Modern American Journal of Medical and Health Sciences
ISSN (E): 3067-803X
Volume 01, Issue 04, July, 2025
Website: usajournals.org

A COMPARATIVE STUDY OF THE EFFECTIVENESS OF DIFFERENT PROTOCOLS AND SCHEMES FOR STIMULATING OVARIAN FUNCTION USING RECOMBINANT GONADOTROPINS

Mamadalieva D. M.
Department of Obstetrics, Gynecology and Perinatal Medicine, Tashkent Center for the Development of Professional qualifications of Medical Workers

Abstract
Despite the diverse results of studies and meta-analyses regarding the effectiveness of individual drugs, analysis of data on folliculogenesis and oogenesis shows that LH levels during ovarian stimulation have a significant impact on the quality of oocytes and the likelihood of successful embryo implantation. Studies show that insufficient LH content can negatively affect reproductive outcomes. The article presents the results of a comparative analysis of various methods of ovulation stimulation. The choice of ovarian stimulation protocol in ART programs should be based on consideration of the hormonal status of the patient. The optimal LH content and the combination of gonadotropins contribute to improving the quality of oocytes, the success of fertilization and pregnancy.

Keywords: Infertility, ovulation stimulation, hormonal status, human menopausal gonadotropin, recombinant gonadotropins, assisted reproductive technology protocols.

Introduction

The effectiveness of ovarian stimulation is a key factor in the success of ART programs. Two types of gonadotropins are widely used in modern reproductive medicine: urinary drugs and recombinant drugs. Their comparison in terms of efficacy, safety, and cost remains an urgent issue for optimizing ovarian function stimulation protocols.

Modern American Journal of Medical and Health Sciences
ISSN (E): 3067-803X
Volume 01, Issue 04, July, 2025
Website: usajournals.org

Urinary gonadotropins are obtained from the urine of pregnant women and contain both follicle-stimulating and luteinizing hormones. They are a more accessible and long-used tool.

Recombinant gonadotropins created by genetic engineering are characterized by high purity, stability and accurate dosage. Among them are recombinant FSH and combinations with GnRH antagonists.

A large number of scientific studies are presented in which the effectiveness of recombinant gonadotropins is assessed in the number of eggs obtained as a result of stimulation, the quality of mature eggs is also emphasized, and the results of achieving and carrying pregnancy are analyzed. When ovulation is stimulated, the authors point out the possible risks of complications such as ovarian hyperstimulation syndrome (OVS). As for the number of oocytes obtained, most studies show that both types of drugs demonstrate similar efficacy at adequate dosages. However, there is evidence that recombinant drugs can provide a more accurate dosage and lower variability of hormonal reactions, which helps to increase prognostic accuracy and reduce the risk of ovarian hyperstimulation.

Urinary gonadotropins are more affordable, suitable for standard protocols, but may have a higher content of impurities after use and variability due to the natural donor base.

Recombinant drugs provide a more stable hormonal level, which contributes to a more accurate individualization of the treatment protocol, reducing the risk of complications, but are not always available.

The purpose of the study

To study the effectiveness of using recombinant gonadotropins in ART protocols.

Materials and Methods

A study of 257 women undergoing infertility treatment at the ART department of the Eramed Clinic was conducted. Taking into account the inclusion and exclusion criteria, two groups of women were formed that were comparable in age and parity.

Modern American Journal of Medical and Health Sciences
ISSN (E): 3067-803X
Volume 01, Issue 04, July, 2025
Website: usajournals.org

The study groups included women of fertile age, without severe extragenital diseases, who received infertility treatment with conservative hormonal methods, while excluding the male factor of infertility.

Clinical and anamnestic data, laboratory results, parameters of oogenesis and embryogenesis after transvaginal puncture, and ultrasound parameters were studied. The study also conducted a comparative analysis in groups of different methods of ovulation stimulation. Ovarian hyperstimulation syndrome was prevented with the addition of gonadoliberin agonists or antagonists.

During the study, we assessed obstetric and gynecological anamnesis in the examined groups, assessed andrological status, objective examination data – general somatic and gynecological, results of laboratory and instrumental (ultrasound) research methods.

During the induced cycle, stimulation patterns, average initial and course doses of gonadotropins, duration of stimulation, hormonal and ultrasound dynamic monitoring of follicle and endometrial growth were taken into account.

The concentration of hormones in the blood serum was determined using the IHLA method (Siemens Healthcare Diagnostics Inc. USA). The AMH level was determined using ELISA (Beckman Coulter MIS/AMH ELISA, USA).

To determine the basal parameters of gonadotropins, estradiol and AMH in the studied women, blood from the ulnar vein was obtained on the 2nd-3rd day of the menstrual cycle. Baseline blood progesterone levels were determined in phase II of the cycle.

The dynamic monitoring of hormonal homeostasis during ovulation stimulation was carried out, the concentration of gonadotropins, estradiol, progesterone and AMH was studied in patients of the studied groups, blood sampling was carried out after the dominant follicle reached a diameter of 14 mm (on the 5th-7th day of stimulation) and on the day of transvaginal puncture. Then the concentration of gonadotropins, estradiol, progesterone and AMH in the follicular fluid of the patients on the day of egg collection.

Ultrasound examination of the pelvic organs was performed in the first phase of the cycle (on day 2-3) on a Hitachi HI VISION Preirus device (Japan) using a transvaginal sensor with a frequency of 6.5 MHz.

Modern American Journal of Medical and Health Sciences
ISSN (E): 3067-803X
Volume 01, Issue 04, July, 2025
Website: usajournals.org

In the presence of 3 or more follicles of sufficient diameter (> 17 mm), chorionic gonadotropin was administered at a dose of 5,000-10,000 units as an ovulation trigger. Transvaginal follicle puncture followed by an embryological stage was performed under ultrasound control 35-36 hours after the ovulation trigger was administered under aseptic conditions under intravenous anesthesia.

Concentrations of ovarian steroid hormones, gonadotropin hormones, and AMH were determined in the resulting follicular fluid.

Statistical data processing was performed on an individual computer using Microsoft Excel spreadsheets and the Statistica for Windows v.6.1 application software package, StatSoft Inc. (USA).

Results and Discussion

We analyzed the initial clinical and laboratory parameters in the patients of the studied groups.

The results of the analysis of basal hormone levels in the patients of the studied groups did not reveal statistically significant differences in LH and ovarian steroid hormones estradiol and progesterone in both study groups. However, the levels of FSH and AMH significantly differed between the groups. Thus, the FSH index in group 2 of women receiving a combination of recombinant FSH and recombinant LH was 83.5±30.6 mIU/ml and was significantly higher ($P<0.001$) than the FSH index in group 1 of women receiving a combination of recombinant FSH and human menopausal gonadotropin – 62.5±19.7 mIU/ml. The AMH level in group 2 with recombinant FSH and LH was 1.3±0.4 ng/ml and was significantly lower ($P<0.001$) than the AMH value in group 1 (protocol r-FSH + HMG) – 1.9±0.7 ng/ml. Despite significant statistical differences, the average basal levels of FSH and AMH corresponded to the indicators of normal ovarian reserve.

Women in the second group have significantly increased levels of FSH and decreased levels of AMH, which indicates possible differences in reproductive function compared with the first group.

The initial ultrasound data from the patients of the studied groups were also analyzed. The following parameters were analyzed: the volume of the ovaries and

Modern American Journal of Medical and Health Sciences
ISSN (E): 3067-803X
Volume 01, Issue 04, July, 2025
Website: usajournals.org

the number of anatral follicles in the ovaries. The average volume of the left ovary in the first group was 7.9±5, and in the second — 8.1±4.7. There is no statistical significance of differences between the groups (p=0.336). The average volume of the right ovary in the first group was 7.4±3.9 cm3 and 7±4.4 cm3 in the second group. The differences between the groups are also statistically insignificant (p=0.130).

The obtained results of ultrasound measurements of the ovaries in patients of the two groups did not demonstrate statistical differences between the groups using different protocols. Ovarian volumes corresponded to the indicators of normal ovarian reserve.

However, the number of antral follicles in both group 1 (r-FSH + HMG protocol) - 6.7±2.6, and in group 2 (r-FSH + r-LH) – 6.5±2.5 corresponded to the trend of decreasing ovarian reserve (less than 7 follicles in both ovaries).

Thus, the comparative analysis showed that the patients of the two groups were completely comparable in terms of clinical, anamnestic, laboratory and ultrasound parameters, mainly related to late reproductive age and tended to decrease ovarian reserve, which was a predisposing factor to a weakened ovarian response during stimulation.

Conclusion

Most modern studies confirm that both types of gonadotropins exhibit similar efficacy under appropriate conditions. However, recombinant drugs are preferable in cases where precise dosage is required, individualization of stimulation regimens, and reduction of the risk of complications. The choice between urinary and recombinant gonadotropins should be determined by the patient's clinical characteristics, financial capabilities, and physician preferences. Conducting further comparative studies will help optimize stimulation protocols and increase their effectiveness.

Modern American Journal of Medical and Health Sciences
ISSN (E): 3067-803X
Volume 01, Issue 04, July, 2025
Website: usajournals.org

References:

1. Mamadalieva D. M., Gafurova F. A. The Study of Clinical, Anamnestic, and Hormonal Parameters in Patients with Infertility Prior to Assisted Reproductive Technology (ART) Protocols // American Journal of Medicine and Medical Sciences 2025, 15(5): 1600-1602 DOI: 10.5923/j.ajmms.20251505.64
2. Korsak V.S., Dolgushina N.V., Korneyeva I.V., Koloda YU.A., Smirnova A.A., Anshina M.B. et al. Female infertility: clinical guidelines. 2021. Moscow; 2021. 81 p. (In Russ.) Available at: https://rd1.medgis.ru/uploads/userfiles/ shared/StandartMed/Protokol-acusher/jenskoe-besplodie-2021.pdf.
3. Alper M.M., Fauser B.C. Ovarian stimulation protocols for IVF: is more better than less? Reprod Biomed Online. 2017;34(4):345–353. https://doi. org/10.1016/j.rbmo. 2017.01.010.
4. Howie R., Kay V. Controlled ovarian stimulation for in-vitro fertilization. Br J Hosp Med (Lond). 2018;79(4):194–199. https://doi.org/10.12968/ hmed.2018.79.4.194.
5. van der Linden M., Buckingham K., Farquhar C., Kremer J.A., Metwally M. Luteal phase support for assisted reproduction cycles. Cochrane Database Syst Rev. 2015;2015(7):CD009154. https://doi.org/10.1002/14651858. CD009154.pub3.
6. Levi Setti P.E., Alviggi C., Colombo G.L., Pisanelli C., Ripellino C., Longobardi S. et al. Human recombinant follicle stimulating hormone (rFSH) compared to urinary human menopausal gonadotropin (HMG) for ovarian stimulation in assisted reproduction: a literature review and cost evaluation. J Endoc Investig. 2015;38(5):497–503. https://doi. org/10.1007/s40618-014-0204-4.
7. Orvieto R. HMG versus recombinant FSH plus recombinant LH in ovarian stimulation for IVF: does the source of LH preparation matter? Reprod Biomed Online. 2019; 39(6):1001–1006. https://doi.org/10.1016/j.rbmo.2019.08.010.

Modern American Journal of Medical and Health Sciences
ISSN (E): 3067-803X
Volume 01, Issue 04, July, 2025
Website: usajournals.org

8. Chen C.D., Chiang Y.T., Yang P.K., Chen M.J., Chang C.H., Yang Y.S., Chen S.U. Frequency of low serum LH is associated with increased early pregnancy loss in IVF/ICSI cycles. Reprod Biomed Online. 2016;33(4):449–457. https://doi.org/10.1016/j.rbmo.2016.07.001.
9. Gleicher N., Kushnir V.A., Barad D.H. Worldwide decline of IVF birth rates and its probable causes. Hum Reprod Open. 2019;2019(3):hoz017. https://doi.org/10.1093/hropen/hoz017.
10. Lehert P., Kolibianakis E.M., Venetis C.A., Schertz J., Saunders H., Arriagada P. et al. Recombinant human follicle-stimulating hormone (r-hFSH) plus recombinant luteinizing hormone versus r-hFSH alone for ovarian stimulation during assisted reproductive technology: systematic review and metaanalysis. Repr Biol Endocrin. 2014;12:17. https://doi.org/10.1186/1477-7827-12-17.
11. Vuong T.N., Phung H.T., Ho M.T. Recombinant follicle-stimulating hormone and recombinant luteinizing hormone versus recombinant folliclestimulating hormone alone during GnRH antagonist ovarian stimulation in patients aged ≥35 years: a randomized controlled trial. Hum Reprod. 2015;30(5):1188–1195. https://doi.org/10.1093/humrep/dev038.
12. Mochtar M.H., Danhof N., Olugbenga Ayeleke R., van der Veen F., van Wely M. Recombinant luteinizing hormone (rLH) and recombinant follicle stimulating hormone (rFSH) for ovarian stimulation in IVF/ICSI cycles. Cochrane Database Syst Rev. 2017;(5):CD005070. https://doi.org/10.1002/14651858. cd005070.pub3.
13. Syrkasheva A.G., Dolgushina N.V., Agarsheva M.V., Andreeva M.G., Kalinina E.A., Yarotskaya E. Current views of a differentiated approach to choosing a superovulation stimulation protocol in IVF cycles. Akusherstvo i ginekologiya = Obstetrics and Gynecology. 2016;(5):38–43. (In Russ.) http://doi.org/10.18565/aig.2016.5.38-43.
14. Mak S.M., Wong W.Y., Chung H.S., Chung P.W., Kong G.W., Li T.C., Cheung L.P. Effect of mid-follicular phase recombinant LH versus urinary HCG supplementation in poor ovarian responders under- going IVF –

Modern American Journal of Medical and Health Sciences
ISSN (E): 3067-803X
Volume 01, Issue 04, July, 2025
Website: usajournals.org

a prospective double-blinded randomized study. Reprod Biomed Online. 2017;34(3):258–266. http://doi.org/10.1016/j.rbmo.2016.11.014.

15. Hompes P.G., Broekmans F.J., Hoozemans D.A., Schats R., FIRM group. Effectiveness of highly purified human menopausal gonadotropin vs. recombinant follicle-stimulating hormone in first-cycle in vitro fertilization-intracytoplasmic sperm injection patients. Fertil Steril. 2008;89(6):1685–1693. https://doi.org/10.1016/j.fertnstert.2007.05.039.