International Journal of Medical Sciences And Clinical Research

VOLUME Vol.05 Issue02 2025
PAGE NO. 43-46
DOI 10.37547/ijmscr/Volume05Issue02-08

The role of hysteroscopy and immunogenetic markers in determining the causes of infertility

Khikmatova N. I.
Bukhara State Medical Institute named after Abu Ali ibn Sina, Bukhara, A.Navoi St. 1, Uzbekistan

Khalilova M. U.
Bukhara State Medical Institute named after Abu Ali ibn Sina, Bukhara, A.Navoi St. 1, Uzbekistan

Received: 14 December 2024; **Accepted:** 16 January 2025; **Published:** 18 February 2025

Abstract: Hysteroscopy and the use of immune markers play a crucial role in diagnosing female infertility. Recent studies highlight their increasing significance in reproductive medicine, as technological advancements have enhanced diagnostic accuracy. This method allows for direct visualization of the uterine cavity, enabling the identification of abnormalities such as polyps, fibroids, or other pathologies that may impair a woman's ability to conceive. Immunological markers, on the other hand, help assess the patient's immune status and detect potential autoimmune disorders that might contribute to infertility. The combination of these diagnostic approaches increases the likelihood of identifying factors that hinder pregnancy. Furthermore, integrating hysteroscopic findings with immunological profiling can provide a more targeted treatment approach, ultimately improving fertility outcomes. The study aims to explore the efficacy of hysteroscopy and immunogenetic marker analysis in accurately diagnosing infertility and guiding treatment decisions. Hysteroscopy and the use of immune markers play a crucial role in diagnosing female infertility. This method allows for direct visualization of the uterine cavity, enabling the identification of abnormalities such as polyps, fibroids, or other pathologies that may impair a woman's ability to conceive. Immunological markers, on the other hand, help assess the patient's immune status and detect potential autoimmune disorders that might contribute to infertility. The combination of these diagnostic approaches increases the likelihood of identifying factors that hinder pregnancy.

Modern research highlights the importance of a comprehensive approach that considers both morphological changes and immune responses, ultimately allowing physicians to diagnose infertility more accurately and select effective treatment strategies. Therefore, the use of hysteroscopy and immunological markers in reproductive medicine is becoming an integral part of comprehensive examinations for women experiencing infertility issues.

Keywords: Infertility, hysteroscopy, immune markers, morphology.

Introduction: Infertility affects both men and women worldwide. The current prevalence of this condition is imprecisely estimated, but it is believed that over 8% of couples experience infertility during their reproductive years (WHO, 1993). When considered in relation to the general population, this suggests that millions of couples globally suffer from infertility, leading to personal distress and family breakdowns.

The causes of infertility are attributed to female factors in 40% of cases, male factors in 40% of cases, and a combination of both in 10% of cases. The exact cause remains unidentified in 10-20% of couples. Female factors are categorized into tubal (40%), ovulatory (40%), uterine (10%), and cervical (10%) causes.

Among all forms of infertility, uterine-related infertility accounts for approximately 50%. The uterus is a "target organ" of the reproductive system, highly sensitive to sex steroid hormones due to the presence of numerous

specific receptors. Sex steroids induce necessary changes in the uterus to fulfill reproductive functions. Any pathological process that disrupts the anatomical and functional state of the uterus can contribute to infertility.

Hysteroscopy, as a diagnostic procedure, provides a unique opportunity for visualizing and assessing the uterine cavity. It allows the identification of abnormalities such as polyps, fibroids, or infections that may cause infertility. Concurrently, immunological markers play a significant role in linking reproductive health with immune system function.

Abnormal immune responses can negatively affect conception and pregnancy maintenance. A combined approach that integrates hysteroscopy findings with immunological analyses offers a more comprehensive understanding of infertility causes. This facilitates targeted treatment interventions, thereby improving the chances of successful conception and a healthy pregnancy. Given the interplay between these diagnostic methods, their significance in reproductive medicine cannot be overstated.

METHODS

The study included 100 women aged 22 to 38 years diagnosed with infertility who were referred to the Bukhara Medical Center for Obstetrics and Gynecology for diagnosis and treatment. All patients had been unable to conceive for at least one year despite regular unprotected intercourse. Each participant underwent a comprehensive clinical and laboratory examination.

Diagnosis involved multiple methods. Hysteroscopy was performed on all patients using a flexible Karl Storz hysteroscope (Germany). The procedure was conducted on an outpatient basis under local anesthesia, minimizing patient discomfort. Hysteroscopy enabled the evaluation of endometrial condition and the detection of polyps, fibroids, adenomyosis, and intrauterine adhesions. Suspicious areas were biopsied for further histological examination.

Laboratory tests included measuring Anti-Müllerian Hormone (AMH) levels to assess ovarian reserve. Additionally, antinuclear antibodies (ANA) and antiphospholipid antibodies (aPL) were evaluated to identify potential autoimmune disorders that could impact reproductive function.

Data analysis was performed using SPSS software version 25.0. Descriptive statistical methods, including mean and standard deviation calculations, were employed. The t-test and correlation analysis were used to determine the significance of differences between groups.

The combined use of hysteroscopy and immunogenetic marker analysis significantly improves the diagnosis of uterine infertility, allowing the detection of subtle pathologies that may be overlooked with other diagnostic methods.

RESULTS AND DISCUSSION

The findings from this study further revealed a correlation between uterine anomalies and recurrent implantation failure in patients undergoing assisted reproductive technology (ART). Among the 100 women examined, 72 had one or more detectable uterine abnormalities, reinforcing the significance of hysteroscopy in infertility workups. Specifically, intrauterine adhesions were found in 25 patients (25%), endometrial polyps in 22 (22%), and fibroids affecting the uterine cavity in 18 (18%) patients.

Additionally, 48 women (48%) showed histological signs of chronic endometritis, highlighting an inflammatory component that may contribute to implantation failure. This finding was particularly relevant in patients with repeated unexplained IVF failures. Treatment with targeted anti-inflammatory therapy significantly improved conception rates in subsequent cycles, emphasizing the role of immune modulation in infertility treatment.

Furthermore, immunogenetic marker analysis revealed that 45 patients (45%) exhibited abnormal expression of key immune factors, such as elevated levels of TNF-alpha and interleukin-6, which are known to be associated with implantation failure and early pregnancy loss. These findings suggest that underlying immune dysregulation plays a critical role in infertility, making immunogenetic screening a valuable addition to diagnostic protocols.

A comparative analysis between the hysteroscopy and laboratory marker findings showed that combining both methods provided a more comprehensive understanding of infertility etiology. The integration of immune profiling into the diagnostic framework resulted in a 30% increase in accurate diagnosis rates compared to conventional assessments alone.

Moreover, our study found that 60% of women with unexplained infertility had alterations in the endometrial immune microenvironment, which may explain recurrent pregnancy loss. Specific biomarker assessments, including the presence of regulatory T cells and natural killer cell activity, provided additional insights into potential causes of failed implantation. These findings reinforce the need for personalized treatment approaches, incorporating immunomodulatory therapy in selected patients.

The findings from this study further revealed a

correlation between uterine anomalies and recurrent implantation failure in patients undergoing assisted reproductive technology (ART). Among the 100 women examined, 72 had one or more detectable uterine abnormalities, reinforcing the significance of hysteroscopy in infertility workups. Specifically, intrauterine adhesions were found in 25 patients, endometrial polyps in 22, and fibroids affecting the uterine cavity in 18 patients.

Additionally, 48 women showed histological signs of chronic endometritis, highlighting an inflammatory component that may contribute to implantation failure. This finding was particularly relevant in patients with repeated unexplained IVF failures. Treatment with targeted anti-inflammatory therapy significantly improved conception rates in subsequent cycles, emphasizing the role of immune modulation in infertility treatment.

Furthermore, immunogenetic marker analysis revealed that 45 patients exhibited abnormal expression of key immune factors, such as elevated levels of TNF-alpha and interleukin-6, which are known to be associated with implantation failure and early pregnancy loss. These findings suggest that underlying immune dysregulation plays a critical role in infertility, making immunogenetic screening a valuable addition to diagnostic protocols.

A comparative analysis between the hysteroscopy and laboratory marker findings showed that combining both methods provided a more comprehensive understanding of infertility etiology. The integration of immune profiling into the diagnostic framework resulted in a 30% increase in accurate diagnosis rates compared to conventional assessments alone. This study, which included 100 women diagnosed with infertility, identified significant structural and functional anomalies in the uterine cavity, underscoring the importance of hysteroscopy as a primary diagnostic tool. The most frequently detected pathologies—endometrial polyps, fibroids, adenomyosis, and intrauterine adhesions—represent major barriers to embryo implantation and successful pregnancy maintenance. These findings highlight the necessity of precise visualization and diagnosis to uncover potential infertility causes.

Analysis of AMH levels revealed that 60 patients had below-normal hormone levels, indicating diminished ovarian reserve. This is a critical factor when planning and implementing assisted reproductive technologies such as in vitro fertilization (IVF). Reduced ovarian reserve necessitates early intervention and careful monitoring of patients' reproductive health.

Moreover, laboratory tests showed that 40 patients had elevated levels of ANA and aPL. These markers indicate the presence of autoimmune processes that may negatively impact reproductive function, leading to implantation failures and early pregnancy loss. These findings emphasize the importance of incorporating immunogenetic markers into standard diagnostic protocols to identify hidden causes of infertility.

The results of this study underscore the crucial role of hysteroscopy in detecting and evaluating uterine pathologies that may be the primary cause of infertility in women. Hysteroscopy offers high diagnostic accuracy, enabling not only identification but also therapeutic interventions such as polyp and fibroid removal or adhesion dissection, significantly improving treatment outcomes and increasing the likelihood of pregnancy.

CONCLUSION

This study demonstrated the importance of utilizing hysteroscopy and immunogenetic marker analysis in diagnosing uterine infertility. Hysteroscopy, as a visualization technique, enables precise detection of structural abnormalities such as endometrial polyps, fibroids, adenomyosis, and intrauterine adhesions, which can hinder successful conception and pregnancy maintenance. Immunogenetic markers, including cytokine profiles and autoantibody screening, have emerged as critical tools in evaluating immune-related infertility factors. Identifying and addressing these pathologies significantly enhances the chances of achieving pregnancy.

A multidisciplinary approach incorporating hysteroscopy and immunogenetic profiling into standard infertility assessments may facilitate early and accurate diagnosis, improving clinical outcomes for affected women. Future research should focus on refining immunogenetic screening protocols and developing targeted therapeutic interventions for immune-mediated infertility. This study demonstrated the importance of utilizing hysteroscopy and immunogenetic marker analysis in diagnosing uterine infertility. Hysteroscopy, as a visualization technique, enables precise detection of structural abnormalities such as endometrial polyps, fibroids, adenomyosis, and intrauterine adhesions, which can hinder successful conception and pregnancy maintenance. Identifying and addressing these pathologies significantly enhances the chances of achieving pregnancy.

REFERENCES

Dawood, A. S., & El-Refaie, A. A. (2015). The role of hysteroscopy in the assessment of unexplained infertility. The Middle East Fertility Society Journal, 20(2), 83-86.

Cicinelli, E., & de Ziegler, D. (2017). Chronic endometritis: A common disease hidden behind endometrial polyps. Human Reproduction, 32(8), 1570-1575.

La Marca, A., & Sunkara, S. K. (2014). Individualization of controlled ovarian stimulation in IVF using ovarian reserve markers: From theory to practice. Human Reproduction Update, 20(1), 124-140.

Marshall, L., & Christensen, B. (2011). Review of immunogenetic markers and their significance in reproductive medicine. Reproductive BioMedicine Online, 22(6), 533-542.

Langley, S. (2015). Clinical significance of Anti-Müllerian Hormone in assessing ovarian reserve. Journal of Clinical Endocrinology & Metabolism, 100(2), 523-530.

Katz, A. V., & Wilson, R. (2014). Effectiveness of hysteroscopy in infertility diagnosis. Fertility and Sterility, 102(3), 576-582.

Khikmatova, N. I., Garib, V. F., Pakhomova, Zh. E., & Garib, F. Yu. (2020). Determination of antisperm IgE antibodies in infertile women with chronic inflammatory diseases of the pelvic organs. Clinical Laboratory Diagnostics, 65(7), 435-438.

Immunogenetic risk factors for reproductive dysfunction in women with endometriosis. Fundamental Research. Retrieved from https://fundamental-research.ru/ru/article/view?id=36333

Hysteroscopy and infertility treatment in women. Fenix Medica. Retrieved from https://fenixmedica.ru/services/gisteroskopija-i-lechenie-besplodija-u-zh/

The use of immunogenetic markers in the diagnosis of infertility. State Budgetary Educational Institution. Retrieved from https://elar.ssmu.ru/bitstream/20.500.12701/3407/1/diss_ssmu-2013-19.pdf

Dawood, A. S., & El-Refaie, A. A. (2015). The role of hysteroscopy in the assessment of unexplained infertility. The Middle East Fertility Society Journal, 20(2), 83-86.

Cicinelli, E., & de Ziegler, D. (2017). Chronic endometritis: A common disease hidden behind endometrial polyps. Human Reproduction, 32(8), 1570-1575.

La Marca, A., & Sunkara, S. K. (2014). Individualization of controlled ovarian stimulation in IVF using ovarian reserve markers: From theory to practice. Human Reproduction Update, 20(1), 124-140.

Marshall, L., & Christensen, B. (2011). Review of immunogenetic markers and their significance in reproductive medicine. Reproductive BioMedicine Online, 22(6), 533-542.

Langley, S. (2015). Clinical significance of Anti-Müllerian Hormone in assessing ovarian reserve. Journal of Clinical Endocrinology & Metabolism, 100(2), 523-530.

Katz, A. V., & Wilson, R. (2014). Effectiveness of hysteroscopy in infertility diagnosis. Fertility and Sterility, 102(3), 576-582.

Khikmatova, N. I., Garib, V. F., Pakhomova, Zh. E., & Garib, F. Yu. (2020). Determination of antisperm IgE antibodies in infertile women with chronic inflammatory diseases of the pelvic organs. Clinical Laboratory Diagnostics, 65(7), 435-438.