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CHANGES OF CYTOKINE PROFILE THE DURING REHABILITATION PERIOD AFTER SURGICAL TREATMENT OF PELVIC ORGAN PROLAPSE

Najmutdinova D.K., Gadoyeva D.A., Axmedova G.A.

ИЗМЕНЕНИЯ ЦИТОКИНОВОГО ПРОФИЛЯ В РЕАБИЛИТАЦИОННОМ ПЕРИОДЕ ПОСЛЕ ОПЕРАЦИИ ПРОЛАПСА ТАЗОВЫХ ОРГАНОВ

Нажмутдинова Д.К., Гадоева Д.А., Ахмедова Г.А.

CHANOQ A'ZOLARI PROLAPSI OPERATSIYASIDAN KEYINGI REABILITATSIYA DAVRIDA SITOKIN PROFILIDAGI O'ZGARISHLAR

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Цель: определение уровня провоспалительных и противовоспалительных цитокинов в сыворотке крови пациенток, перенесших переднюю кольпорафию и заднюю кольпоперинеолеваторопластику. **Материал и методы:** под наблюдением были 90 пациенток, страдающих различными стадиями пролапса тазовых органов по классификации POP-Q, которые разделены на две группы в зависимости от применения PRP-терапии. **Результаты:** в течение первой недели после операции пациенткам обеих групп вводились провоспалительные и противовоспалительные цитокины. Через 30 дней послеоперационного периода в группе, где проводилась PRP-терапия, уровень противовоспалительных цитокинов был выше. Хирургическая травма может вызывать острое системное воспаление, которое изначально играет роль в иммунной защите от бактериальной инфекции и в процессе заживления ран. **Выводы:** при использовании PRP-терапии можно ускорить заживление ран, а также возможно сокращение сроков реабилитации с улучшением ее течения.

Ключевые слова: цитокины, воспаление, пролапс тазовых органов, период реабилитации после PRP-терапии.

Maqsad: oldingi kolporafiya va posterior kolpoperineoplastika qilingan bemorlarning qon zardobidagi yallig'lanishga qarshi va yallig'lanishga qarshi sitokinlar darajasini aniqlash. **Material va usullar:** POP-Q tasnifi bo'yicha tos a'zolari prolapsasining turli bosqichlari bilan og'rig'an 90 nafar bemor kuzatildi, ular PRP terapiyasidan foydalanishga qarab ikki guruhga bo'lingan. **Natijalar:** Operatsiyadan keyingi birinchi hafta davomida ikkala guruhdagi bemorlarga yallig'lanishga qarshi va yallig'lanishga qarshi sitokinlar qo'llanilgan. Operatsiyadan keyingi 30 kun ichida PRP-terapiya guruhida yallig'lanishga qarshi sitokinlarning yuqori darajasi bor edi. Jarrohlik jarohati o'tkir tizimli yallig'lanishni keltirib chiqarishi mumkin, bu dastlab bakterial infektsiyaga qarshi immunitetni himoya qilish va yarani davolash jarayonida rol o'ynaydi. **Xulosa:** PRP terapiyasidan foydalanish jarohatni davolashni tezlashtirishi mumkin, shuningdek, reabilitatsiya davrini qisqartirish va uning kursini yaxshilash mumkin.

Kalit so'zlar: sitokinlar, yallig'lanish, tos a'zolarining prolapsasi, PRP terapiyasidan keyingi reabilitatsiya davri.

Increased blood flow, accumulation of leukocytes and vascular permeability together with upregulation of inflammatory mediators create inflammation after surgery [3]. Cytokines divided into two groups and depending on the which group include they play inflammatory and anti-inflammatory roles during the inflammation as a key modulator [3,5]. Because of cytokines take part in acute and chronic inflammation in a complex network of interactions throughout a few recent decades, the physiological changing of the cytokines level after trauma or surgery have gained more attention. Under physiologic situations, inflammatory and anti-inflammatory cytokines provide a service as immunomodulatory elements which limit potential injury or excess inflammatory reactions. During pathologic conditions, unnormal cytokines level can create systemic inflammatory responses which is called immunosuppression [3]. A dynamic and balanced shift exists between pro- and anti-inflammatory cytokines which affects organ dysfunction, immunity and infection, as well as wound healing and pain after surgery. The wound healing process include three main phases: an inflammation, regeneration, and a remodeling or repairing [2]. At the end of the wound healing always have two different outcomes.

First of them is full restoration of function, whereas second one is a chronic failure to remodel [4,8]. The results of the failure to remodel is developing of chronic fibrosis and scar tissue formation, which can also lead to chronic inflammation at the site of injury (Fig. 1) [6].

Understanding the complex interplay of pro-inflammatory and anti-inflammatory cytokines is crucial in the field of wound healing, as it holds the key to developing effective therapeutics. In the initial stages of wound healing, pro-inflammatory cytokines like IL-1 β , IL-6, TNF- α , and various chemokines play vital roles in recruiting cells for debris clearance and the recruitment of growth factor [7]. Careful regulation and timely resolution of this early inflammation are essential for optimal wound repair. As the healing process progresses, anti-inflammatory proteins such as VEGF, IL-10 and IL-4 become instrumental in facilitating the transition to later stages where pro-inflammatory cytokines promote angiogenesis and wound remodeling [6].

Purpose of the study

Determination of the level of proinflammatory and anti-inflammatory cytokines in the blood serum of patients who underwent anterior colporrhaphy and posterior colpoperineoplasty.

Under physiologic situations, inflammatory and anti-inflammatory cytokines provide a service as immunomodulatory elements which limit potential injury or excess inflammatory reactions. During pathologic conditions, unnormal cytokines level can create systemic inflammatory responses which is called immunosuppression [3]. A dynamic and balanced shift exists between pro- and anti-inflammatory cytokines which affects organ dysfunction, immunity and infection, as well as wound healing and pain after surgery. The wound healing process include three main phases: an inflammation, regeneration, and a remodeling or repairing [2]. At the end of the wound healing always have two different outcomes.

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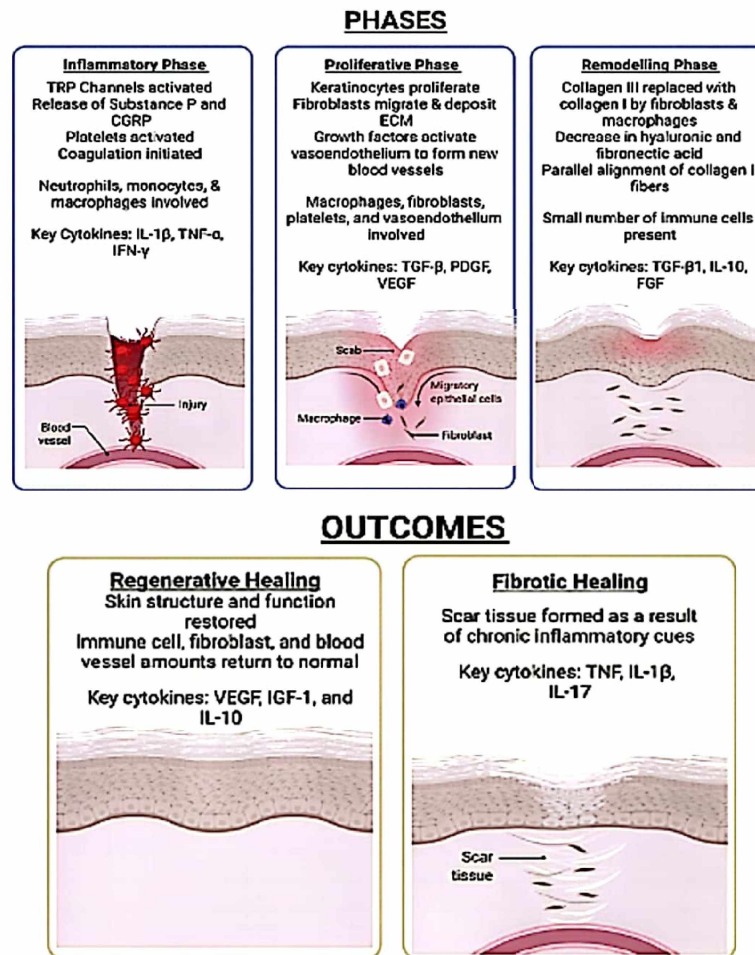


Fig. 1. The stages of skin wound healing and the outcomes after the injury [5].

Materials and methods

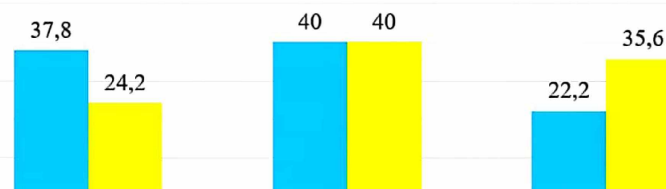
For our research we collected 90 patients who suffer from different stages of pelvic organ prolapse according to POP-Q classification [1]. Depending on how was leaded rehabilitation period patients were divided into two groups. Main group include 45 patients who took PRP-therapy in the perineum area one day before the operation and in the third days of rehabilitation. Comparison group consist of 45 patients without PRP-therapy. Patients were examined before surgery, and a personal

medical card was opened for each patient, and special attention was paid to the patients' complaints, history of past diseases, history of existing gynecological diseases, and parity characteristics. In the preoperative period and on the 10th and 30th days of the rehabilitation period, inflammatory (Interleukin-1, TNF (Tumor necrosis factor)) and anti-inflammatory (Interleukin-10, VEGF (Vascular endothelial growth factor)) cytokines were detected in the blood plasma of patients in the main and comparison groups.

Results and discussion

The groups included in the study had the following average ages (M \pm m): Main group – 42,2 \pm 1.52 years; Comparison group – 45,1 \pm 1.76 years (Fig. 2).

According to the distribution of residence, 86,7% and 75,6% of all groups, respectively, showed that those living in urban areas had the upper share.



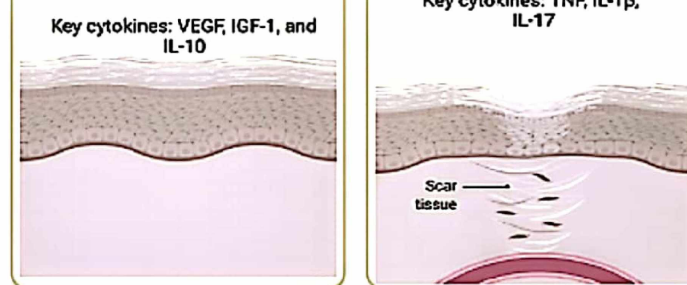


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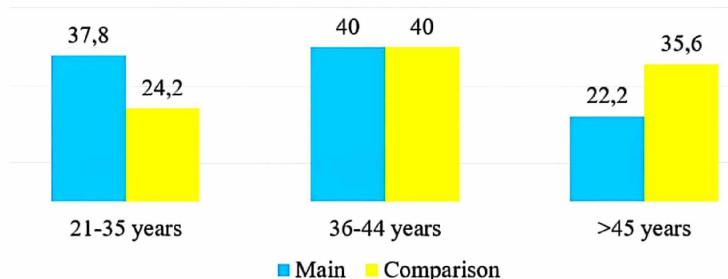


Fig. 2. Age of the surveyed women, %.

The highest prevalence of acquired somatic diseases in all groups were anemia (80%, 60%, respectively), urinary tract diseases (22,2, 23,9%, respectively), obesity (37,8, 40%, respectively), and hypertension (13,3, 23,9%, respectively).

Gynecological history data showed that there was no statistically significant difference in the average age of menarche and the average age of sexual debut between

women in this group. In the main group, it was found that the incidence of women who underwent uterine curettage was 1,8 times higher than in the comparison group. At the same time, the incidence of uterine fibroids was 2 times higher in the main group than in the other comparison group. The incidence of inflammatory diseases of the genital organs was 51% in the main group and 53,35% in the comparison group (Table 1).

Gynecological anamnesis of patients, $M \pm m$, %

Table 1

Indicators	Main group		Comparison group	
Menarche	13,20±0,2		13,07±0,14	
Sexual debut	21±0,23		21,53±0,57	
	abs	%	abs	%
Manual vacuum aspiration	12±0,06	28,9	13±0,08	28,9
Cervical curettage	16±0,06*	20	9±0,05	20
Miscarriage	8±0,05*	22,2	10±0,08	22,2
Ectopic pregnancy	4±0,04	2,2	1±0,03*	2,2
Ovarian cyst	-		2±0,05	4,4
CIN (Cervical Intraepithelial Neoplasia)	-		1±0,02	2,2
Uterine fibroids	6±0,04	6,6	3±0,04	6,7
Infertility	3±0,03	5,5	2±0,03	4,4
Endometriosis	1±0,02	2,2	1±0,02	2,2
Inflammatory diseases of the genitals	28±0,06	51	24±0,05	53,3
Hysterectomy	-	-	2±0,01*	4,4

Note. * – $p < 0.05$ differences – between groups are statistically significant.

As was mentioned serum level of inflammatory and anti-inflammatory cytokines was estimated in dynamic three times. Initially before the operation, and two times

after the operation (10th and 30th days of rehabilitation). The results of immunologic test are given in the table 2, 3 and 4.

Table 2

Both types of cytokines level of before the operation, $M \pm m$, pg/ml

Table 2

Cytokines	Normal values in	Main group	Comparison group
IL-1	0-5	2,1±0,7	2,3±0,8
TNF	0-8,1	6,2±0,3	5,4±0,3
IL-10	0-9,1	7,4±0,5	8,0±0,9
VEGF	27-30	29,1±2,4	27,6±1,8

According to data from table 2 we can say that, serum level of not only inflammatory, but also anti-inflammatory cytokines in the preoperative period was be-

tween normal values and there was not any statistically difference.

Cytokines level in blood serum on the 10th day of rehabilitation, $M \pm m$, pg/ml

Table 3

Cytokines	Normal values	Main group	Comparison group
IL-1	0-5	10,2±1,4	16,3±1,6*
TNF	0-8,1	12,7±1,8	17,7±0,9*
IL-10	0-9,1	20,2±1,0	18,4±1,1
VEGF	27-30	40,2±2,4*	36,3±0,7

Note. * - $p < 0.05$ differences between groups are statistically significant.

On the 10th day of rehabilitation there was significantly increase in the level of in both types of cytokine levels. However, the main thing which should be mentioned is that, the values of inflammatory cytokines was

excessive in the blood serum of patients for whom rehabilitation leading was traditionally comparing to patients group where was used PRP-therapy before and after the surgical treatment.

Cytokines level in blood serum on the 30th day of rehabilitation, $M \pm m$, pg/ml

Table 4

Cytokines	Normal values	Main group	Comparison group
IL-1	0-5	5,1±0,4	11,7±0,8*
TNF	0-8,1	9,0±0,5	16,3±0,4*
IL-10	0-9,1	28,3±2,1*	20,2±1,7
VEGF	27-30	43,3±1,6*	38,0±1,4

Note. * - $p < 0.05$ differences between groups are statistically significant.

The results of immunologic test on the 30th day of rehabilitation period showed that, despite the anti-inflammatory cytokines level was high in both groups, results of the main group were remarkably higher than results of comparison group. Moreover, inflammatory cytokines level on the 30th day of rehabilitation period become near to normal values, whereas in the comparison group they stayed higher.

Conclusion

1. Depending on the research results it can be concluded that, inflammatory and anti-inflammatory cytokine level fluctuates during rehabilitation period and by managing their levels we can provide early finishing of the inflammation phase and starting of the regeneration phase.

2. On the other hand, using PRP-therapy also can accelerate the wound healing process and promote full restoration of tissue without scar.

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CHANGES OF CYTOKINE PROFILE THE DURING REHABILITATION PERIOD AFTER SURGICAL TREATMENT OF PELVIC ORGAN PROLAPSE

Najmutdinova D.K., Gadoyeva D.A., Axmedova G.A.

Objective: To determine the level of proinflammatory and anti-inflammatory cytokines in the blood serum of patients who underwent anterior colporrhaphy and posterior colpoperineoplasty levatorplasty. **Material and methods:** 90 patients with different stages of pelvic organ prolapse according to the POP-Q classification were

observed, who were divided into two groups depending on the use of PRP therapy. **Results:** During the first week after surgery, proinflammatory and anti-inflammatory cytokines were administered to patients in both groups. After 30 days of the postoperative period, the level of anti-inflammatory cytokines was higher in the group where PRP therapy was performed. Surgical trauma can cause acute systemic inflammation, which initially plays a role in immune defense against bacterial infection and in the wound healing process. **Conclusions:** When using PRP therapy, wound healing can be accelerated, and it is also possible to shorten the rehabilitation period with an improvement in its course. **Keywords:** cytokines, inflammation, pelvic organ prolapse, rehabilitation period after PRP therapy.

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