İstanbul Med J 2022; 23(1): 29-33
DOI: 10.4274/imj.galenos.2022.68812

Evaluation of Vaginal Culture Results in Recurrent Vaginitis

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ABSTRACT

Introduction: Vaginitis is one of the most common complaints of women who present to health institutions. This study aimed to evaluate the results of vaginal culture obtained from patients who were admitted to the outpatient clinic because of recurrent vaginitis.

Methods: Patient records including vaginal culture results of patients aged 18-49 years who were admitted to the gynecology outpatient clinics of the University of Health Sciences Turkey, İstanbul Training and Research Hospital between January 2018 and June 2020 with the complaint of recurrent vaginitis were analyzed retrospectively.

Results: The mean age of the 206 patients included in the study was 34.4±12.2 years. Of the 206 vaginal cultures, 124 (60,1%) were negative and 82 (39.8%) were culture positive. Thirty-four patients (16,5%) had mixt microorganisms, 22 had Candida species (10,6%) and 11 had Gardnerella vaginalis (5,3%). Various bacteria were isolated in 15 patients.

Conclusion: The rate of vaginitis recurrence and type of microorganism detected can be affected by various factors such as sociocultural structure, race, education level, and contraception method. Only a few studies examined vaginal culture results in patients with recurrent and persistent vaginitis in general and in Turkey. In this study, the contribution of vaginal culture to patient management was limited in this patient group; moreover, the incidence of recurrent vaginitis was lower in women who were using the barrier method.

Keywords: Vaginitis, Candida, *Gardnerella vaginalis*, Trichomonas

Introduction

Vaginitis is a state of vaginal infection and inflammation with symptoms such as itching, burning, dyspareunia, abnormal vaginal discharge and bad odor (1). It is one of the most common reasons for women to apply to a health institution (2). Pain and discomfort may result in significant loss of work force, absenteeism from school, and sexual dysfunction (1). In patients with vaginal symptoms, 20-25% candida, 40-50% bacterial vaginosis (BV) and 15-20% trichomonas have been found to be causative agents, but some patients may not be able to show an agent (1,3,4).

There are no symptoms that have sufficient predictive value to definitively diagnose infectious diseases, but they can help the diagnosis (3). Microscopic examination of fresh saline preparation in vaginitis is the most practical way to confirm the diagnosis (3). Because of the heterogeneity of the vaginal flora, culture is not recommended in the diagnosis of BV (1). The diagnosis of vulvovaginal candidiasis is made by detecting yeast, spores, and pseudohyphae in fresh saline preparation microscopy in patients with clinical suspicion and normal pH (sensitivity 60-70%) (1,3). In treatment planning for vulvovaginal candidiasis with negative microscopy or complicated vulvovaginal candidiasis [recurrent (4 or more attacks in 12 months), severe vulvovaginal candidiasis, suspected to be caused by non-albicans species, seen in immunocompromised patients such as pregnant, uncontrolled diabetes, human immunodeficiency virus infection] culture is preferred (1,5). Trichomonas vaginitis is diagnosed by showing motile Trichomonas vaginalis in a fresh saline preparation (sensitivity: 50-60%) or by nucleic acid amplification tests with high sensitivity (1,3). In the diagnosis of trichomonas, culture is considered less appropriate than molecular detection methods because it takes at least 5 days to result and requires special microbiological media (1).

Culture in vaginitis is a method suitable for use in selected cases. Culture seems appropriate in cases where access to other simple methods is not possible (e.g., inability to perform microscopy, lack of molecular detection methods) and in vulvovaginal candidiasis microscopy-negative and complicated cases (1,3,5,6).

In our study, we aimed to evaluate the results of vaginal cultures obtained from patients who applied to our hospital with recurrent or persistent vulvovaginitis.

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Cite this article as: Ünal F. Evaluation of Vaginal Culture Results in Recurrent Vaginitis. İstanbul Med J 2022; 23(1): 29-33.

Received: 19.10.2021
Accepted: 07.01.2022

Methods

The study was carried out by retrospectively examining the files of patients aged 18-49 years who applied to the gynecology outpatient clinics of University of Health Sciences Turkey, İstanbul Training and Research Hospital, Obstetrics and Gynecology Outpatient Clinics between January 2018 and June 2020 with the complaint of recurrent or persistent vulvovaginitis and whose vaginal cultures were taken. As a result of the examination, the results of the vaginal cultures taken from the patients were evaluated and the percentage distribution of the results was obtained. In our hospital, vaginal culture samples are delivered to the University of Health Sciences Turkey, İstanbul Training and Research Hospital microbiology laboratory with Stuart transport swap and medium (BTR-Gülkimya/Ankara or Fıratmed/Ankara). Samples are inoculated on 5% blood agar, MacConkey agar and Candidal samples on Sabouraud medium. Microorganisms are identified by fresh saline preparation and gram staining after incubation. *T. vaginalis* is diagnosed by monitoring trophozoites in a fresh saline preparation. *Candida* is identified by the appearance of yeast or pseudohyphae and growth in culture. BV is diagnosed by Gram staining of coccobacilli with variable staining, visualization of epithelial cells, namely clue cells, to which these bacteria adhere, and Nugent scoring.

Inclusion criteria:

1. Persistent vaginitis: patients whose symptoms regressed after the first treatment, but who were diagnosed with vaginitis with the same symptoms in the controls within the first month.

2. Recurrent vulvovaginal candidiasis: defined as 4 or more attacks per year (7).

3. Three or more attacks in the last 12 months for recurrent BV and other vaginitis agents (8,9).

Exclusion criteria:

1. Contact dermatitis (allergic dermatitis): vaginitis caused by intravaginal pessaries and creams (10).

2. Desquamative inflammatory vaginitis: uncommon, non-infective, painful vaginitis of unknown cause, characterized by radiance, erythematous patches and/or petechiae (11).

3. Chronic drug eruption: erosive vulvovaginitis mostly associated with nonsteroidal anti-inflammatory drugs and statins.

4. Type 1 hypersensitivity reactions: itching, burning, may result from exposure to latex condoms and seminal fluids.

5. Pregnant patients, those with malignant or chronic autoimmune diseases, those who use drugs continuously for these reasons and other rare causes of vaginal symptoms.

Our study was approved by the Ethics Committee of University of Health Sciences Turkey, İstanbul Training and Research Hospital (approval number: 2468, date: 10.07.2020). Since our study was retrospective, informed consent was not obtained from the patients.

Statistical Analysis

Statistical analyzes were performed using Windows Statistical Package for the Social Sciences 15.0 software (SPSS, Chicago, IL, USA). Qualitative data were analyzed with the chi-square test. $P<0.01$ was considered statistically significant.

Results

As a result of retrospective examination of patient files, vaginal culture results of 212 patients were obtained. Four patients were excluded from the study because of continuous drug use due to various chronic diseases, and 2 patients due to antibiotic use in the last 15 days due to different focus of infection. Culture results of 206 patients with recurrent or persistent vaginitis were included in the study. The mean age of the patients included in the study was 34.4 and ±12.2. Median parity value was determined as 2 (minimum: 0 - maximum: 9). Thirty-nine patients had never given birth. The microorganisms detected in the culture results and their percentages are given in Table 1.

There was no growth in 124 (60.1%) of 206 patients. Mixed growth was observed in 34 patients (16.5%). Candida species grew in 22 (10.6%) and *Gardnerella vaginalis* in 11 (5.3%) of 48 (23.3%) patients with growth. Various bacteria grew in the remaining 15 patients (Table 1). Trichomonas vaginalis, which is one of the important vaginitis agents, could not be determined as a factor.

Twenty-five of 206 patients was using condom (barrier method) to prevent pregnancy. One hundred and seven patients were using non-barrier methods: distribution of these patients by method; 43 patients were protected with intrauterine device (IUD), 24 patients with oral contraceptive (OCS), 11 patients with monthly injectable hormone, 29 patients with tubal ligation. The remaining 44 patients were either unprotected or protected by ineffective-conventional methods (calendar method, withdrawal, etc.). Information about the method of protection could not be obtained from the files of 30 patients.

When 132 patients using any effective contraceptive method were evaluated within themselves; in 25 patients using the barrier method; there were 2 mixed growths, 2 *Candida albicans* (*C. albicans*), 2 *G. vaginalis*, 1 *Escherichia coli* (*E. coli*) growth.

Thirty-two mixed growth, 15 *Candida albicans*, 5 non-albicans *Candida* (NAC), 9 *G. vaginalis*, 7 *E. coli*, 3 *Streptococcus agalactiae*, 3 *Klebsiella*,

Table 1. Microorganisms with their percentages in vaginal culture

Cause	n=206	%
Culture negative	124	60.1
Mix reproductive	34	16.5
Candida albicans	17	8.2
Non-albicans Candida	5	2.4
Gardnerella vaginalis	11	5.3
Escherichia coli	8	3.8
Streptococcus agalactiae	3	1.4
Klebsiella pneumoniae	3	1.4
Enterococcus faecalis	1	0.4

1 *Enterococcus faecalis* were detected in 107 patients using non-barrier method.

The reproductive rate in the vaginal culture (28%) of the patients using the barrier method was found to be statistically lower than the patients using the non-barrier method (70%) (Pearson chi-square value: 14,797, p=0.0012) (Table 2).

Table 2. Vaginal culture reproductive results by protection methods

Groups	n	%	
Barrier methods	25	18%	
Non-barrier methods	107	81%	
Total	132	100%	
	Barrier methods n (%)	**Non-barrier methods n (%)**	**p-value**
Reproduction	7 (28)	75 (70)	*p=0.0012
No reproduction	18 (72)	32 (30)	*p=0.0027

*Pearson chi-square test. Significance at the 0.01 level

Discussion

Our study aims to evaluate the results of vaginal cultures obtained from patients with recurrent and persistent vaginitis in the obstetrics and gynecology outpatient clinic of our hospital over a 30-month period. From the patient files reviewed retrospectively, 206 patients treated with this diagnosis were included in the study.

Vaginal flora is colonized by a very large group of bacteria and Candida. Cultivation of these bacteria, which can be found in the normal flora, does not conclusively indicate that they are responsible for the patient's symptoms. Treatments given only based on culture may result in inadequate or inappropriate treatment (12). In the results we determined in our study, it was observed that some bacteria that can be found in the normal flora reproduce.

In our study, only 5.3% of *G. vaginalis* culture positivity was found (Table 1). In a study conducted by Thulkar et al. (13), 400 patients were examined with recurrent vaginitis and BV at a rate of 53.8% was found. In addition to the socioeconomic status of the patients and whether they comply with the hygiene rules, these authors stated that the results may be related to the contraceptive method of women (13). These authors found a higher rate of BV (70.3%) in patients protected by tubal ligation, and this rate decreased with condom use. Although Donders et al. (14) did not examine barrier methods, they showed that different contraceptive methods can affect the vaginal flora. In other studies, increased vaginal anaerobic bacteria amount and decreased *Lactobacillus* rates were shown in women using IUD with levonorgestrel and combined oral contraceptive (15,16). Haukkamaa et al. (16) showed that vaginal flora was preserved and *Lactobacillus* rates were higher in women using the barrier method compared to those using OCS and IUDs with levonorgestrel. Ceruti et al. (17), in their large study involving 2,387 patients, found less BV in patients using the barrier method (condom, diaphragm) and found a higher rate of lactobacilli in the vaginal flora in these patients (17). Kaplan (18), in their study, found that the frequency of BV increased in patients using copper IUDs. In our study, we found that the rate of growth in vaginal culture in patients using the barrier method was statistically significantly lower than the rate of growth in culture in patients using other methods.

Powell and Nyirjesy (19) reported the rate of recurrent BV as 30% in their review. [American College of Obstetricians and Gynecologists (ACOG)] does not recommend culture in the diagnosis of BV (1). Amsel criteria and gram staining with Nugent scoring are used in the diagnosis (6,20,21). In patients with BV, it was stated that 10% KOH dripping (Whiff test) and pH determination instead of culture, fresh saline preparation and microscopy with gram staining are more valuable (12).

In our study, *Candida albicans* grew in 17 patients (8.2%), while non-albicans species grew in 5 (2.4%) patients. Rosati et al. (22) reported that 75% of women in fertile age had vulvovaginal candidiasis at least once in their lifetime, and although it varies in different societies, up to 9% of them have recurrent vulvovaginal candidiasis. Our results were consistent with this, and we detected 10.6% of all candidal infections (albicans and non-albicans species). 90% of all vulvovaginal candida infections are caused by *C. albicans* (1). 60-70% of these patients can be diagnosed by microscopic examination of spores and pseudohyphae (1,3). Culture is performed only in patients with negative microscopy and in complicated cases (1,5). Vulvovaginal candida infections caused by NAC species tend to be milder than *C. albicans* infection (23). The peculiarity of NAC species is that first-line therapy results in treatment failure due to their resistance to azole antifungals or their low dose sensitivity (23). Culture and antifungal susceptibility testing may be necessary for optimal treatment of these infections. In our study, the majority of recurrent *Candida infections* were caused by albicans species. ACOG states that 150 mg weekly fluconazole treatment for 6 months prevents disease recurrence by 90% and recommends extended fluconazole treatment in this patient group (1).

In total, no Trichomonas vaginalis was detected in 206 disease groups. In these patients, it is difficult to obtain results from the culture due to the need for special media, insufficient communication between the clinician and the microbiologist, and failure to convey the suspicion of the relevant diagnosis to the microbiologist. In addition, this suggests that this patient group was effectively treated at the time of initial diagnosis. Although the possibility of detecting trichomonas with microscopy is limited, it can be successful up to 60% (1). Until the use of molecular detection methods, vaginal culture was the most sensitive and preferred method in the diagnosis of trichomonas (1). Culture is considered less appropriate than molecular detection methods, as it takes at least 5 days to result and requires special microbiological media (1). Nucleic acid amplification tests are easy, quick to diagnose, and highly sensitive (95-100%) tests (6). Commercially available DNA probe tests or PCR tests are also recommended by ACOG and (Food and Drug Administration-USA) because of their high sensitivity and easy and quick diagnosis (1,6). In Turkey, it seems more appropriate to do microscopy instead of culture, and to start using these tests in the patient group that cannot be diagnosed by microscopy. Until this is done, treatment delays may occur due to unnecessary culture taking and long waiting times for results.

The number of studies evaluating the results of vaginal culture in recurrent vaginitis is limited. Although there are valid guidelines on this subject, the rate of compliance with them is limited in general and in our clinic for various reasons. Moreover, vaginitis rates are affected by many factors such as the distribution of microorganisms in cultures taken from these patients and microorganisms detected in the normal flora, education, cultural influences, socioeconomic status, and race (13,24-26). Therefore, it may be more appropriate to localize the guides on this subject. There are also studies on vaginitis in Turkey, but the number of studies on culture results in recurrent and persistent vaginitis is limited and generally studies investigating a single microorganism (27-30). It is highly probable that the sociocultural habits of Turkish women also affect the prevalence of vaginitis, the rate of recurrence, and the rate of microorganisms produced in the culture, and more studies are needed on this subject. Our patient series has shown that, in clinical practice, taking vaginal cultures is an expensive and limited method in chronic and recurrent vaginitis. In addition to the Whiff test, pH measurement, fresh saline preparation microscopy, and gram staining opportunities for clinicians, with the introduction of trichomonas molecular detection methods into clinical practice, unnecessary cultures can be avoided and more effective treatment will be selected.

Study Limitations

Due to the retrospective nature of our study, the contraceptive method information of some patients could not be accessed from their files. Information on treatment success in subsequent follow-ups is also missing. For the same reason, it is not known for certain whether patients are given training on keeping the vaginal flora healthy, but this training is widely given in our polyclinics. Information on various behaviors that may affect the results of condom use, such as wearing the condom while close to ejaculation, is lacking. Despite these shortcomings, we think that our study will be a good contribution to the limited data on this subject.

Conclusion

Follow-up and treatment are characteristic in recurrent and persistent vaginitis. Vaginitis recurrence rate and the type of microorganism detected can be affected by many factors such as sociocultural structure, race, education level and contraception method. The number of studies on vaginal culture results in recurrent and persistent vaginitis patients in general and in the Turkish population is insufficient. In our study, we found that the contribution of vaginal culture taking to patient management was limited in this patient group and the rate of recurrent vaginitis was lower in women using the barrier method.

Ethics Committee Approval: Our study was approved by the Ethics Committee of University of Health Sciences Turkey, İstanbul Training and Research Hospital (approval number: 2468, date: 10.07.2020).

Informed Consent: Since our study was retrospective, informed consent was not obtained from the patients.

Peer-review: Externally peer-reviewed.

Financial Disclosure: The author declared that this study received no financial support.

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