



Significance of candida culture in women with vulvovaginal symptoms

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OBJECTIVE(S): To determine the rate of culture positivity of vaginal candida species and its relation to clinical criteria used for diagnosis of vulvovaginal candidiasis (VVC).

METHOD(S): A prospective study of laboratory diagnosis of VVC by estimation of vaginal pH, direct microscopic examination of vaginal discharge/secretions, and vaginal culture for candida species, was carried out in 400 women with vulvovaginal symptoms.

RESULTS: Culture for candida species was positive in 92 (23%). Of the 92 women, 76(82.6%) showed pH in normal range and 78 (84.8%) were positive for yeast cells and mycelia on direct microscopic examination. *C. albicans* accounted for 69.57% and other candida species for 30.43% of the isolated candida species. Culture positivity was significantly related to pregnancy, increase in parity, use of oral contraceptives, and use of antibiotics. Pruritus with or without vaginal discharge and vaginal erythema were the most common symptoms and signs in women with positive candida culture.

CONCLUSION(S): Culture positivity rate of 23% in the present study suggests that VVC cannot be accurately diagnosed by clinical criteria alone. It requires correlation of vulvovaginal symptoms with candida culture.

Key words : vulvovaginal candidiasis, direct microscopy, vaginal culture

Introduction

Vulvovaginitis is a common day to day problem in gynecological practice. It may have an infectious cause or a noninfectious cause or a combination of both. *Candida albicans* is the commonest infectious cause producing symptoms and signs of vulvovaginal pruritus, burning irritation, soreness, burning on micturition, dyspareunia, and whitish cheesy discharge¹. Unfortunately, none of these symptoms either individually or collectively is pathognomonic of candida infection. The lack of specificity of symptoms and signs therefore precludes a diagnosis that is based on history and physical examination without the corroborative evidence of laboratory tests. In the Detroit medical center's *Candida* vaginitis clinic, over 80% patients, referred by physicians with a putative diagnosis of vulvovaginal

candidiasis (VVC) were found to have some other cause of vaginitis². In a study of patients with self diagnosed VVC, more than half did not have yeast confirmed as the causative organism¹. In fact, the most common reason patients fail to respond to antifungal therapy is incorrect diagnosis³. The present study was therefore undertaken to determine the rate of culture positivity of vaginal candida species and its relation to clinical manifestations in women presenting with vulvovaginal symptoms.

Methods

Four hundred women of reproductive age group (14-45 years) attending the Obstetrics and Gynecology outpatient department (OPD) with complaints of vaginal discharge and/or vaginal itching and irritation were included in the study. After recording their history, local examination was done and pH of the vagina was estimated.

Vaginal discharge and secretions were collected from the upper part of the posterior vaginal fornix and lateral vaginal wall using sterile cotton tipped applicators and subjected to direct microscopy (saline preparation and 10% KOH

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preparation) and culture for candida species. In cultures positivity for candida and species identification were based on a) germ tube production, b) growth on corn meal agar, and c) sugar fermentation and sugar assimilation tests ⁴⁻⁶.

Results

Out of a total of 400 patients, positive culture for candida species was obtained from 92 (23%). Of these 92 patients, 76 (82.6%) showed normal vaginal pH (4.0-5.0) and 16 (17.4%) had the pH in excess of 5. Direct microscopy for yeast cells and mycelia was found to be positive in 78 (84.8%). Species identification of 92 cultures positive for candida showed that 64 (69.57%) were *C. albicans*, 8 (8.7%) *C. glabrata*, 6 (6.55%) each *C. tropicalis* and *C. krusei*, and 4 (4.3%) each *C. parapsilosis* and *C. guilliermondii*.

It was observed that of the 400 women studied, 248 were pregnant and candida culture positivity in them was 28.2%. This was significantly higher (P<0.0001) than the culture positivity (7.9%) shown by 152 nonpregnant women. Thirty-five women had a history of taking broad spectrum antibiotics like ampicillin, cephalosporins, aminoglycosides or quinolones two or more times during the year of the study and of them 15 (42.8%) were found to be culture positive for candida species. This too was significantly higher (P=0.0059) than that observed in 77 (21.1%) of the 365 women who did not have a history of taking antibiotics during the same period. Women with parity of more than one and those using oral contraceptives also showed significantly higher rate of candida culture positivity than women with parity one or nil (P=0.0119) and women not using oral contraceptives (P=0.0059) (Table 1).

Table 1. Correlation of various risk factors of vulvovaginal candidiassis.

Risk factor	Number	Candida culture +ve		P value
		Number	(Percent)	
Pregnancy				
Pregnant	248	70	(28.2)	<0.0001
Non-pregnant	152	12	(7.9)	
Parity				
> One	228	63	(27.6)	0.0119
One or nil	172	29	(16.9)	
Oral contraceptive				
Users	38	14	(36.9)	0.0422
Nonusers	362	78	(21.5)	
Antibiotics				
Users	35	15	(42.8)	0.0059
Nonusers	365	77	(21.1)	

P <0.05 – Significant.

Table 2. Correlation of important symptoms and signs of vulvovaginal candidiasis to candida culture (n=400).

Symptom / Sign	Number		P value
	Culture positive (n) =92	Culture negative (n) = 308	
Pruritis with or without discharge	80 (86.9%)	154 (50%)	<0.0001
Vaginal erythema	66 (71.7%)	185 (60.1%)	0.049

P < 0.05 – Significant.

Of the 92 women with positive culture, 80 (86.9%) presented with complaints of pruritus with or without vaginal discharge and 12 (13.1%) with vaginal discharge alone. The discharge varied from watery to homogenously thick with minimal or no odor. On examination, vaginal erythema was found to be more common in women with positive culture than in women with negative culture (P= 0.049) (Table 2).

Discussion

Mycological methods used for diagnosis of VVC are variable and currently vaginal culture is the most sensitive method available for its accurate diagnosis. The two other simple tests are, estimation of vaginal pH and microscopic examination of vaginal secretions. In the present study culture for candida species was positive in 92 of 400 women attending the gynecology OPD of our tertiary care hospital. This gave an incidence of VVC as 23% in women of child bearing age suffering from vulvovaginitis.

Estimation of vaginal pH, an inexpensive and simple test, has been greatly underused in cases of suspected VVC ¹. Numerous studies have reported that in VVC, vaginal pH remains in normal range ¹⁻³. In the present study normal vaginal pH was observed in 76 of 92 (82.6%) culture positive women. Vaginal pH in excess of 5 in the remaining 16 (17.4%) culture positive women in our study could be because of mixed infection (candida and bacterial). The true frequency of mixed infection is not exactly known but is estimated at about 10% ¹.

Microscopy for yeast cells and pseudohyphae was found to be positive in 78 of 92 (84.8%) culture positive women in the present study. Sobel ² reported 65-85% sensitivity of microscopic examination and found it a very sensitive, valuable and simple method of diagnosis of VVC. However, McCormack et al ⁶ visualized fungal elements in only 22% of culture positive women. The difference in the sensitivity of direct microscopy could be because of the difference in yeast concentration in vaginal secretions. Direct microscopy is reliable only if the infection is fairly heavy ². Therefore in cases where microscopy fails to provide an answer,

vulvovaginal swab culture becomes essential for elucidation of diagnosis of VVC. The importance of taking a vaginal swab culture before starting the treatment must be emphasized to the patients. Antifungal therapy may then be prescribed before the availability of culture results. Elimination of yeast after therapy, together with simultaneous resolution of signs and symptoms verifies the diagnostic significance of positive candida culture.

Vaginal culture is also essential for identification of various candida species. In the present study, although *C. albicans* (69.57%) predominated, nonalbicans species were found to be present in more than 30% of infections. Recently several authors have also reported an increase in the incidence of VVC caused by nonalbicans species of candida^{1,7,8}. The highest proportion of nonalbicans candida reported is that of *C. glabrata*, which is similar to the finding of our study^{1,7}. These nonalbican yeasts are relatively nonpathogenic but ultimately get selected and start appearing more frequently because of the widespread abuse of over the counter antifungals, use of single dose oral and topical azole regimens, and long term maintenance regimens of oral azoles^{7,9}. Therefore vaginal culture is valuable not only for identifying the species of vaginal candida but also for monitoring the changing trends in the microbiology of vulvovaginal candidiasis which is essential for the complete and prolonged treatment of the patients of VVC.

Study of various putative factors responsible for VVC showed that culture positivity for candida was significantly related to pregnancy and increase in parity as reported by other authors^{1,8,10}. High level of reproductive hormones present during these conditions might be providing an excellent carbon source for the growth of candida organisms by providing higher glycogen content in the vaginal tissue.

Many investigators continue to identify oral contraceptives as a predisposing factor to VVC². This might be because of similarity between the mechanism operating in pregnancy and high estrogen oral contraceptives in increasing vaginal colonization of candida. In our study there were 14 or 38.89% culture positives among 38 women using contraceptives as compared 78 or 21.55% culture positives among 362 women not using contraceptives (P=0.0422). Use of antibiotics might also be exacerbating the symptoms by destroying the protective vaginal flora². In our study significantly higher (P=0.059) percentage of women not exposed to antibiotics in the past showed culture positivity when compared to women exposed to antibiotics.

Of the various symptoms, pruritus was present in significantly more women who were culture positive (P<0.0001) than in

those who were culture negative. Sobel³ also reported vulval pruritus as the most frequent clinical manifestation of VVC. The burning sensation of vulval epithelium reported frequently by women suffering from VVC is caused by the yeast's metabolites and seldom by infection of vulvar skin⁹. Therefore it is suggested that treatment in such patients be directed to the vaginal source of infection and not to the vulvar area. Applying antifungal preparations to the vulva is not only ineffective but also worsens the contact dermatitis which is a feature of the complaint. At times vulval area may present with mixed pathology and the commonest combination is vulvar dermatitis exacerbated by bouts of candidiasis. Vaginal swab culture is the only means of selecting the appropriate treatment in such patients⁹.

Conclusion

Vulvovaginal candidiasis (VVC) cannot be definitely identified by clinical criteria alone. It requires culture for candida species and its correlation to vulvovaginal symptoms. Culture is valuable not only for the accurate diagnosis of VVC but also to avoid indiscriminate use of antifungal agents, which may ultimately decrease the incidence of VVC caused by resistant and nonalbicans candida species.

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