

World Journal of *Clinical Cases*

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REVIEW

- 1888 Endoscopic transluminal drainage and necrosectomy for infected necrotizing pancreatitis: Progress and challenges
Zeng Y, Yang J, Zhang JW

MINIREVIEWS

- 1903 Functional role of frontal electroencephalogram alpha asymmetry in the resting state in patients with depression: A review
Xie YH, Zhang YM, Fan FF, Song XY, Liu L
- 1918 COVID-19 related liver injuries in pregnancy
Sekulovski M, Bogdanova-Petrova S, Peshevska-Sekulovska M, Velikova T, Georgiev T
- 1930 Examined lymph node count for gastric cancer patients after curative surgery
Zeng Y, Chen LC, Ye ZS, Deng JY
- 1939 Laparoscopic common bile duct exploration to treat choledocholithiasis in situs inversus patients: A technical review
Chiu BY, Chuang SH, Chuang SC, Kuo KK
- 1951 Airway ultrasound for patients anticipated to have a difficult airway: Perspective for personalized medicine
Nakazawa H, Uzawa K, Tokumine J, Lefor AK, Motoyasu A, Yorozu T

ORIGINAL ARTICLE**Observational Study**

- 1963 Clinicopathological features and expression of regulatory mechanism of the Wnt signaling pathway in colorectal sessile serrated adenomas/polyps with different syndrome types
Qiao D, Liu XY, Zheng L, Zhang YL, Que RY, Ge BJ, Cao HY, Dai YC

Randomized Controlled Trial

- 1974 Effects of individual shock wave therapy *vs* celecoxib on hip pain caused by femoral head necrosis
Zhu JY, Yan J, Xiao J, Jia HG, Liang HJ, Xing GY

CASE REPORT

- 1985 Very low calorie ketogenic diet and common rheumatic disorders: A case report
Rondanelli M, Patelli Z, Gasparri C, Mansueto F, Ferraris C, Nichetti M, Alalwan TA, Sajoux I, Maugeri R, Perna S
- 1992 Delayed versus immediate intervention of ruptured brain arteriovenous malformations: A case report
Bintang AK, Bahar A, Akbar M, Soraya GV, Gunawan A, Hammado N, Rachman ME, Ulhaq ZS

- 2002** Children with infectious pneumonia caused by *Ralstonia insidiosa*: A case report
Lin SZ, Qian MJ, Wang YW, Chen QD, Wang WQ, Li JY, Yang RT, Wang XY, Mu CY, Jiang K
- 2009** Transient ischemic attack induced by pulmonary arteriovenous fistula in a child: A case report
Zheng J, Wu QY, Zeng X, Zhang DF
- 2015** Motor cortex transcranial magnetic stimulation to reduce intractable postherpetic neuralgia with poor response to other therapies: Report of two cases
Wang H, Hu YZ, Che XW, Yu L
- 2021** Small bowel adenocarcinoma in neoterminal ileum in setting of stricturing Crohn's disease: A case report and review of literature
Karthikeyan S, Shen J, Keyashian K, Gubatan J
- 2029** Novel combined endoscopic and laparoscopic surgery for advanced T2 gastric cancer: Two case reports
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- 2036** Acromicric dysplasia caused by a mutation of fibrillin 1 in a family: A case report
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- 2051** Granulomatous prostatitis after bacille Calmette-Guérin instillation resembles prostate carcinoma: A case report and review of the literature
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- 2060** Unusual capitate fracture with dorsal shearing pattern and concomitant carpometacarpal dislocation with a 6-year follow-up: A case report
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- 2067** Live births from *in vitro* fertilization-embryo transfer following the administration of gonadotropin-releasing hormone agonist without gonadotropins: Two case reports
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- 2074** Spontaneous conus infarction with "snake-eye appearance" on magnetic resonance imaging: A case report and literature review
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- 2084** Transseptal approach for catheter ablation of left-sided accessory pathways in children with Marfan syndrome: A case report
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- 2091** Occipital artery bypass importance in unsuitable superficial temporal artery: Two case reports
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ABOUT COVER

Editorial Board Member of *World Journal of Clinical Cases*, Marilia Carabotti, MD, PhD, Academic Research, Medical-Surgical Department of Clinical Sciences and Translational Medicine, University Sapienza Rome, Rome 00189, Italy. mariliacarabotti@gmail.com

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Vaginal microbes confounders and implications on women's health

Wassan Nori, Ban H-Hameed

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Wassan Nori, Ban H-Hameed, Department of Obstetrics and Gynecology, Mustansiriya University, Baghdad 10052, Al Saydyah, Iraq

Corresponding author: Wassan Nori, PhD, Academic Editor, Academic Research, Senior Researcher, Department of Obstetrics and Gynecology, Mustansiriya University, Al Amin, Street No. 38, Baghdad 10052, Al Saydyah, Iraq. dr.wassan76@uomustansiriya.edu.iq

Abstract

The vagina has diverse vaginal microbes (Vm). A disturbance in the delicate balance maintained in Vm is linked to women's obstetrical and reproductive tract problems. Vaginal microbes play an essential role in protecting the health of the female reproductive tract by alleviating gynecological infection. However, Vm profiling has many confounders that need to be addressed during sampling, including age, race, pregnancy, medical illness, and smoking. Vm profiling improves reproduction odds, may serve as a marker for genital malignancies and have a therapeutic application in menopausal women and women with cervical cancers.

Key Words: Vaginal microbes; Lactobacillus; Infertility; Probiotics; Cancer; Menopause

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Core Tip: The vaginal ecosystem has a key role in women's health. Vaginal microbes (Vm) affect the obstetrical performance of pregnant women and, in turn, can be affected by age, gestational age, race, and time of sampling. For infertile women, Vm composition can affect fertilization odds, the success of assisted reproduction technique, and even may predict the chances of live birth. The therapeutic aspect of Vm was introduced to enhance vaginal protection against infection, alleviate menopausal symptoms, and, finally, in genital malignancies. Vm was used as a signature marker in predicting and preventing ovarian and cervical malignancies, respectively.

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TO THE EDITOR

We read with interest Liao *et al's* study[1] published in *World J Clin Cases* that discusses the influence of vaginal microbes (Vm) on pregnant women's health and how the integrity of the vaginal ecosystem is maintained by a delicate balance of vaginal sanitation and group B streptococcus status[1].

Studying the Vm has many implications for obstetrical and gynecological diseases in women. Earlier work has examined confounders that can affect Vm, which was not discussed in Liao *et al's* study[1], including; women's age, race, pregnancy and gestational age at sampling, smoking, and sexual activity [2-4].

A recent meta-analysis described the effect of race and age on the unique ecosystem of Vm. The study confirmed that Chinese females hosted a distinct Vm from other ethnicities. In good agreement, Dunlop *et al* discussed different Vm in a group of African American women *vs* non-African American study population they examined[5,6].

Certain behaviors and customs can influence human races. Male circumcision, which is performed in some societies, is believed to minimize Human papillomavirus (HPV) transmission, a significant factor in the development of cervical cancer. Furthermore, in other communities, females may have several male partners, which may enhance the transmission of sexually transmitted diseases, including HPV[7, 8].

Other studies addressed the difference between Vm in the pregnant *vs* non-pregnant population due to different hormonal influences[5].

Even for pregnant women, the sampling timing affects the observed Vm seen, as Laghi *et al's* study[9] suggested. Moreover, they discussed the effect of females' age, diet, smoking, and sex on modifying the Vm composition[9,10].

Diseases caused by vaginal infections inversely impact obstetrical performance, like preterm labor and abortion. Furthermore, the implication of Vm on fertility outcomes and women's health in menopause was explored, given the increasing number of women entering menopause. An emphasis was made on Vm's benefit in the management of menopausal symptoms, reducing the risk of osteoporosis, regulating the nervous system, and lipid profiling for menopausal women[11-13].

Polycystic ovarian syndrome is a common cause of female infertility; research showed reduced Lactobacillus in the vagina and cervix of affected women. Consequently, fertilization rates were reduced due to oocyte damage by colonizing microbes in the oocyte's follicular fluid[14,15]. For infertile couples seeking assisted reproductive technique(ART), an alteration in Vm and male seminal fluid microbes were linked to unsuccessful ART outcome; in fact, Lactobacillus presence in the women's lower and upper genital tract favors positive outcomes[16-18].

Additionally, Vm profiling was used to predict successful *in-vitro* fertilization with or without intracytoplasmic sperm injection cycle and showed a predictive accuracy of 94%. Lactobacillus dominance was key in predicting pregnancy success and odds of live birth (odds ratio 0.66, 95% confidence interval 0.50-0.88)[19,20].

It is well known that genital infection causes a change of Vm predominant; interestingly, a correlation was found between the alteration of Vm and the development of epithelial ovarian cancer, a malignancy that is usually present in late or advanced stages. It was proposed that Vm could serve as a useful biomarker for earlier diagnosis and prevention of ovarian and cervical cancers[21-23].

Detection and clustering of Vm were based on culture-dependent methods[9,21]. However, due to their limitations, detection of Vm was shifted to culture-independent methods in the last few years, for example, Sanger sequencing of the 16S rRNA of bacterial colonies and Illumina-based amplicon sequencing of the V6 region of the 16S rRNA gene[10,21].

A therapeutic avenue of Vm was also suggested; a probiotic is a preparation containing viable microbial agents to improve health. Treatment with probiotics to relieve genitourinary sequelae in postmenopausal women (PMW) is a promising option *via* restoring Lactobacillus abundance in the vagina. Recent evidence shows that oral and direct administration of probiotics in the vagina is an adjuvant therapy to estrogen withdrawal in PMW[13,24].

Probiotics were also used for their anticancer activities in cervical cancer *via* activating the maturation of natural killer cells and promoting cellular and humoral immunity. Additionally, probiotics were added to reduce the side effects of radiation therapy for cervical malignancies[25].

The Corona Virus Infectious Disease(COVID)-19 pandemic has had a detrimental effect on fetal-maternal outcomes[26]. Celik *et al*[27] discovered a considerable change in Vm in affected cases. In fact, the more severe the maternal illness, the more Vm is altered. As a result, the researchers hypothesized that COVID-19 fosters an undesirable vaginal microenvironment. These findings point to the potential use of microbiome-associated indicators as a risk assessment tool for preterm birth in COVID-19 pregnant women. In addition, a therapeutic avenue can be created *via* the modification of Vm in affected cases[27].

In conclusion, Vm have confounders that need to be adjusted before sampling; moreover, Vm has implication for women's obstetrical and fertility potential. Vm can protect against infection development, be a signature biomarker for predicting ovarian cancer, and have promising therapeutic applications for PMW and patients with cervical cancer.

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FOOTNOTES

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ORCID number: Wassan Nori 0000-0002-8749-2444; Ban H-Hameed 0000-0001-8451-652X.

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