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Prognostic Role of Biochemical Markers in the Diagnosis of Anovulatory Infertility in Women Associated with Ovarian Follicular Cysts

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ABSTRACT

Background. Anovulatory infertility represents one of the most common causes of infertility in women, characterised by the absence of ovulation. The aim of the study was to investigate the activity of the early marker of the inflammatory process, myeloperoxidase, in women with anovulatory infertility caused by ovarian follicular cysts.

Materials. The study included 100 women with anovulatory infertility caused by ovarian follicular cysts, among them - 40 women with follicular cysts that developed against the background of chronic salpingo-oophoritis (Group I) and 40 women with follicular cysts that developed in the context of latent salpingo-oophoritis (Group II). The control group consisted of 20 healthy women.

Results. The study results showed that myeloperoxidase levels were statistically significantly higher in Group I (with chronic salpingo-oophoritis) compared to Group II (with latent salpingo-oophoritis). Myeloperoxidase demonstrated high sensitivity (85%) and moderate specificity (60%) in predicting infertility caused by ovarian follicular cysts.

Conclusion. The study results indicated that myeloperoxidase levels were statistically significantly higher in Group I compared to Group II. Myeloperoxidase demonstrated high sensitivity (85%) and moderate specificity (60%) in predicting infertility caused by ovarian follicular cysts. Plasma blood myeloperoxidase activity levels serve as a marker of inflammatory processes and can be used in the outpatient setting to refine the diagnosis and determine patient management strategies. Ovarian follicular cysts in women may be indicative of the presence of chronic inflammatory processes in the appendages of the uterus.

Keywords: Anovulatory infertility, myeloperoxidase, salpingo-oophoritis, ovarian follicular cysts.

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INTRODUCTION

Anovulatory infertility is one of the most common causes of infertility in women, characterised by the absence of ovulation [1-3].

It can be caused by various factors, including endocrine disorders, gynaecological diseases, and pathologies in the structure of the ovaries [4-7].

Among such pathologies, follicular ovarian cysts are often distinguished, which can lead to impaired ovulatory function and, consequently, infertility [8-11].

The diagnosis of anovulatory infertility caused by follicular ovarian cysts is a challenging task [12-15].

However, in recent decades, considerable attention has been devoted to the research of biochemical markers that can assist in a more accurate and early diagnosis of this condition [16-19].

Despite the multifaceted study of this problem, some issues remain unresolved [20-23].

The relevance of this problem lies in the fact that the treatment of follicular ovarian cysts often commences with surgery. Furthermore, not all surgical techniques provide a cure, and relapses account for 46.6% [24-28].

Among women with follicular ovarian cysts, 62.2% have a history of acute or chronic salpingo-oophoritis [29-32].

Therefore, it is advisable to explore the role of inflammation in the formation of follicular ovarian cysts and develop a differentiated approach to the diagnosis and treatment of reproductive-age patients with this pathology. Simultaneously, the search for biochemical markers that enable the detection of inflammation in the absence of clinical manifestations remains relevant [33-35].

There is insufficient information in the available literature about markers of inflammation in ovarian follicular cysts [36-40], and scientific papers addressing the role and prognostic significance of nonspecific inflammation markers in this category of patients are also insufficient.

The aim of the study was to study the activity of an early marker of the inflammatory process, myeloperoxidase, in women with anovulatory infertility associated with follicular ovarian cysts.

MATERIALS AND METHODS

The study included 100 women with anovulatory infertility associated with follicular ovarian cysts, 40 of whom had follicular cysts that developed against the backdrop of chronic salpingo-oophoritis (Group I) and 40 women with follicular cysts

arising on the background of latent salpingo-oophoritis (Group II). The comparison group consisted of 20 healthy women. The age of the patients ranged from 20 to 35 years. In patients, blood was drawn from the ulnar vein to study the level of myeloperoxidase. Myeloperoxidase activity was determined using a spectrophotometric method with an o-dianisidine (ODA) substrate and a specific myeloperoxidase inhibitor.

RESULTS

The study's results revealed that, during gynecological and clinical examinations, the following nosological forms of inflammatory uterine appendage conditions were diagnosed: chronic salpingo-oophoritis in 32 cases (40%), subacute salpingo-oophoritis in 31 cases (38.7%), and latent salpingo-oophoritis in 17 patients (21.3%) (see Figure 1).

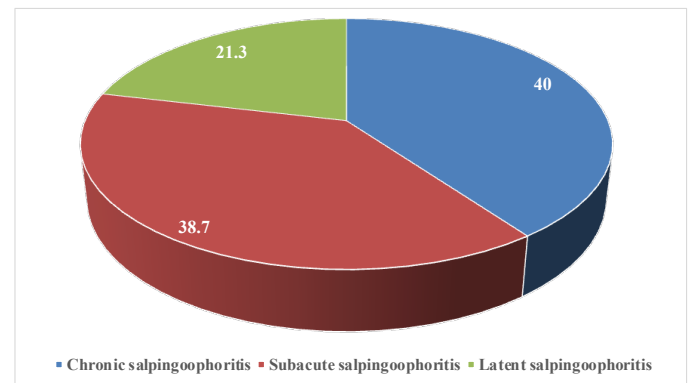


Figure 1. Nosological forms of the inflammatory process of the uterine appendages, %

The results of the study on myeloperoxidase activity, conducted using a spectrophotometric method, yielded the following outcomes: when studying the activity of myeloperoxidase, we observed that this indicator was high up to 570 pmol/L in patients of group I and was significantly increased in blood serum compared to patients of group II.

In the presence of inflammation, the level of free myeloperoxidase in the blood of patients was noted to increase.

It can be assumed that follicular ovarian cysts occur against the background of inflammation of the uterine appendages, and the determination of myeloperoxidase activity is informative for assessing the presence and even intensity of inflammatory processes.

Results of the study showed that myeloperoxidase levels were statistically significantly higher up to 570 pmol/l in group I (with chronic salpingo-oophoritis)

compared with the index of group II 480 pmol/l (with latent salpingo-oopharitis).

Myeloperoxidase demonstrated high sensitivity (85%) and medium specificity (60%) in predicting infertility caused by follicular ovarian cysts.

Ultrasound examination of the ovaries revealed that the size of ovarian follicular cysts was 6 cm and 5.8 cm, respectively, in the groups.

The results of the study: the level of myeloperoxidase was statistically significantly higher up to 570 pmol/l in group I (with chronic salpingo-oopharitis) compared with the indicator of group II 480 pmol/l (with latent salpingo-oopharitis).

Myeloperoxidase demonstrated high sensitivity (85%) and medium specificity (60%) in predicting infertility caused by follicular ovarian cysts.

Ultrasound examination of the ovaries showed that the size of ovarian follicular cysts in the groups was 6 cm and 5.8 cm, respectively (see Figure 2).

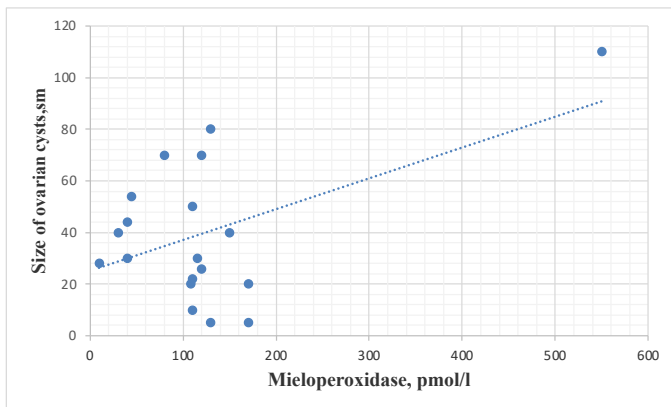


Figure 2. Correlation between the size of the follicular cyst and the level of myeloperoxidase

The study of the correlation between the levels of myeloperoxidase and the size of follicular ovarian cysts showed a direct correlation between them, the correlation coefficient was ($r=0.32$).

The results of the study indicate the prognostic significance of myeloperoxidase in the diagnosis of infertility caused by follicular ovarian cysts. Myeloperoxidase can serve as a useful indicator of this condition, especially in the context of chronic salpingo-oopharitis.

Thus, the determination of this marker can be used as a prognostic indicator of inflammation in patients at risk for the development of follicular ovarian cysts and will also make it possible to optimize treatment approaches in patients with anovulatory infertility caused by follicular ovarian cysts.

DISCUSSION

Among benign ovarian tumors, the leading place is occupied by follicular ovarian cysts (FOC). According to the latest data, follicular cysts are the cause in every 3rd case of female infertility [1-3].

In the structure of the causes of female infertility, FOC account for 19.2% of cases [4-6].

Anovulatory infertility in women associated with follicular ovarian cysts is a serious medical problem that requires careful diagnosis and treatment. Biochemical markers have become the object of active research in the search for more accurate methods of diagnosing and predicting this condition.

Many studies have shown that certain biochemical markers can be useful tools for the preliminary diagnosis of anovulatory infertility [7-9].

Many studies have also revealed a link between biochemical markers, such as serum levels of estrogen and progesterone, and ovulation disorders. These markers can help determine how successful ovulation is and can also indicate the state of the ovaries [10-12].

The use of biochemical markers can help doctors develop an individualized approach to the treatment of women with anovulatory infertility associated with follicular ovarian cysts. This may include the optimal choice of medications or ovulation stimulation methods. Biochemical markers can also be useful tools for monitoring the effectiveness of treatment and determining the optimal time for artificial insemination or ICSI procedures.

However, it is worth noting that despite the prospects and research results, biochemical markers cannot serve as an exceptional method of diagnosis and prediction of anovulatory infertility. Their use should be integrated into a comprehensive clinical analysis, including ultrasound and other methods.

Myeloperoxidase is an enzyme that is present in granulocytes, white blood cells responsible for the body's immune defense. Its main function is to destroy pathogenic microorganisms such as bacteria and viruses. MPO is part of the process of phagocytosis – the absorption and destruction of harmful particles by immune cells.

Myeloperoxidase has not only antimicrobial but also antioxidant effects. The results of the study of myeloperoxidase in 80 women with infertility caused by follicular ovarian cysts are divided into several key aspects. The study was important because infertility associated with ovarian follicular cysts is a serious medical problem for

many women. Understanding the biochemical markers that can help in its early diagnosis and assessment of severity can improve treatment outcomes and the quality of life of patients.

Myeloperoxidase levels were statistically significantly higher in the group of women with follicular cysts that arose against the background of chronic salpingo-oopharitis (group I), compared with the group in which cysts arose against the background of latent salpingo-oopharitis (group II). The diagnostic sensitivity of myeloperoxidase was 85%, which indicates the high ability of this marker to detect infertility associated with follicular ovarian cysts.

The specificity of myeloperoxidase was 60%, which means that it can indicate the presence of infertility, but it can also give false positive results.

The high sensitivity of myeloperoxidase allows us to consider it a potentially useful marker for the early diagnosis of infertility associated with follicular ovarian cysts, especially in cases with chronic salpingo-oopharitis. In general, the study of myeloperoxidase in the context of infertility caused by follicular ovarian cysts represents an important step towards early diagnosis and management tactics for women with infertility caused by follicular ovarian cysts.

In conclusion, the prognostic role of biochemical markers in the diagnosis of anovulatory infertility in women associated with follicular ovarian cysts is an important area of research in the field of reproductive medicine. These markers can complement existing diagnostic and treatment methods, contributing to improved outcomes and more effective care for women facing this condition.

CONCLUSION

Results of the study, myeloperoxidase levels were statistically significantly higher in group I compared to group II. Myeloperoxidase demonstrated high sensitivity (85%) and medium specificity (60%) in predicting infertility caused by follicular ovarian cysts. Plasma myeloperoxidase activity levels are a marker of inflammatory processes and can be used at the outpatient care stage to clarify the diagnosis and determine patient management tactics. Follicular ovarian cysts in women may be evidence of the presence of a chronic inflammatory process of the uterine appendages.

Ethics approval and consent to participate - All patients gave written informed consent to participate in the study.

Consent for publication - The study is valid, and recognition by the organization is not required. The author agrees to open the publication.

Availability of data and material - Available

Competing interests - No

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Conflict of interest authors declare that there is no conflict of interest.

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AYOLLARDA TUXUMDONLAR FOLLIKULAR KISTALARI BILAN BOG‘LIQ ANOVULYATOR BEPUSHTLIKNI DIAGNOSTIKASIDA BIOKIMY-OVIY MARKERLARNI PROGNOSTIK ROLI

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Toshkent Tibbiyot Akademiyasi

АБСТРАКТ

Dolzarbligi. Anovulyator bepushtlik ayollarda bepushtlikning eng keng tarqalgan sabablaridan biri bo‘lib, ovulyatsiya bo‘lmasligi bilan tavsiflanadi. Tadqiqotning maqsadi follikulyar tuxumdon kistalari bilan bog‘liq anovulyator bepushtligi mavjud ayollarda yallig‘lanish jarayonining erta markeri mieloperoksidaza faoliyatini o‘rganishdan iborat bo‘ldi.

Materiallar. Tadqiqotga tuxumdon follikulyar kistasi bilan bog‘liq anovulyator bepushtlik bilan 80 nafar ayollar kiritildi, ulardan 40 nafari surunkali salpingoofarit (guruh I) fonida yuzaga kelgan follikulyar kistalar bilan, 40 nafari latent salpingoofarit (guruh II) fonida yuzaga kelgan follikulyar kistalar bilan bog‘liq bepusht ayollar kiritilgan. Nazorat guruhi 20 nafar sog‘lom ayollardan iborat bo‘ldi.

Natijalar. Tadqiqot natijalari, mieloperoksidazaning darajasi II - guruhga nisbatan I- guruhda statistik jihatdan ancha yuqori ekanligi aniqlandi. Mieloperoksidaza tuxumdonlar follikulyar kistalari bilan bog‘liq bepushtlikni prognozlashda yuqori sezuvchanlik (85%) va o‘ziga xoslikni (60%) namoyish etdi. Mieloperoksidaza darajasi guruhlardagi bemorlarda salpingoofaritning klinik kechishi bilan bog‘liq. Shuningdek, mieloperoksidaza darajasining I va II - guruhlardagi tuxumdon follikulyar kistalarining hajmi o‘rtasida to‘g‘ridan to‘g‘ri korelyatsion bog‘liqlik mavjudligi aniqlandi.

Xulosa. Tadqiqot natijalari, mieloperoksidaza darajasi II- guruhga nisbatan I- guruhda statistik jihatdan ancha yuqori ekanligi aniqlandi. Mieloperoksidaza tuxumdon kistalari sabab bo‘lgan bepushtlikni bashorat qilishda yuqori sezuvchanlik (85%) va o‘rta o‘ziga xoslikni (60%) ko‘rsatdi. Qon plazmasidagi mieloperoksidazaning faollik darajasi yallig‘lanish jarayonlarining belgisidir va ambulatoriya sharoitida tashxisni aniqlashtirish va bemorlarni olib bori taktikasini ishlab chiqish uchun qo‘llanilishi mumkin. Ayollarda tuxumdonlar follikulyar kistalari bachadon ortiqlarining surunkali yallig‘lanish jarayoni mavjudligining dalili bo‘lishi mumkin.

Kalit so‘zlar: anovulyator bepushtlik, mieloperoksidaza, salpingoofarit, tuxumdon follikulyar kistalari

ПРОГНОСТИЧЕСКАЯ РОЛЬ БИОХИМИЧЕСКИХ МАРКЕРОВ В ДИАГНОСТИКЕ АНОВУЛЯТОРНОГО БЕСПЛОДИЯ У ЖЕНЩИН АССОЦИИРОВАННЫЙ Фолликулярными кистами

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Актуальность. Ановуляторное бесплодие является одной из наиболее распространенных причин бесплодия у женщин и характеризуется отсутствием овуляции. Целью исследования было изучение активности миeloperоксидазы, раннего признака воспалительного процесса у женщин с ановуляторным бесплодием, вызванным фолликулярными кистами яичников.

Материалы. В исследование были включены 100 женщин с ановуляторным бесплодием в результате фолликулярных кист, из них 40 с фолликулярными кистами, возникшими на фоне хронического сальпингоофарита (I группа), и 40 женщин с фолликулярными кистами, возникшими на фоне латентного сальпингоофарита (II группа). Группу сравнения составили 20 здоровых женщин.

Результаты. Результаты исследования показали, что уровни миeloperоксидазы были статистически значительно выше в I группе по сравнению со II группой. Миeloperоксидаза продемонстрировала гиперчувствительность (85%) и специфичность (60%) при прогнозировании бесплодия, вызванного фолликулярными кистами яичников. Уровни миeloperоксидазы связаны с тяжестью клинических проявлений бесплодия у пациенток I группы. Уровни миeloperоксидазы также связаны с размером и характеристиками фолликулярных кист яичников в I и II группах.

Заключение. Результаты исследования показали, что уровни миeloperоксидазы были статистически значительно выше в I группе по сравнению со II группой. Миeloperоксидаза продемонстрировала гиперчувствительность (85%) и промежуточную специфичность (60%) при прогнозировании бесплодия, вызванного кистами яичников. Уровень активности миeloperоксидазы в плазме крови является признаком воспалительных процессов и может быть использован в амбулаторных условиях для уточнения диагноза и разработки тактики ведения пациента. Фолликулярные кисты яичников у женщин могут свидетельствовать о наличии хронического воспалительного процесса придатков матки.

Ключевые слова: ановуляторное бесплодие, миeloperоксидаза, сальпингоофарит, фолликулярные кисты яичников