UO‘K: 616.146-006.52:578.827.1-07

REPRODUKTIV YOSHDAGI AYOLLARDA JINSIY A’ZOLARNING PAPILLOMAVIRUS INFEKSIYASINI ERTA ANIQLASHDA PZR, SITOLOGIK VA MIKROBIOLOGIK TEKSHIRUVLARNING AHAMIYATI

Raxmanova Nozima Qahramon qizi – doktarant
Xadjimetov Abdugafur Axatovich – t.f.d., professor
Toshkent davlat tibbiyot universiteti (Toshkent, O‘zbekiston)
Orifjon Aripov Abdumalikovich – t.f.d., professor
Tibbiyot xodimlarining kasbiy malakasini rivojlantirish Markazi (Toshkent, O‘zbekiston)

Annotatsiya. *Inson papillomavirusi infeksiyasi ayollar reproduktiv salomatligiga salbiy ta’sir ko‘rsatadigan, bachadon bo‘yni va boshqa genital a’zolar kasalliklari rivojlanishida muhim etiologik omillardan biri hisoblanadi. Shu sababli infeksiyani erta bosqichda aniqlash, xavf guruhlarini belgilash hamda asoratlarning oldini olish zamonaviy tibbiyotning dolzarb vazifalaridan biridir. Reproduktiv yoshdagi ayollarda jinsiy a’zolarning papillomavirus infeksiyasini erta aniqlashda polimeraza zanjir reaksiyasi, sitologik va mikrobiologik tekshiruvlarning ahamiyati yoritilgan. Tadqiqotda HPV16 bo‘yicha PZR natijalari, vaginal mikroflora haqidagi mikrobiologik hisobotlar hamda sitologik materiallar birgalikda baholandi. Olingan natijalar klinik amaliyotda kompleks laborator yondashuv muhim ekanini ko‘rsatadi.*

Kalit so‘zlar: *HPV, HPV16, PZR, sitologiya, Pap-test, vaginal mikroflora, mikrobiologik tekshiruv, reproduktiv yoshdagi ayollar.*

ЗНАЧЕНИЕ ПЦР, ЦИТОЛОГИЧЕСКОГО И МИКРОБИОЛОГИЧЕСКОГО ИССЛЕДОВАНИЙ В РАННЕЙ ДИАГНОСТИКЕ ПАПИЛЛОМАВИРУСНОЙ ИНФЕКЦИИ ПОЛОВЫХ ОРГАНОВ У ЖЕНЩИН РЕПРОДУКТИВНОГО ВОЗРАСТА

Рахманова Нозима Кахрамон кизи – ассистент
Хаджиметов Абдугафур Ахатович – д.м.н., профессор
Ташкентский государственный медицинский университет (Ташкент, Узбекистан)
Орифжон Арипов Абдумаликович – д.м.н., профессор
Центр Квалификации Медицинских Работников (Ташкент, Узбекистан)

Аннотация. *Вирус папилломы человека, особенно его высокоонкогенные типы, может служить причиной развития патологических изменений шейки матки и других генитальных органов. В связи с этим ранняя диагностика данной инфекции, оценка факторов риска и профилактика осложнений являются одной из актуальных задач современной медицины. В данной статье проанализированы современные методы ранней диагностики папилломавирусной инфекции половых органов у женщин репродуктивного возраста, включая цитологические, молекулярно-генетические и микробиологические методы исследования. Значение полимеразной цепной реакции, цитологического и микробиологического исследований в ранней диагностике папилломавирусной инфекции у женщин репродуктивного возраста. Проанализированы результаты ПЦР на HPV16, микробиологические данные о вагинальной микрофлоре и цитологические материалы. Полученные данные показывают целесообразность комплексного лабораторного подхода.*

Ключевые слова: *HPV, HPV16, ПЦР, цитология, Пап-тест, вагинальная микрофлора, микробиологическое исследование.*

THE IMPORTANCE OF PCR, CYTOLOGICAL, AND MICROBIOLOGICAL EXAMINATIONS IN THE EARLY DIAGNOSIS OF GENITAL PAPILLOMAVIRUS INFECTION IN WOMEN OF REPRODUCTIVE AGE

Rakhmanova Nozima Kahramon kizi – doctoral student
Khadjimetov Abdugafur Akhatovich – D.M.Sc., professor
Tashkent state medical university (Tashkent, Uzbekistan)
Orifjon Aripov Abdumalikovich – D.M.Sc., professor
Center for Professional Development of Medical Workers (Tashkent, Uzbekistan)

Abstract. *Human papillomavirus, especially its high-oncogenic-risk types, may lead to the development of pathological changes in the cervix and other genital organs. Therefore, early diagnosis of this infection, assessment of risk factors, and prevention of complications remain urgent issues in modern medicine. This article analyzes current approaches to the early diagnosis of genital papillomavirus infection in women of reproductive age, including cytological, molecular-genetic, and microbiological diagnostic methods. The importance of PCR, cytological, and microbiological examinations in the early diagnosis of genital papillomavirus infection in women of reproductive age. The study considered HPV16 PCR results, microbiological reports on vaginal microflora, and cytological materials. The findings support the value of a combined laboratory approach.*

Keywords: *HPV, HPV16, PCR, cytology, Pap test, vaginal microflora, microbiological examination.*

Inson papilloma virusi reproduktiv yoshdagi ayollarda bachadon bo‘yni patologiyalarining muhim xavf omillaridan biTri hisoblanadi. Ayniqsa, HPV 16 va 18 yuqori onkogen xavfga ega bo‘lib, uzoq davom etuvchi infeksiya holatida bachadon bo‘yni epiteliysida displastik o‘zgarishlar rivojlanishiga sabab bo‘lishi mumkin. Shu sababli kasallikni erta aniqlash va laborator tekshiruvlarni kompleks baholash muhimdir.

Amaliyotda PZR usuli virusni erta bosqichda aniqlash imkonini beradi, sitologik tekshiruv esa epiteliy hujayralaridagi morfologik o‘zgarishlarni ko‘rsatadi. Mikro-biologik tekshiruvlar vaginal muhit va yondosh infeksiyalar holatini baholashga yordam beradi. Ushbu maqolada aynan shu uch yo‘nalish birgalikda ko‘rib chiqildi.

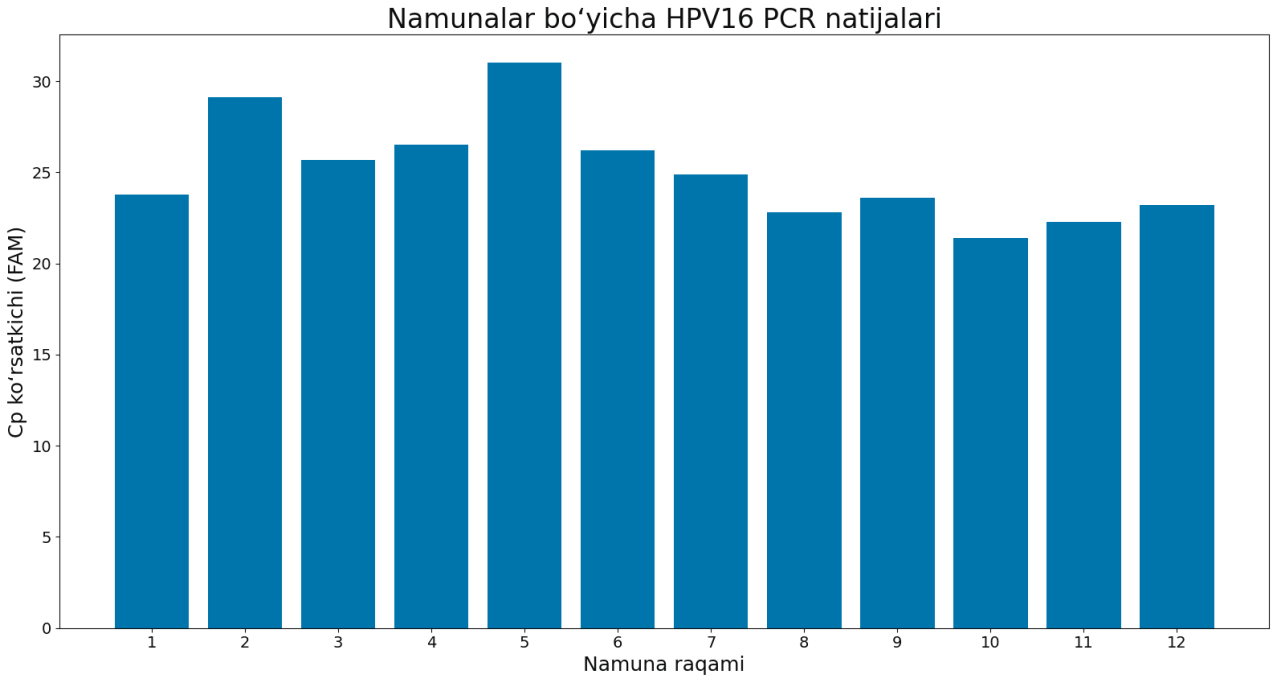
Tadqiqot maqsadi. Reproduktiv yoshdagi ayollarda papillomavirus infeksiyasini erta aniqlashda PZR, sitologik va mikrobiologik tekshiruvlarning ahamiyatini baholash.

Tadqiqot materiallari va usullari. Tadqiqotda HPV16 bo‘yicha real-time PCR hisoboti, mikrobiologik laborator natijalar va sitologik materiallar o‘rganildi. PZR hisobotida 12 ta namuna bo‘yicha Cp ko‘rsatkichlari keltirilgan. Mikrobiologik hisobotlarda vaginal mikroflorada aniqlangan turli mikroorganizmlar va ularning sezgirlik profillari qayd etilgan. Sitologik materiallar rasm ko‘rinishida taqdim etilgan bo‘lib, ular hujayraviy o‘zgarishlarni tasdiqlovchi material sifatida baholandi.

1-jadval.

HPV16 bo‘yicha PCR natijalari

Namuna	Cp (FAM)	Cp (HEX)	Izoh
1	23.8	22.5	Ijobiy amplifikatsiya
2	29.1	-	Ijobiy amplifikatsiya
3	25.7	-	Ijobiy amplifikatsiya
4	26.5	-	Ijobiy amplifikatsiya
5	31.0	-	Ijobiy amplifikatsiya
6	26.2	-	Ijobiy amplifikatsiya
7	24.9	34.3	Ijobiy amplifikatsiya
8	22.8	36.0	Ijobiy amplifikatsiya
9	23.6	-	Ijobiy amplifikatsiya
10	21.4	24.1	Ijobiy amplifikatsiya
11	22.3	-	Ijobiy amplifikatsiya
12	23.2	-	Ijobiy amplifikatsiya



1-rasm. **Namunalar bo‘yicha HPV16 Cp ko‘rsatkichlari**

Tadqiqot natijalari

PCR natijalariga ko‘ra, tekshirilgan 12 namunada HPV16 bo‘yicha amplifikatsiya qayd etildi. Eng past FAM qiymati 10-namunada 21,4 bo‘lib, undan keyin 11-namuna 22,3 va 8-namuna 22,8 ko‘rsatkichlari kuzatildi. Eng yuqori qiymat 5-namunada 31,0 bo‘ldi. Bu natijalar tekshirilgan materiallarda HPV16 mavjudligini ko‘rsatadi.

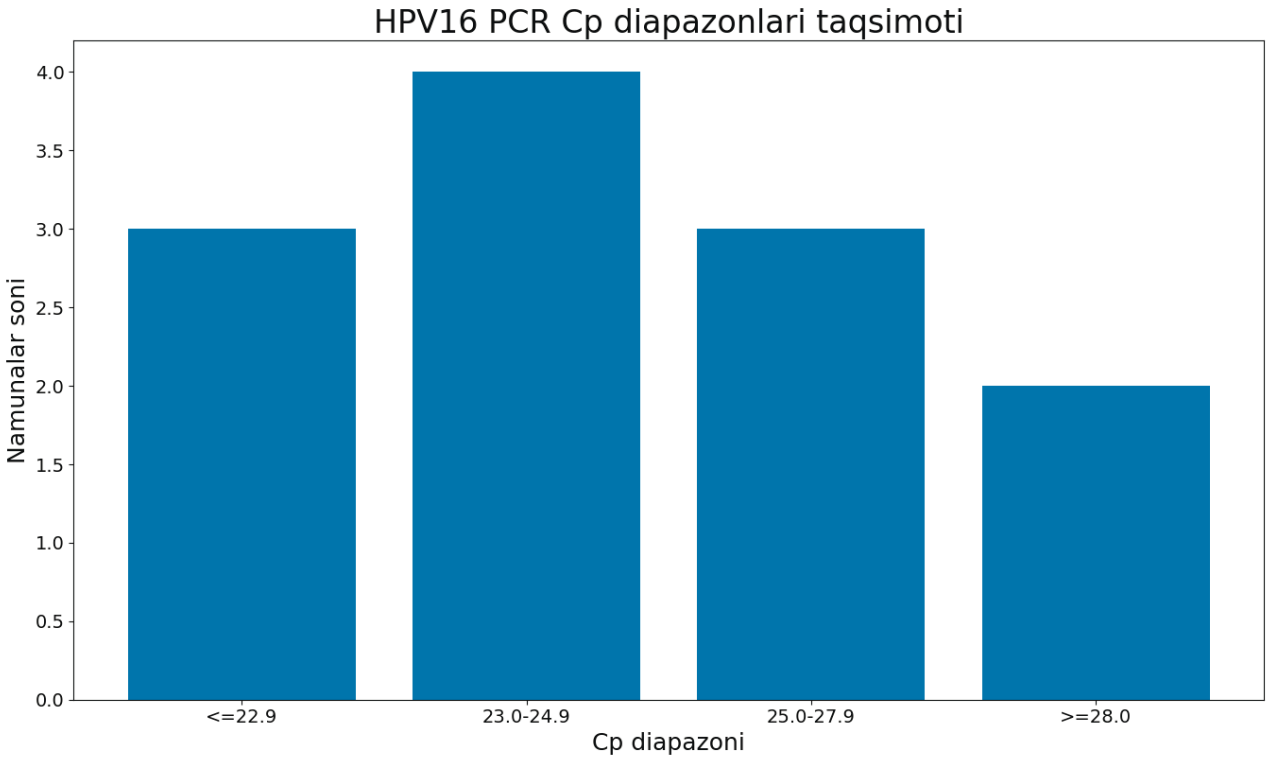
Mikrobiologik tekshiruvlarda vaginal mikrofloraning bir xil emasligi aniqlandi. Hisobotlarda Staphylococcus epidermidis, Staphylococcus aureus, Streptococcus agalactiae, Escherichia coli, Shigella dysenteriae, Candida spp., Lactococcus lactis lactis va Leuconostoc pseudomesenteroides kabi mikroorganizmlar qayd etilgan. Ushbu topilmalar yondosh mikrobiologik o‘zgarishlar ham mavjud bo‘lishi mumkinligini ko‘rsatadi.

Sitologik materiallarda hujayraviy o‘zgarishlarni tasdiqlovchi morfologik belgilar kuzatildi. Sitologik tasvirlar PCR natijalari bilan birgalikda qaralganda, papillomavirus infeksiyasi faqat molekulyar emas, balki hujayraviy darajada ham namoyon bo‘layotganini ko‘rsatadi.

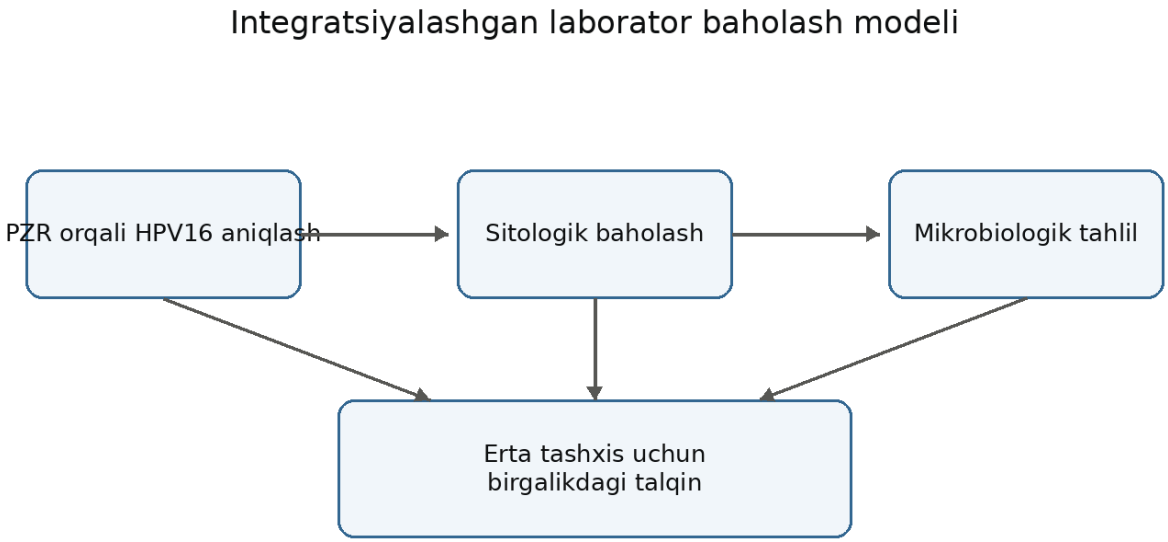
2-jadval.

Mikrobiologik hisobotlarda aniqlangan asosiy mikroorganizmlar

Mikroorganizm	Guruh	Klinik ahamiyati
Staphylococcus epidermidis	Opportunistik flora	Servikovaginal muhitdagi disbiotik fonni ko‘rsatishi mumkin
Staphylococcus aureus	Opportunistik flora	Yallig‘lanish va qo‘shimcha infeksiya bilan bog‘liq bo‘lishi mumkin
Streptococcus agalactiae	Streptokokk	Genital traktda klinik ahamiyatga ega bo‘lishi mumkin
Escherichia coli	Enterik flora	Aralash flora yoki kontaminatsiya ehtimolini ko‘rsatadi
Shigella dysenteriae	Enterik flora	Etiologik rolini klinik ma’lumot bilan baholash lozim
Candida spp.	Zamburug‘	Kandidoz yoki mikrobiota buzilishi bilan bog‘liq bo‘lishi mumkin



2-rasm. **HPV16 Cp ko‘rsatkichlarining diapazonlar bo‘yicha taqsimlanishi**



3-rasm. **Integratsiyalashgan diagnostik yondashuv sxemasi**

Olingan natijalar papillomavirus infeksiyasini baholashda kompleks yondashuv zarurligini ko‘rsatadi. PZR usuli virusni aniqlaydi, sitologik tekshiruv hujayralardagi o‘zgarishlarni baholaydi, mikrobiologik usul esa vaginal muhit va yondosh mikroorganizmlar haqidagi ma’lumotlarni beradi. Shu sababli birgina usulga tayanish ayrim hollarda yetarli bo‘lmasligi mumkin.

Mikrobiologik natijalarda opportunistik flora va Candida spp. aniqlanishi servikovaginal muhitda disbiotik o‘zgarishlar mavjud bo‘lishi mumkinligini

ko‘rsatadi. Bu esa sitologik tasvir va klinik belgilarni to‘g‘ri talqin qilishda qo‘shimcha ahamiyatga ega.

Xulosa.

Reproduktiv yoshdagi ayollarda papillomavirus infeksiyasini erta aniqlashda PZR, sitologik va mikrobiologik tekshiruvlar bir-birini to‘ldiruvchi usullar hisoblanadi. PCR natijalari HPV16 mavjudligini, sitologik materiallar hujayraviy o‘zgarishlarni, mikrobiologik tekshiruvlar esa vaginal mikroflorada yondosh o‘zgarishlar borligini ko‘rsatdi.

ADABIYOTLAR

1. World Health Organization. Cervical cancer. Geneva: WHO; 2025.
2. World Health Organization. WHO guideline for screening and treatment of cervical pre-cancer lesions for cervical cancer prevention: use of dual-stain cytology to triage women after a positive test for human papillomavirus (HPV). Geneva: WHO; 2024.
3. World Health Organization. Self-care interventions for health and well-being: HPV self-sampling as part of cervical cancer screening. Geneva: WHO; 2023.
4. Wei F, Georges D, Man I, Baussano I, Clifford GM, et al. Causal attribution of human papillomavirus genotypes to invasive cervical cancer worldwide: a systematic analysis of the global literature. Lancet. 2024.
5. International Agency for Research on Cancer. Global attribution of HPV genotypes to invasive cervical cancer: a systematic analysis. Lyon: IARC; 2024.
6. National Cancer Institute. HPV and Cancer. Bethesda: NCI; 2025.
7. Ouh YT, Min KJ, Choi CH, Lee JW, Kim BG, et al. Enhancing cervical cancer screening: review of p16/Ki-67 dual staining as a promising triage strategy. Cancers (Basel). 2024;16(2).
8. Clarke MA, Cheung LC, Castle PE, et al. Recommendations for use of p16/Ki67 dual stain for management of individuals testing positive for human papillomavirus. J Low Genit Tract Dis. 2024.
9. Harper DM, et al. p16/Ki-67 dual stain triage of individuals positive for HPV to detect cervical precancer: review and clinical perspective. Ther Adv Vaccines Immunother. 2025.
10. Schreiberhuber L, Barrett JE, Wang J, et al. Cervical cancer screening using DNA methylation triage in a real-world population. Nat Med. 2024;30 (8):2251-2257.
11. Burdier FR, Nieves L, Rojas M, et al. DNA methylation as a triage tool for cervical cancer screening: a systematic review. Int J Mol Sci. 2024.
12. Xia W, Li Y, Zhang H, et al. DNA methylation triage of human papillomavirus-positive ASC-US women in cervical cancer screening. Cancer Cytopathol. 2026.
13. Thrall MJ, et al. Triage options for positive high-risk HPV results from HPV-based cervical cancer screening: a review of potential alternatives to Papanicolaou test cytology. J Am Soc Cytopathol. 2025.
14. Goldstein A, et al. The future of cervical cancer screening. Int J Womens Health. 2024.
15. Martins TR, et al. Molecular screening for cervical cancer. Genes (Basel). 2025;16(9):1041.
16. Bhatla N, Aoki D, Sharma DN, Sankaranarayanan R. Cancer of the cervix uteri: 2025 update. Int J Gynaecol Obstet. 2025;171 Suppl 1:87-108.
17. Colonetti T, et al. Self-sampling for HPV testing in cervical cancer screening: a systematic review. Healthcare (Basel). 2024.
18. Fullerton MM, et al. HPV self-sampling implementation strategies to engage under-screened women: a scoping review. 2024.
19. Aimagambetova G, et al. Comparison of diagnostic accuracy and acceptability of self-sampling devices for HPV testing in cervical cancer screening. 2024.
20. Otieno JA, et al. Human papillomavirus self-sampling versus provider-collected sampling for cervical cancer screening: acceptability, accuracy and cost-effectiveness. 2024.
21. Cora-Cruz MS, et al. Evaluating human papillomavirus self-sampling among Latinas in the United States: a systematic review. 2024.
22. Oommen AM, et al. Strategies and implementation outcomes of HPV-based cervical screening studies to prevent cervical cancer in India: a systematic review. J Cancer Policy. 2024;42:100513.
23. Goulart RA, et al. Extended HPV genotyping and dual stain for the triage of HPV-positive screening tests: practical considerations for laboratory implementation. 2025.
24. Ntamushigo JC, et al. Review of triage strategies for atypical squamous cells in HPV-based cervical screening. 2025.
25. de Sanjosé S, et al. Design of the HPV-Automated Visual Evaluation (PAVE) study: integrated modern approaches to HPV-based cervical screening. 2023.