate statistical tests, with statistical significance defined as a two-sided p value <0.05.

Ethical Considerations

The study was conducted in accordance with the ethical principles governing biomedical research. All participants received information regarding the study objectives and procedures and provided written informed consent before inclusion. Patient anonymity and data confidentiality were strictly maintained throughout the study, and no personally identifiable information was used for data analysis or publication.

Results

Sociodemographic Characteristics

The mean age of the study participants was 33.4 ± 6.77 years (range, 18–45 years). Women aged 30–39 years represented the largest age group. The median age was 34 years, with the highest frequency observed at 39 years. Age distribution was non-normal according to the Shapiro–Wilk test ($W = 0.957$; $p < 0.001$). Regarding marital status, nearly all participants were married (98.9%), whereas only 1.1% were single. Most women (91.2%) had a middle socioeconomic status, while 8.8% belonged to a low socioeconomic group. The majority of patients (92.3%) were referred by a general practitioner or an obstetrician–gynecologist, whereas only 7.7% were already receiving follow-up care at our institution.

Medical, Obstetric, and Family Characteristics

Family and environmental risk factors were uncommon in the study population. Consanguinity was reported in only 1.1% of patients, and exposure to toxic substances, including tobacco or alcohol, was documented in 0.6%.

Pre-existing medical conditions included pregestational diabetes in 5.0% of patients, thyroid disorders in 1.7%, chronic hypertension in 4.4%, and antiphospholipid syndrome in 1.7%. Other medical conditions, such as asthma or breast cancer, were reported in 5.5% of patients.

With respect to gynecological and obstetric history, 93.9% of women had regular menstrual cycles, and 92.8% were not using contraception at the time of conception. Among contraceptive users, only a few women reported using an intrauterine device or oral contraceptives. Two patients had a congenital uterine

septum. Previous preeclampsia and genital tract infections were reported in 1.1% and 6.1% of patients, respectively.

A history of previous missed miscarriage was identified in 28.7% of patients, including 17.7% with one previous episode and a smaller proportion with recurrent episodes. The mean parity was 1.61. The study population included 24.3% nulliparous women, 23.8% primiparous women, and 51.9% multiparous women. Parity distribution was non-normal.

Clinical and Ultrasound Findings at Admission

At admission, all patients were afebrile and hemodynamically stable, with no evidence of circulatory shock. The mean body mass index (BMI) was 24.9 ± 4.33 kg/m². Nearly half of the patients (48.6%) had a normal BMI, whereas 38.7% were overweight and 12.7% were obese.

None of the patients reported pelvic pain or exhibited abdominal or pelvic guarding on physical examination. Gynecological examination consistently demonstrated a closed cervical os without vaginal bleeding on speculum examination.

Initial pelvic ultrasonography showed an embryo with a crown-rump length (CRL) ≥ 7 mm and no detectable cardiac activity in 91.7% of cases. Anembryonic pregnancy was diagnosed in 4.9% of patients, whereas persistent trophoblastic tissue was identified in 3.3%.

All pregnancies were conceived spontaneously. The mean gestational age at diagnosis was 11.3 ± 2.2 weeks of amenorrhea (range, 4–14 weeks), with a median of 12 weeks. Gestational age was not normally distributed.

The mean interval between embryonic or fetal demise and clinical presentation (retention interval) was 1.97 ± 1.08 weeks (range, 0–4 weeks), with a median of 2 weeks. A retention interval of 3 weeks was the most frequently observed (38.1%), followed by 1 week (27.1%) and 2 weeks (22.1%). Immediate consultation after diagnosis (0-week interval) occurred in 9.9% of patients. The distribution of the retention interval was also non-normal.

Therapeutic Management and Clinical Outcomes

Management followed a structured, individualized, stepwise approach comprising expectant management (79 patients), medical management with misoprostol (77 patients), and surgical management (25 patients). In the medical management group, misoprostol was administered sublingually at a dose of four tablets per administration.

Pelvic pain was uncommon among women managed expectantly (13%) and those treated surgically (20%) but was frequently reported in the medical management group (91%). Vaginal bleeding occurred in all treatment groups, with its intensity and duration varying according to the management strategy and the post-treatment period. No cases of fever, clinically significant infection, or major hemorrhage were observed.

Regarding unplanned emergency consultations, none of the patients managed expectantly or surgically required emergency department visits. In contrast, 26% of women receiving medical treatment presented to the emergency department, mainly because of pelvic pain or heavy vaginal bleeding.

Follow-up ultrasonography performed 15 days after treatment demonstrated complete uterine evacuation in 83.4% of patients, whereas persistent intrauterine retained products of conception were observed in 16.6%, predominantly among women managed expectantly or medically.

Comparative analysis of the three treatment groups revealed statistically significant differences in age ($p = 0.009$), parity ($p = 0.006$), and retention interval ($p < 0.001$). In contrast, no significant differences were found regarding gestational age, number of previous missed miscarriages, or body mass index.

Discussion

Risk Factors Associated with Missed Miscarriage: Clinical and Epidemiological Evidence

Advanced maternal age is widely recognized as one of the most important risk factors for missed miscarriage. In a large Danish cohort study including more than 634,000 pregnancies, Nybo Andersen et al. demonstrated an exponential increase in the risk of fetal loss with advancing maternal age, rising from less than 10% before the age of 25 years to approximately 20% at 35 years, 40% at 40 years, and more than 70% after 45 years.(3) This trend is primarily attributable to the increasing prevalence of maternal chromosomal abnormalities, as confirmed by Hassold et al., who showed that most fetal aneuploidies originate from maternal meiotic errors.(4) More recent studies have further demonstrated that women aged 35 years and older are at increased risk of adverse obstetric outcomes, including pregnancy loss, owing to declining oocyte quality as well as age-related metabolic and vascular changes.(5)

In our cohort, the mean maternal age was 33 years, with a predominance of women aged 30–39 years, reflecting the societal trend toward delayed childbearing. The statistically significant association observed between maternal age and treatment modality also suggests that advanced age may influence the clinical presentation and subsequent management of missed miscarriage.

Maternal weight, particularly overweight and obesity, represents an important public health concern in Africa, where prevalence rates may exceed 30–50% in urban populations.(6) In Morocco, previous studies have demonstrated a clear association between excess body weight and pregnancy complications, including hypertensive disorders and gestational diabetes, which may indirectly increase the risk of pregnancy loss.(7) In our study, more than half of the patients (51.4%) were overweight or obese, consistent with the regional epidemiological context. Although no statistically significant association was found between body mass index (BMI) and treatment strategy, the high prevalence of excess body weight suggests that metabolic, inflammatory, and hormonal mechanisms may contribute to the pathophysiology of missed miscarriage.

Socioeconomic status has also been identified as an important determinant of pregnancy outcomes. Several studies have shown that socioeconomic deprivation is associated with adverse perinatal outcomes, including preterm birth, fetal growth restriction, and delayed access to antenatal care.(8) Women from disadvantaged backgrounds are also at greater risk of early pregnancy loss because of suboptimal prenatal follow-up.(9) In our series, however, most patients belonged to the middle socioeconomic group (91.2%), whereas only 8.8% were classified as having a low socioeconomic status. This relatively homogeneous distribution may explain the absence of a significant association between socioeconomic status and missed miscarriage in our population. Nevertheless, international evidence consistently highlights socioeconomic deprivation as an indirect determinant through its impact on access to healthcare.

Parity has likewise been associated with adverse obstetric outcomes. Baser et al. reported that parity modifies pregnancy-related risks among older women, with different patterns according to nulliparity or multiparity.(10) In our cohort, parity was relatively evenly distributed, with 24.3% nulliparous, 23.8% primiparous, and 51.9% multiparous women, while parity 2 represented the largest subgroup (30.4%). These findings suggest that parity itself does not protect against missed miscarriage. Furthermore, the significant association observed between parity and treatment modality may indicate that multiparity is

associated with a more complex clinical course requiring interventional management, possibly reflecting cumulative uteroplacental changes.

Exposure to toxic substances such as tobacco, alcohol, and cannabis is well established as a risk factor for miscarriage, with a dose-dependent effect reported for cigarette smoking.(11) In Africa and Morocco, the use of traditional herbal abortifacients represents an additional but frequently underestimated risk factor.(12) In our cohort, only one patient (0.6%) reported toxic exposure, although this figure is likely underestimated because of reporting bias and sociocultural factors.

A previous history of missed miscarriage is another well-established predictor of recurrence. Several prospective studies have demonstrated a dose-response relationship between the number of previous pregnancy losses and the risk of subsequent miscarriage.(13,14) In our population, 28.7% of women had experienced at least one previous missed miscarriage, supporting the concept of persistent reproductive vulnerability.

Finally, several chronic medical conditions have been associated with pregnancy loss. Pregestational diabetes, identified in 5% of our patients, contributes to embryonic malformations and impaired placental development.(15) Thyroid dysfunction, particularly autoimmune hypothyroidism, was present in 1.7% of patients and is a recognized cause of pregnancy loss.(16) Chronic hypertension, observed in 4.4% of patients, is associated with chronic placental insufficiency. Although antiphospholipid syndrome was identified in only 1.7% of cases, it remains one of the leading causes of recurrent pregnancy loss, particularly during the second trimester. Genital tract infections, the most frequent infectious condition identified in our series (6.1%), may disrupt endometrial receptivity and increase the risk of pregnancy loss.(17) Consanguinity, although uncommon (1.1%), has also been described as a potential contributor to genetic susceptibility.

Therapeutic Management and Follow-up of Missed Miscarriage: Effectiveness, Safety, and International Recommendations

International guidelines, including those issued by the American College of Obstetricians and Gynecologists (ACOG), the International Federation of Gynecology and Obstetrics (FIGO), and the National Institute for Health and Care Excellence (NICE), recognize expectant, medical, and surgical management as equally safe treatment options when implemented within a shared decision-making framework that incorporates the woman's preferences.(18) The establishment of dedicated early pregnancy assessment units, as recommended by the Irish Health Service Executive (HSE), has been shown to improve the quality and consistency of care.(19)

The care pathway implemented at Les Orangers Maternity and Reproductive Health Hospital (HMSRO) closely follows this evidence-based model by integrating emergency triage, specialized consultation, standardized ultrasound assessment, and individualized therapeutic decision-making.

In our cohort, expectant management resulted in spontaneous uterine evacuation in 79% of patients, a rate comparable to, or slightly higher than, the 74% reported by Nadarajah et al.,(20) without unexpected secondary surgical intervention. Medical management with 800 µg sublingual misoprostol demonstrated high effectiveness, achieving complete uterine evacuation in 80.6% of patients after the first dose and 97.4% after the second dose, exceeding the success rates reported in the recent European Journal of Clinical Medicine study.(21) The overall success rate without surgical intervention reached 87%, highlighting the robustness of our management protocol despite a limited need for surgery following treatment failure. Surgical management by uterine aspiration was required in only 13.8% of patients,

substantially lower than the 30–39% reported in the multicenter MIST trial,(2) further supporting the effectiveness of our structured care pathway and close follow-up.

Clinical outcomes were consistent with the existing literature. Pelvic pain occurred significantly more frequently among women treated with misoprostol, whereas vaginal bleeding was observed across all treatment groups. Importantly, no major infectious or hemorrhagic complications were recorded, in agreement with the findings reported by Fernlund et al., ACOG, and other investigators.(22) Unscheduled emergency department visits occurred in 26% of women receiving medical management, a rate comparable to the 25–35% reported in international cohorts.(23)

Follow-up ultrasonography performed 15 days after treatment demonstrated complete uterine evacuation in 83.4% of patients. Persistent retained products of conception were more common after expectant management than after medical treatment with misoprostol, consistent with the observations of Bagratee et al.(24) As these residual findings are generally asymptomatic, expectant follow-up with clinical surveillance is usually sufficient, avoiding unnecessary surgical intervention.

Conclusion

Missed miscarriage is a common complication of the first trimester, with diagnosis relying primarily on ultrasonography. Our study shows that it predominantly affects women aged 30–40 years and is associated with several risk factors, including advanced maternal age, overweight and obesity, and adverse obstetric history. The three management strategies—expectant, medical, and surgical—are all effective and safe when tailored to the clinical context and implemented within a structured care pathway. A comprehensive, patient-centered approach that incorporates psychological support remains essential to improve both the quality of care and women's overall experience following pregnancy loss.

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