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THE SIGNIFICANCE OF COLPOSCOPY IN THE DETECTION AND EVALUATION OF CERVICAL INTRAEPITHELIAL NEOPLASIA

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XULOSA

Bachadon bo‘yni displaziyasi (CIN) bachadon bo‘yni saratonining rivojlanish xavfi yuqori bo‘lgan o‘zgarishlardan biri bo‘lib, uning erta tashhisi va monitoringi muhim ahamiyatga ega. Kolposkopiya bachadon bo‘yni epiteliyasidagi o‘zgarishlarni aniqlash, patologik jarayonlarni baholash va biopsiya olish uchun asosiy vizualizatsiya usuli hisoblanadi.

Ushbu maqolada kolposkopiyaning diagnostik imkoniyatlari, displaziya darajasini aniqlashdagi roli va uning sitologik hamda kolposkopik belgilarning tuzilishi, uning maqsadi ushbu shartlarning tarqalishini aniqlash va ularning mumkin bo’lgan klinik oqibatlari tahlili o’tkazildi. Tadqiqot natijalari shuni ko‘rsatdiki, kolposkopiya bachadon bo‘yni displaziyasini aniqlash va nazorat qilishda yuqori sezgirlikka ega bo‘lib, uni sitologik skrining bilan qo‘shib olib borish davolash samaradorligini oshirishga yordam beradi.

Kalit so‘zlar: *bachadon bo‘yni intraepitelial neoplaziyasi, papillomavirus infektsiyasi, kolposkopiya, uksuslik sinama, Schiller testi.*

РЕЗЮМЕ

Цервикальная дисплазия (CIN) является одним из предраковых состояний шейки матки с высоким риском развития рака, что делает её раннюю диагностику и мониторинг крайне важными. Кольпоскопия является основным методом визуализации, позволяющим выявлять изменения эпителия шейки матки, оценивать патологические процессы и проводить прицельную биопсию. В данной статье рассматриваются диагностические возможности кольпоскопии, её роль в определении степени дисплазии, а также структура цитологических и кольпоскопических признаков.

Цель исследования *– определить распространённость данных состояний и возможные клинические последствия. Результаты исследования показали, что кольпоскопия обладает высокой чувствительностью в выявлении и контроле цервикальной дисплазии, а её сочетание с цитологическим скринингом способствует повышению эффективности лечения.*

Ключевые слова: *цервикальная интраэпителиальная неоплазия, папилломавирусная инфекция, кольпоскопия, уксусная проба, проба Шиллера.*

Cervical intraepithelial neoplasia (CIN) is one of the precancerous conditions that can lead to cervical cancer [1]. According to the World Health Organization (WHO), more than 600,000 new cases of cervical cancer are registered annually, and over 90% of them are associated with human papillomavirus (HPV) infection [3]. HPV, particularly its high-risk strains (HPV-16, HPV-18), plays a key role in the pathogenesis of CIN, and women carrying this viral infection have a high risk of progression to invasive cervical cancer.

Colposcopy is a primary diagnostic method that allows visualization of morphological changes in the cervical epithelium, assessment of pathological processes, and targeted biopsy sampling. In combination with cytological and histological examinations, this method is crucial for the accurate diagnosis of CIN and for assessing the risk of malignant transformation. In modern medicine, the diagnosis of HPV-associated CIN has been improved through molecular genetic testing, immunohistochemical techniques, and advanced colposcopic examinations [2,3,5].

During colposcopic examinations, pathological signs such as acetowhite epithelium, leukoplakia, punctuation, mosaic pattern, iodine-negative areas, and atypical vessels can be detected. These features help determine the severity of CIN and the likelihood of its progression to cancer [6]. Moreover, colposcopy is an important tool for dynamic follow-up and for evaluating the effectiveness of treatment in patients with HPV-associated CIN.

The relevance of colposcopic diagnosis lies in its high accuracy and sensitivity, making it, in combination with other diagnostic methods (PAP test, molecular tests, biopsy), highly valuable for selecting treatment strategies based on the patient's individual condition [4]. Therefore, the widespread use of colposcopy in cases of HPV-associated CIN is a pressing issue in clinical practice.

OBJECTIVE

To study colposcopic findings in patients with cervical intraepithelial neoplasia associated with human papillomavirus infection.

MATERIALS AND METHODS

The study included 205 women aged 30 to 59 years (mean age: 38.3 ± 6.35 years). The main prospective group consisted of 86 patients with morphologically confirmed moderate dysplasia of the cervical stratified squamous epithelium.

Inclusion criteria: age between 30 and 59 years; morphologically confirmed moderate cervical dysplasia of the stratified squamous epithelium; and signed informed consent to participate in the study.

Exclusion criteria: age under 30 or over 59 years; pregnancy; postpartum period; presence of psychoneurological disorders; genital bleeding; as well as decompensated renal, pulmonary, or hepatic dysfunction. Patients who refused to participate were also excluded.

The main group was divided into two subgroups:

Group 1: 40 patients with CIN2 and confirmed HPV carriage;

Group 2: 46 patients with CIN2 and negative HPV screening results.

The control group included data from 92 healthy women with negative HPV PCR results and NILM findings on liquid-based cytology.

Examination protocol: collection of complaints, medical history, gynecological examination, extended colposcopy, molecular biological tests, cytological examination, and histological evaluation of biopsy material (as indicated).

Extended colposcopy was performed conventionally using an acetic acid test (5% solution) and the Shiller test (Ukraine) during colposcopic examination. Cervical images were obtained with a digital photo-colposcope "Scaner" (MK-300). The results of the colposcopic examination were coded according to the International Terminology of Colposcopy, adopted at the VII World Congress of Colposcopy in 1990 and updated by the International Federation for Cervical Pathology and Colposcopy in 2002.

For the study, a Leisegang colposcope (Germany) with 7×, 15×, and 30× magnification was used. RCS was performed according to standard protocols, first examining the untreated cervical mucosa, followed by application of 3% acetic acid solution and then 2% aqueous Lugol's solution (Shiller's test). During RCS, the affected areas of the cervix were identified for targeted sampling and biopsy for subsequent cytological and histological examination.

RESULTS AND DISCUSSION

According to the examination results, patients in the main group were divided into two subgroups: the first subgroup included 100 patients with CIN2 and negative HPV screening results; the second subgroup comprised 105 patients with CIN2 and confirmed HPV carriage. The control group consisted of 92 patients without morphological changes in the cervix.

Table 1

Distribution of patients by study groups

Age	30-39	40-49	50-59
Group 1, HPV-negative (n = 100)	66,0±4,7	23,0±4,2	11,0±3,1
Group 2, HPV-positive (n = 105)	64,8±4,6	26,6±4,3	8,6±2,7
Control group (n = 92)	67,4±4,9	26,1±4,6	6,5±2,6

The distribution of participants by age categories across the three study and control groups showed that, in both the first and second groups, the largest proportion of patients were aged 30–39 years, accounting for approximately two-thirds of the sample (66.0 ± 4.7% and 64.8 ± 4.6%, respectively). In the control group, the 30–39

age category also predominated, comprising the majority of participants (67.4 ± 4.9%). Patients aged 40–49 years represented a smaller proportion in all groups, with the highest share observed in the second group (26.6 ± 4.3%) and the lowest in the control group (26.1 ± 4.6%). The 50–59 age group was minimally represented in both the first and second groups (11.0 ± 3.1% and 8.6 ± 2.7%, respectively) (Table 1).

Clinical and anamnestic analysis revealed that, regardless of HPV carriage, patients with CIN2 had timely onset of menstruation, whereas in the cervical cancer group, delayed menarche (at age 15 years or older) was recorded in 57.6% of cases. According to patient reports, the average monthly blood loss in the study groups was noted in 95% of patients in group I and 89% in group II.

Table 2

Structure of colposcopic signs in the examined women: comparison of the main and control groups

	Pathology	Group 1, n = 100		Group 2, n = 105		Control group, n = 92	
		n	%	n	%	n	%
1	Normal colposcopic findings						
	Original metaplastic squamous epithelium (MSE)	-	-	-	-	15	16,3±3,9
	Ectopia	-	-	-	-	14	15,2±3,7
	Normal transformation zone	-	-	-	-	90	98,8±1,4
2	Abnormal colposcopic findings	100	100,0±0	105	100,0±0		
A	Minor changes:						
	Acetowhite epithelium	53	53,0±4,9	76	72,3±4,4		
	Fine punctuation	21	21,0±4,1	25	23,8±4,2		
	Fine mosaic	35	35,0±4,8	47	44,8±4,9		
Б	Major changes:						
	Dense acetowhite epithelium	48	48,0±4,9	57	54,3±4,9		
	Coarse punctuation	34	34,0±4,7	44	41,9±4,8		
	Coarse mosaic	41	41,0±4,9	58	55,2±4,9		
	Gross atypical vessels	56	56,0±4,9	69	65,7±4,6		
C	Signs suspicious for invasion:						
	Ulcerations, irregular surface	-	-	-	-		
	Exophytic lesions	-	-	-	-		
	Necrosis, tissue destruction	-	-	-	-		
	Large atypical vessels	-	-	-	-		
3	Non-specific changes:						
	Erosions	23	23,0±4,2	27	25,7±4,3		
	Polyps	11	11,0±3,1	15	14,3±3,4		
	Ectropion	-	-	-	-		
	Atrophy	-	-	-	-		
4	Postoperative changes:						
	After conization, LEEP, biopsy	8	8,0±2,7	12	11,4±3,1		
	Scarring, fibrosis	-	-	-	-		

Colposcopy plays a key role in assessing the condition of the cervix and in detecting abnormalities ranging from normal colposcopic findings to atypical and unsatisfactory changes. An analysis of the structure of colposcopic signs was performed in two study groups–Group 1 (n = 100), Group 2 (n = 105)–and in the control group (n = 92), with the aim of determining the prevalence of these conditions and identifying their potential clinical implications.

As previously noted, the control group included patients in whom extended colposcopy revealed no cervical pathology. In the control group, original metaplastic squamous epithelium (MSE) was colposcopically diagnosed in 15 patients (16.3 ± 3.9%), cervical ectopia in 14 (15.2 ± 3.7%), and a normal type 1 transformation zone was observed in 90 (98.8 ± 1.4%) patients.

In patients of Groups 1 and 2, the colposcopic picture was characterized by the presence of abnormal colposcopic findings.

Among minor changes in abnormal colposcopic patterns, acetowhite epithelium (AWE) was identified in 53 patients (53.0 ± 4.9%) in Group 1 and in 76 (72.3 ± 4.4%) in Group 2; fine punctuation was detected in 21 (21.0 ± 4.1%) in Group 1 and 25 (23.8 ± 4.2%) in Group 2; fine mosaic in 35 (35.0 ± 4.8%) in Group 1 and 47 (44.8 ± 4.9%) in Group 2.

Among major changes, the findings were as follows: dense acetowhite epithelium – 48 patients (48.0 ± 4.9%) in Group 1 and 57 (54.3 ± 4.9%) in Group 2; coarse punctuation – 34 (34.0 ± 4.7%) in Group 1 and 44 (41.9 ± 4.8%) in Group 2; coarse mosaic – 41 (41.0 ± 4.9%) in Group 1 and 58 (55.2 ± 4.9%) in Group 2. These data indicate no significant differences in the frequency of these findings between Groups 1 and 2.

Particular attention was given to atypical vessels, which were detected during extended colposcopy in

patients with cervical pathology. Gross atypical vessels were recorded in 56 patients (56.0 ± 4.9%) in Group 1 and in 69 (65.7 ± 4.6%) in Group 2.

It should be noted that abnormal colposcopic patterns in the same patient could occur in various combinations. The most frequent combination was mosaic, punctuation, and acetowhite epithelium – observed in 24 patients (24.0 ± 4.3%) in Group 1 and 21 (20.0%) in Group 2. The combination of mosaic and acetowhite epithelium was noted in 11 patients (11.0 ± 3.1%) in Group 1 and 7 (6.7 ± 2.4%) in Group 2; the combination of mosaic and atypical vessels – in 8 patients (8.0 ± 2.7%) in Group 1 and 10 (9.5 ± 2.9%) in Group 2.

In addition, non-specific changes were observed, such as fissures and erosions (in 23 patients [23.0 ± 4.2%] in Group 1 and 27 [25.7 ± 4.3%] in Group 2) and polyps (in 11 [11.0 ± 3.1%] in Group 1 and 15 [14.3 ± 3.4%] in Group 2). No significant differences between Groups 1 and 2 were identified for these features. In isolated cases, postoperative changes were noted following conization, LEEP, or biopsy: in 8 patients (8.0 ± 2.7%) in Group 1 and 12 (11.4 ± 3.1%) in Group 2.

CONCLUSION

The results of the study demonstrated that colposcopy is an important diagnostic method for detecting CIN associated with HPV and for assessing its progression. In the analyzed patients, there was a high level of concordance between colposcopic findings and the results of cytological and histological examinations, confirming the reliability of this diagnostic method.

Colposcopic diagnosis plays a key role in evaluating the severity of CIN and in selecting individualized treatment strategies for patients infected with HPV. Notably, in HPV-positive patients, features such as acetowhite epithelium, iodine-negative areas, and atypical vessels were more frequently observed.

This highlights the necessity of using colposcopy as a continuous monitoring tool for patients diagnosed with HPV infection. The study confirms that combining colposcopy with cytological screening and molecular testing increases diagnostic efficiency and enables a more accurate assessment of the risk of malignant transformation. Such an approach contributes to the prevention of cervical cancer development and to the improvement of treatment strategies.

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