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Original Research Article

Evaluation of uterine factors in patients with recurrent pregnancy loss by office hysteroscopy: a prospective and retrospective study

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ABSTRACT

Background: Pregnancy loss or miscarriage, occurs before 20 weeks, often due to chromosomal issues. Recurrent pregnancy loss (RPL), defined as two or more consecutive losses, has various causes. Office hysteroscopy is the gold standard for diagnosing uterine anomalies, improving accuracy and patient comfort in RPL management. The study aims to evaluate uterine factors in patients of recurrent pregnancy loss by office hysteroscopy.
Methods: This prospective study was conducted over 18 months (June 2023 to December 2024) Department of Obstetrics and Gynaecology at Department of Obstetrics and Gynaecology at Government Medical College, Akola, Maharashtra. All patients with a history of recurrent pregnancy loss attending the outpatient department (OPD) during the study period were included using universal sampling method.
Results: Among 132 women with recurrent pregnancy loss (RPL), the mean age was 27.75±4.6 years and mean duration of marriage was 5±2.04 years. Overweight and obesity were common (78%) and acquired uterine anomalies (54.16%) slightly exceeded congenital ones (45.83%). Office hysteroscopy detected more uterine abnormalities than transvaginal sonography, confirming its superior diagnostic yield with minimal procedural complications.
Conclusions: Office hysteroscopy demonstrated high diagnostic accuracy and safety in evaluating uterine abnormalities among women with recurrent pregnancy loss. It effectively identified both congenital and acquired intrauterine pathologies, outperforming transvaginal sonography and proved valuable as both a diagnostic and therapeutic tool for improving reproductive outcomes in affected women.

Keywords: Office hysteroscopy, Recurrent pregnancy loss, Transvaginal sonography, Uterine anomalies

INTRODUCTION

Pregnancy loss or miscarriage, is the spontaneous termination of pregnancy before 20 weeks of gestation and remains a major reproductive health concern with significant emotional and physical impact.[1,2] Most early, sporadic miscarriages are linked to chromosomal abnormalities and show increasing incidence with maternal age.[3]

In contrast, RPL defined as two or more consecutive pregnancy losses is recognized as a distinct clinical condition that warrants comprehensive evaluation, as recommended by ASRM.[4,5] RPL may be primary or secondary depending on the presence of previous live birth.[6] RPL has a multifactorial etiology involving genetic, anatomical, endocrine, immunological, infectious and male factors.[7]

Among these, uterine anatomical abnormalities constitute a major and potentially correctable cause.[8] Conventional imaging methods such as transvaginal ultrasonography and hysterosalpingography can identify gross structural defects but frequently miss subtle intrauterine lesions.[9] Office hysteroscopy (OH) offers direct visualization of the uterine cavity and is superior for detecting small but

clinically significant abnormalities.[10] The vaginoscopic "no-touch" technique enhances patient comfort and minimizes complications.[11] Evidence shows that OH accurately identifies and treats intrauterine pathologies polyps, adhesions, septa and submucous fibroids commonly associated with RPL.[12] It is minimally invasive, cost-effective and associated with a low rate of complications such as perforation, infection or bleeding.[13,14]

Consequently, OH is regarded as the gold standard for evaluating uterine factors in RPL.[15] Its ability to restore normal uterine anatomy and improve reproductive outcomes is increasingly recognized.[16] The present study was undertaken to assess uterine factors contributing to RPL using office hysteroscopy and to examine the association between uterine abnormalities and the number of previous pregnancy losses.

METHODS

This prospective and retrospective observational study was conducted over 18 months, from June 2023 to December 2024, in the Department of Obstetrics and Gynaecology at a tertiary care hospital and medical college. All eligible women aged 18-45 years attending the outpatient department with a history of two or more consecutive spontaneous abortions were included through a universal sampling method. Patients with a desire to conceive, those with suspected uterine abnormalities on clinical or imaging evaluation and those seeking detailed uterine assessment were enrolled after obtaining written informed consent.

Exclusion criteria included acute pelvic inflammatory disease, active vaginal bleeding, chromosomal abnormalities, uncontrolled endocrine disorders, antiphospholipid syndrome, recent pelvic surgery, pregnancy, uterine perforation, cervical stenosis and severe medical comorbidities.

Ethical approval was obtained from the institutional ethics committee and participant confidentiality was maintained throughout the study. Office hysteroscopy was performed using a 1.8 mm hysteroscope with a 2.9 French outer sheath via the vaginoscopic approach, allowing visualization of the uterine cavity, cervix and endometrium for identification of polyps, fibroids, adhesions or septa. Findings were documented and correlated with patients' reproductive histories.

Data were recorded using a structured proforma, entered in Microsoft Excel and analyzed using SPSS version 24.0 (IBM, USA). Qualitative variables were expressed as frequencies and percentages, while quantitative data were summarized as mean±standard deviation. Associations between qualitative variables were analyzed using the Chi-square or Fisher's exact test and mean differences were compared using the unpaired t-test. A p value<0.05 was considered statistically significant.

RESULTS

The present prospective and retrospective observational study was conducted over 18 months, from June 2023 to December 2024, in the Department of Obstetrics and Gynaecology at a tertiary care hospital and medical college. All eligible women aged 18–45 years attending the outpatient department with a history of two or more consecutive spontaneous abortions were enrolled.

Table 1: Age distribution of RPL patients.

Age group (in years)	Number of cases (N)	(%)
<25	17	12.5
25–30	65	50
>30	50	37.5
Mean±SD	27.75±4.601	
Total	132	100

Table 2: Duration of marriage in RPL patients.

Duration (in years)	Number of cases (N)	(%)
2-3	33	25
4-6	75	56.94
>6	24	18
Mean±SD	5.00±2.04	
Total	132	100

A total of 132 women aged 21–35 years (mean±SD=27.75±4.60) were evaluated for uterine factors contributing to recurrent pregnancy loss (RPL). Most participants (50%) were aged 25–30 years and the mean duration of marriage was 5±2.04 years, indicating adequate reproductive exposure. The majority (56.9%) had been married for 4–6 years, reflecting a population with

sufficient reproductive attempts to warrant uterine evaluation.

Body mass index (BMI) analysis revealed a predominance of overweight (41.66%) and obese (36.11%) women, suggesting an association between higher BMI and RPL risk. Among uterine anomalies, acquired causes (54.16%) slightly outnumbered congenital anomalies (45.83%). The most frequent congenital findings included septate (6.02%) and bicornuate uterus (3.03%), while common acquired pathologies were chronic endometritis (9.06%), endometrial adhesions (4.54%) and endometrial polyps (4.54%). Primary RPL was observed in 66.66% of women and 61.11% reported irregular menstrual cycles, suggesting possible underlying endocrine or structural abnormalities.

Table 3: BMI distribution.

Category	Number of cases (N)	(%)
Underweight (<18.5)	4	2.7
Normal (18.5–24.9)	25	19.44
Overweight (25–29.9)	55	41.66
Obese (>30)	48	36.11
Total	132	100

Table 4: Distribution based on type of uterine anomaly.

Type of uterine anomaly	No. of cases (N)	(%)
Congenital	61	45.83
Acquired	71	54.16
Total	132	100

Table 5: Distribution of patients according to type of recurrent pregnancy.

Type of RPL	No. of cases (N)	(%)
Primary	88	66.66
Secondary	44	33.33
Total	132	100

Table 6: Comparison of office hysteroscopy and transvaginal sonography (TVS) findings.

Uterine Anomaly / Finding	Office hysteroscopy (N)	TVS (n)
Normal	81	56
Congenital anomalies	19	11
Acquired abnormalities	32	20

Table 7: Incidence of hysteroscopy complications.

Complication	No. of cases (N)	(%)
Abdominal pain	5	6.94
Bleeding	4	5.50
Cervical injury	3	4.16
Perforation of uterus	1	1.38
Volume overload	2	2.77
No complications	117	88.63
Total	132	100

Approximately one-third (31.8%) of patients were in consanguineous marriages, an important factor in genetic counselling. Most women (52.77%) experienced three losses, with the mean number of pregnancy losses being 3.51±1.07.

Office hysteroscopy revealed normal uterine findings in 61.36% of cases, while 38.64% had abnormalities. Compared to transvaginal sonography (TVS), office hysteroscopy identified more uterine pathologies (51 vs. 31 total anomalies), especially subtle lesions such as arcuate uterus, endometrial adhesions and small polyps,

demonstrating its superior diagnostic capability. Operative hysteroscopy was required in 16 cases, most commonly for septum resection (35%) and polyp removal (20%).

Procedure-related complications were minimal: vomiting (13.88%) and nausea (11.11%) were the most frequent minor anesthesia-related issues, while abdominal pain (6.94%) and bleeding (5.5%) were the common procedural complications. No major adverse events, such as venous air embolism or mortality, occurred. Overall, the study highlights the significant diagnostic value of office hysteroscopy in detecting uterine factors contributing to RPL, outperforming TVS while maintaining excellent safety and patient tolerability.

DISCUSSION

RPL, defined as two or more consecutive miscarriages before 20 weeks, affects 1–3% of reproductive-aged couples and has multifactorial causes like genetic, anatomical, endocrine and immunological.[17] Among these, uterine anomalies remain a key but underdiagnosed factor.[18] In this study of 132 women with RPL, office hysteroscopy identified uterine anomalies in 38.6% of cases, with acquired abnormalities (24.24%) more common than congenital ones (14.39%). The most frequent findings included chronic endometritis, endometrial polyps, fibroids and intrauterine adhesions.[19] Septate and bicornuate uteri were the leading congenital defects.[20]

These results align with previous studies by Labib et al and Sayed et al which demonstrated that hysteroscopy detects subtle intrauterine lesions often missed by ultrasonography and that corrective hysteroscopic surgery improves pregnancy outcomes.[21,22] In the present cohort, 12.1% required operative hysteroscopy for septum resection, myomectomy or adhesiolysis, all performed safely with minimal complications such as nausea, vomiting and mild bleeding. Comparison with transvaginal sonography (TVS) revealed that hysteroscopy detected 51 anomalies versus 31 by TVS, emphasizing its superior sensitivity and diagnostic precision.[23] Additionally, the study highlighted obesity (77.77%) and menstrual irregularities (61.11%) as common risk factors, further implicating endocrine-metabolic dysfunction in RPL.[24]

Overall, office hysteroscopy proved invaluable for diagnosing and managing intrauterine anomalies in women with RPL.[25] It offers accurate visualization, therapeutic potential and cost-effective, minimally invasive evaluation. The findings support its inclusion as a first-line investigation after two consecutive miscarriages rather than three, enabling earlier detection, psychological reassurance and improved reproductive outcomes.[26] Future controlled studies with larger samples and long-term follow-up are warranted to optimize individualized care in RPL.[27]

The present study was conducted at a single tertiary-care center with a relatively small sample size, which may limit the generalizability of the findings. As it was primarily an observational study, long-term reproductive outcomes following hysteroscopic correction could not be assessed. In addition, other contributory factors such as genetic, hormonal and immunological causes of recurrent pregnancy loss were not evaluated in detail. Future multicentric studies with larger sample sizes and extended follow-up are recommended to validate these findings and establish stronger clinical correlations.

CONCLUSION

This study highlights the significant role of office hysteroscopy in the comprehensive evaluation of women with RPL. It proved to be a superior diagnostic tool compared to transvaginal sonography, enabling precise detection of both congenital and acquired uterine anomalies. The ability of hysteroscopy to simultaneously diagnose and treat intrauterine abnormalities offers a distinct clinical advantage, improving subsequent reproductive outcomes. Minimal complications and excellent patient tolerability further establish its feasibility as an outpatient procedure. Given its high diagnostic accuracy, safety and therapeutic potential, office hysteroscopy should be incorporated as a first-line investigation in the evaluation of RPL, particularly after two or more pregnancy losses. Early identification and correction of uterine pathologies can substantially improve fertility prognosis and reduce the psychological burden among affected women.

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