



## EXOGENOUS AND ENDOGENOUS FACTORS IN THE DEVELOPMENT OF ADHESIONS IN THE PELVIC CAVITY IN WOMEN OF REPRODUCTIVE AGE

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### ✓ Resume

*It is known that the peritoneum has the ability to respond to any irritation by adhesion formation, the result of this, in fact, a protective mechanism, is often tubal-peritoneal infertility, pelvic pain syndrome, violation of the anatomical and topographic location of the pelvic organs with a violation of their functional activity. In this regard, we analyzed 232 case histories of patients who underwent surgery for various gynecological pathologies. We found that in women with adhesion formation, patients with III-IV degree of prevalence prevail, regardless of the etiological factor. Significant exogenous risk factors associated with surgical trauma were identified: laparotomic access, the presence of repeated operations, the urgency of the previous operation, drainage of the abdominal cavity*

**Keywords:** adhesion formation, gynecological complications

## ЭКЗОГЕННЫЕ И ЭНДОГЕННЫЕ ФАКТОРЫ РАЗВИТИЯ СПАЕЧНОГО ПРОЦЕССА В ПОЛОСТИ МАЛОГО ТАЗА У ЖЕНЩИН ФЕРТИЛЬНОГО ВОЗРАСТА

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### ✓ Резюме

*Известно, что брюшина обладает способностью реагировать на любое раздражение спайкообразованием, результатом этого, по сути защитного механизма, зачастую является трубно-перитонеальное бесплодие, синдром тазовых болей, нарушение анатомо-топографического расположения органов малого таза с нарушением их функциональной активности. В связи с этим, мы проанализированы 232 историй болезни пациенток, которым выполнены оперативные вмешательства по поводу различной гинекологической патологии. Нами выявлено, что у женщин со спайкообразованием преобладают пациентки с III–IV степенью распространения, вне зависимости от этиологического фактора. Выделены значимые экзогенные факторы риска, связанные с хирургической травмой: лапаротомный доступ, наличие повторных операций, экстренность предшествующей операции, дренирование брюшной полости*

**Ключевые слова:** спайкообразование, гинекологические осложнения

## TUG'ISH YOSHIDAGI AYOLLARDA CHANOQ BO'SHLIG'I A'ZO BITISHMALAR RIVOJLANISHINING EKZOGEN VA ENDOGEN OMILLARI

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### ✓ Rezyume

*Ma'lumki, qorin parda har qanday tirnash xususiyati bilan adezyon shakllanishi bilan javob berish qobiliyatiga ega, buning natijasi, aslida, himoya mexanizmi bo'lsada, ko'pincha tubo-peritoneal bepustlik, kichik chanoq a'zolarining og'riq sindromi, qorin bo'shlig'ining anatomik va topografik joylashuvining buzilishiga olib keladi. Shu munosabat bilan biz turli xil ginekologik*



**patologiyalar bo'yicha jarrohlik amaliyoti o'tkazgan bemorlarning 232 ta holatini tahlil qildik. Biz ayollarda etiologik omildan qat'i nazar, III-IV darajadagi bitishmalari bo'lgan bemorlar ustunlik qilishini aniqladik. Jarrohlik jarohati bilan bog'liq bo'lgan muhim ekzogen xavf omillari aniqlandi: laparotomiyaga kirish, takroriy jarrohliklarning mavjudligi, oldingi jarrohlik amaliyotining shoshilinchligi, qorin bo'shlig'ini drenajlash.**

**Kalit so'zlar: bitishmalarning shakllanishi, ginekologik asoratlari**

### Relevance

The study of adhesive disease (AD) has no more than a century of history. Literature data indicate that after surgical interventions on the pelvic organs, 60-90% of patients develop an adhesive process [1, 3]. For example, the SCAR study by Lower et al. in Scotland showed that it is the adhesive process after gynecological operations that leads to infertility, since in 40% of cases pregnancy occurred after surgical adhesiolysis [2].

The study of the epidemiological aspect of this pathology (ESAC study, 1986-1996) conducted in Scotland was based on the results of monitoring 30,000 women after gynecological operations [6, 8,9]. The authors found that every third patient was hospitalized twice in ten years due to complaints caused by the presence of adhesions. And 5% of women were hospitalized during this period of time more than 6 times. At the same time, conservative methods of treating adhesive disease do not have the proper effectiveness, and surgical treatment leads to aggravation of adhesion formation [10, 11, 12]. Most often, the following etiological factors of the adhesive process are indicated in the literature - surgical trauma, foreign bodies, endometriosis, and an infectious process [3, 4, 5, 6, 7, 8, 12, 13]. It remains unclear not only the predominant cause of adhesions in the pelvis, but also those often neglected factors that, ceteris paribus, turn the physiological process of limiting the site of pathological effects by the peritoneum into the pathological process of severe adhesive disease. These aspects suggest a special role of risk factors in the fact and intensity of the development of adhesive disease in each case.

**The purpose of the study:** to identify risk factors for the development of adhesions of the pelvic organs in women of reproductive age.

### Materials and methods

We retrospectively analyzed 232 case histories of patients selected by a random method, which performed surgical interventions for various gynecological pathologies. These women were called for a second examination by a gynecologist. Out of 232 women, 183 women came to the examination. From these, the main group consisted of 106 patients with adhesive process of the pelvic organs, established according to the R-AFS classification; comparison group - 77 patients without adhesions of the pelvic organs.

As descriptive statistics for quantitative data, the median and quartiles were used, for qualitative data, the share of the attribute, expressed as a percentage. The Mann-Whitney test was used to determine the statistical significance of differences in quantitative traits. The odds ratio (OR) and 95% confidence interval (CI 95%) of risk factors for the development of adhesions were calculated.

### Results of the study

The incidence of adhesions in the structure of intraoperative diagnoses in the department of operative gynecology 9 of the obstetric complex in Tashkent was 57.9%. We analyzed the structure of the causes of the adhesive process, based on an indication in the anamnesis of a factor suggesting the possibility of its formation: previous operations on the abdominal cavity and pelvic organs (laparotomy, laparoscopy), inflammatory diseases of the pelvic organs and external genital endometriosis. With a combination of causes leading to the adhesive process, patients were separated into a separate group, in which the leading factor could not be established. Thus, in the presence of a history of only data on previous surgical interventions, postoperative adhesions were diagnosed, with an indication of inflammatory diseases of the uterine appendages of any etiology - pelvic peritoneal adhesions (TPS), in the presence of endometriosis diagnosed during laparoscopy and the absence of other causes of the formation of adhesions - adhesions associated with endometriosis. Data on the analysis of the structure of the causes of adhesions in the pelvis are presented in Table 1.

**Table 1. The structure of the etiological factors of the adhesive process**

| Possible causes of the adhesive process                        | Absolute indicator | %    |
|----------------------------------------------------------------|--------------------|------|
| Pelvic peritoneal adhesions (PPS)                              | 21                 | 19,8 |
| Postoperative adhesions                                        | 16                 | 15,1 |
| Adhesions associated with endometriosis                        | 15                 | 14,2 |
| Combination of TPS and postoperative adhesions                 | 23                 | 21,7 |
| Combination of endometriosis and postoperative adhesions       | 20                 | 18,9 |
| Combination of TPS and adhesions associated with endometriosis | 11                 | 10,3 |
| Total                                                          | 106                | 100  |

The above analysis of the causes of adhesion formation shows that only in 49.1% of women it is possible to establish the only cause of the formation of speck in the small pelvis, among which TPS was more often detected (19.8%). As for the combination of causes of adhesion formation, the combination of TPS and postoperative adhesions was more common (21.7%), which did not significantly differ from the rates of the combination of endometriosis and postoperative adhesions (18.9%). Whereas, combinations of TPS and adhesions associated with endometriosis were 2 times less common. When conducting laparoscopy for women with adhesion formation, the degree (stage) of the prevalence of adhesions was analyzed. There was a predominance of patients with III-IV degree of spread (according to the R-AFS classification) - 66 (62.3%), while there were 40 (37.7%) patients with small forms of the spread of the adhesive process (I-II stage), regardless of the etiological factor ( $p < 0.05$ ) (Table 2).

**Table 2. The degree of distribution of the adhesive process (classification R-AFS)**

| Kinds                                          | I-II degree |       | III-IV degree |        |
|------------------------------------------------|-------------|-------|---------------|--------|
|                                                | abs         | %     | abs           | %      |
| Pelvic peritoneal adhesions (PPS) (n=21)       | 8           | 38,1  | 13            | 61,9*  |
| Postoperative adhesions (n=16)                 | 5           | 31,25 | 11            | 68,75* |
| Adhesions associated with endometriosis (n=15) | 7           | 46,7  | 8             | 53,3   |
| Combined forms of adhesions (n=54)             | 15          | 27,8  | 39            | 72,2*  |
| Total (n=106)                                  | 35          | 33,0  | 71            | 67,0*  |

*Note: \* - significant difference between the values of groups with I-II and III-IV degree of adhesion distribution.*

An analysis of the prevalence of adhesions depending on the type of surgical intervention (gynecological/surgical) performed earlier showed significant differences between the groups. Pelvic peritoneal adhesions of I-II degree of spread were diagnosed in 8 (38.1%) cases, which is 1.6 times less (61.9%) of the occurrence of adhesions of III-IV degree ( $p < 0.05$ ). A similar trend was observed in postoperative adhesions, when spikes of I-II stages of spread were detected in 36.9%, and stages III-IV of spread more often (63.1%) ( $p < 0.05$ ). Whereas, with adhesions associated with endometriosis, there was an almost equal number of patients with I-II and III-IV degrees of adhesions ( $p \geq 0.05$ ). With adhesions of combined etiology, stage III-IV of the spread of the adhesion process was predominantly identified (72.2%) ( $p < 0.01$ ). Thus, the prevalence structure did not depend on the etiological factor, but cases of pronounced adhesions prevailed in the structure of comorbidity (especially postoperative).

Adhesions in the pelvis are initially the result of the body's adaptation to the effects of hypoxia. Hypoxia is a pathological process caused by external and / or internal influences, at the extreme value of which, under the conditions of a genetic predisposition, the pelvic peritoneum reacts with the formation of adhesions. Given the above, we decided to analyze exogenous and endogenous risk factors that contribute to the formation of adhesions, and analyze their relationship with the degree of prevalence of the adhesion process. Exogenous risk factors for adhesion formation are understood as such external factors, the influence of which exceeds the adaptive capabilities of the body and leads to the formation of adhesions [3, 4]. While endogenous risk factors imply genetically determined features (predisposition) that reduce the body's ability to withstand hypoxia and become the cause of adhesion formation [7, 8]. The combination of exogenous and endogenous risk factors significantly increases the likelihood of the formation of an adhesive process and the stage of its spread.

To identify the most significant exogenous factors of adhesion formation and their influence on the prevalence in the small pelvis, we analyzed the clinical and anamnestic data of our patients. depending on the etiology. In the anamnesis, 59 (55.7%) patients had indications of previous surgical interventions, 55 (51.9%) - inflammatory diseases of the pelvic organs of various etiologies, 46 (43.4%) patients were

diagnosed with endometriosis. The discrepancy between the number of patients and the total number of observations is explained by the combination of several reasons for the formation of adhesions in one patient. The presented data show that the proportion of etiological risk factors in the structure of this pathology did not differ significantly ( $p>0.05$ ).

Considering that women with postoperative adhesions still made up a larger number, we conducted a more detailed analysis of the following factors, such as: surgical access; surgical treatment profile; volume of surgical interventions; the urgency of performing surgical interventions; the presence of drainage of the abdominal cavity; the number of transferred surgical interventions; the duration of surgery and their relationship with the prevalence of adhesions (Table 3).

Depending on the prevalence of the adhesion formation process, we divided women into 2 groups: group 1 consisted of 18 women with I-II degree of adhesion formation and 41 women with III-IV degree of adhesion distribution.

The study of surgical access during operations showed that mild degree (I-II) spread of adhesions occurred 2.6 times more often with laparoscopic access than with laparotomic access. Accordingly, moderate and severe adhesions were more common in the group with laparotomic access (61%).

Interesting data were obtained by studying the relationship between the type of operation and the degree of spread of adhesions. So, most often a mild degree (I-II) of the adhesive process was observed in women who underwent obstetric and gynecological operations (61.1%), while during abdominal operations, a mild degree of adhesion formation occurred 2.2 times less often and even less with a combination of obstetric and gynecological operations. - gynecological and abdominal operations (11%).

**Table 3. Features of the surgical history in patients with postoperative adhesions in the pelvis.**

| Indicators                    |                                               | Group 1<br>with I-II degree<br>(n =18) |       | Group 2<br>with III-IV degree (n =41) |        |
|-------------------------------|-----------------------------------------------|----------------------------------------|-------|---------------------------------------|--------|
|                               |                                               | абс                                    | %     | Абс                                   | %      |
| Surgical access               | laparoscopy (n=29)                            | 13                                     | 72,2* | 16                                    | 39**   |
|                               | laparotomy (n=30)                             | 5                                      | 27,8  | 25                                    | 61*    |
| Surgical treatment profile    | obstetric and gynecological operations (n=27) | 11                                     | 61,1  | 16                                    | 39*    |
|                               | abdominal surgery (n=21)                      | 5                                      | 27,8  | 14                                    | 34,2*  |
|                               | obstetric-gynecological and abdominal (n=13)  | 2                                      | 11,1  | 11                                    | 26,8*  |
| The urgency of the operation  | planned (n=22)                                | 10                                     | 55,6  | 12                                    | 29,3*  |
|                               | emergency (n=37)                              | 8                                      | 44,4  | 29                                    | 70,7 * |
| Abdominal drainage            | yes (n=36)                                    | 3                                      | 16,7  | 33                                    | 80,5*  |
|                               | no (n=23)                                     | 15                                     | 44,7  | 8                                     | 19,5*  |
| Time since the last operation | less than 1 year (n=27)                       | 7                                      | 38,9  | 20                                    | 48,8   |
|                               | over 1 year (n=32)                            | 11                                     | 61,1  | 21                                    | 51,2   |

Note: \* - significant difference between the indicators of group 2 (III-IV degree) relative to the indicators of group 1 (I-II degree) ( $p < 0.05$ ); \* - difference in group values with respect to access to the abdominal cavity ( $p < 0.05$ ), (to assess the significance of frequency discrepancy, the  $\chi^2$  criterion was used; if there was a history of several operations performed by different accesses, the calculation was carried out using laparotomy access).

The number of common forms of adhesions (III-IV degree) in the groups was observed in a non-significantly significant range. The maximum number of patients with stage III-IV adhesions was registered during repeated operations in various parts of the abdominal cavity.

Another important factor influencing the degree of spread of the adhesive process was the urgency of surgical interventions. In 70.7% of cases of severe adhesion formation in women, a history of surgery was performed urgently. Whereas, mild (I - II) degree of adhesions was observed in women who underwent operations in a planned manner. In the presence of two or more surgical interventions in the anamnesis, as well as during the registration of the adhesive process during previous operations, the frequency of moderate and severe forms of the spread of the adhesive process was significantly higher. The duration of the last surgical intervention did not affect the severity of the adhesive process diagnosed during laparoscopy.

Thus, we have identified significant exogenous risk factors associated with surgical trauma. These include: laparotomy access ( $r=0.439$ ;  $p<0.01$ ); the presence of repeated operations on various parts of the

abdominal cavity ( $r=0.355$ ;  $p<0.01$ ); urgency of the previous operation ( $r=0.219$ ;  $p<0.01$ ); drainage of the abdominal cavity ( $r=0.324$ ;  $p<0.01$ ).

### Conclusions

1. In women with adhesion formation, there was a predominance of patients with III-IV degree of spread (62.3%), regardless of the etiological factor.
2. Depending on the cause, the degree of spread of adhesions was different, with a predominance of grade III-IV in pelvic and postoperative adhesions. With adhesions associated with endometriosis, an equal number of patients with I-II and III-IV degrees of adhesion spread was observed.
3. With adhesions of combined etiology, stage III-IV of the spread of the adhesive process was predominantly identified (72.2%).
4. Significant exogenous risk factors associated with surgical trauma were identified: laparotomy access ( $r=0.439$ ;  $p<0.01$ ); the presence of repeated operations ( $r=0.355$ ;  $p<0.01$ ); urgency of the previous operation ( $r=0.219$ ;  $p<0.01$ ); drainage of the abdominal cavity ( $r=0.324$ ;  $p<0.01$ ).

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