

Original Research Article

Colposcopic and microbiological correlation in patients with vaginal infections: a prospective study

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ABSTRACT

Background: Objective of the study was to evaluate the association of abnormal vaginal flora with pathological colposcopic and microbiological findings.

Methods: The present study was conducted in outpatient's department of Obstetrics and Gynaecology, Government Medical College, Patiala. We studied 300 cases with symptoms and signs of vaginal infections in reproductive age group (15-49 years). After taking detailed history and examination, samples of vaginal discharge were collected for microbiological analysis and patients were subjected to colposcopy. Recorded data was analysed to find out any association of abnormal vaginal flora with pathological colposcopic and microbiological analysis.

Results: The prevalence rate of vaginal infections was 31% among patients who reported to us with symptoms and signs of vaginal infections. The most common micro-organism detected was *B. vaginosis* (BV) in 14%, *C. albicans* (C) in 12% and *T. vaginalis* (T) in 3.33%. The normal colposcopic findings were observed in 81.33% and abnormal colposcopic findings were noted in 18.67% of the patients which were vaginal hyperaemia in 9%, chronic cervicitis in 5.33%, small iodine negative area in 2.33%, keratosis in 1.33% and cervical polyp in 0.67% of the patients.

Conclusions: We concluded that vaginal discharge is a common gynaecological complaint and vaginal infections are an important cause of the vaginal discharge thus leading to significant proportion of female morbidity in reproductive age group. So, vaginitis and vaginal discharge highlights the importance of microbiological investigations to find out the causative organisms and the specific findings due to particular micro-organism can be correlated colposcopically and specific treatment can be provided.

Keywords: Colposcopy, Colposcopic findings, Vaginal infections

INTRODUCTION

Genitourinary tract infections are among the most frequent disorders for which patients seek care from gynaecologists. Most of the women experience at least one episode of vaginitis in her lifetime, and more than half faces the recurrent symptoms. Vaginal infections not only are extremely prevalent, but also result in considerable discomfort to the symptomatic patients.

Some vaginal infections put women at risk of upper genital tract diseases and complications of a concurrent pregnancy.

A detailed history, a systematic examination of the vulva, vagina and cervix, and a microscopic examination of the discharge enable one to identify the cause in most of the cases and to choose an appropriate therapy.¹ Colposcopy is a method of examining the cervix, vagina and vulva

under magnification using an external light source. The magnification usually used is between 6x and 20x.² There are two methods of examination: (I) The saline method. (II) The classical or extended method.

Colposcopy of vagina is tedious and time-consuming. Lugol's iodine has immense value in the interpretation of colposcopically abnormal lesions of the vagina. The vaginal epithelium is squamous, and pink in color. The connective tissue of vagina is loose and more vascular than the cervix. Under high magnification terminal capillary network in the stroma can be seen.²

The most common infection causing vaginal discharge is noninflammatory Bacterial vaginosis, responsible for 40% to 50% of vaginal infections, followed closely by vulvovaginal Candidiasis (20% to 25%) and finally Trichomoniasis, which occur less frequently (15% to 20%).¹

A substantial percentage of women with Trichomoniasis (10% to 50%) are also asymptomatic, but one third of asymptomatic infected women become symptomatic within 6 months. Signs and symptoms alone are not sufficiently helpful to make the definitive diagnosis.¹ In acute phase, the colposcopic pattern is characterized by the presence of a generalized, colpo-cervicitis with many fine capillary "hairpin" loops and multiple, patchy red spots.

These red spots are the result of cytolytic foci of squamous epithelium with erosion of superficial and intermediate layers, congested stromal papillae and dilated loops of capillaries surrounded by dense collections of leukocytes. After application of acetic acid solution, the red patches may be accentuated because of surrounding vasoconstriction.

Following application of Lugol's iodine, the yellowish spots on a brown background are highlighted, often referred to as "leopard skin" appearance. With severe inflammation, the coalescence of multiple red spots may produce large, irregular patches ("macular colpitis"), visible even to the naked eye.³

The clinical infection with *Candida albicans* is characterised by a white "curdy" or "cheesy" discharge which is not offensive but frequently accompanied by pruritus of the vulva. After the application of acetic acid solution, colposcopic pattern is produced with fine, poorly defined but uniform, white-yellow patches on the vagina and cervix which are erythematous. The acetic acid may produce burning because of associated fine, skin fissuring at the introitus. The patches do not stain with Lugol's iodine. Colposcopic pattern however, is not pathognomic.³

Bacterial vaginosis, previously referred to as Gardnerella vaginitis or "nonspecific vaginitis" can be asymptomatic in up to 50% of women. Inflammatory signs are frequent,

and can be revealed by colposcopy with Lugol's iodine test; this shows punctate colpitis with small regular points corresponding histologically to an inflammatory focus in the connective tissue.⁴

By understanding the pathophysiology of these diseases and having an effective approach to their diagnosis, one can institute appropriate antimicrobial therapy to treat these conditions and reduce long-term sequelae.⁵

In this background therefore the purpose of this study was to perform colposcopic examination in patients with signs and symptoms related to vaginal infections, Collection and microbiological examination of the vaginal discharge in these patients and to evaluate the association of abnormal vaginal flora with pathological colposcopic and microbiological findings.

METHODS

The present study was carried out prospectively on 300 patients over a period of 1 year (from Nov,2009 to Dec,2010) in the Department of Obstetrics and Gynaecology, Rajendera Hospital Patiala, Punjab; a tertiary care institute after gaining permission from institutional ethical committee. All females of reproductive age group with complains of: Discharge per vaginum, Itching genitalia, Burning sensation and dyspareunia.

Sample size

The respondents were women of reproductive age group of 15 to 49 years attending the Gynae OPD. The sample size was calculated by statistician, using formula with confidence level 90%, error of margin 5 and population size of 3000.

Inclusion criteria

All married women of reproductive age group.

Exclusion criteria

Pregnant and lactating women, menstruating and unmarried women, those who have undergone hysterectomy, those who did not give consent.

Detailed history regarding last menstrual period, menstrual history, obstetric history, last child birth, contraceptive method used, hormonal supplement, about partner, any medical or surgical history will be taken.

After explaining procedure to the patient, informed consent will be taken for external examination followed by per speculum examination and collecting samples of vaginal discharge, patients were subjected to colposcopy followed by microbiological analysis of vaginal discharge. Findings of colposcopic examination were recorded on a proforma. Recorded data analysed, all

observations were compiled in tabulated form and statistically analysed by SPSS 2010 software. The objective of this study was to evaluate the association of abnormal vaginal flora with pathological colposcopic and microbiological findings.

RESULTS

During the course of study, a total of 300 patients who had attended the OPD of Obstetrics and Gynaecology Department of Govt. Medical College and Rajendera Hospital, Patiala in reproductive age group with vaginal infections were studied.

In 31% of the women (93 out of total 300 women) single or multiple micro-organisms were detected in the microbiological analysis of sample of collected vaginal discharge.

Table 1: Distribution of patients on the basis of different presenting symptoms.

Symptoms	No. of cases	%
Vaginal discharge	116	38.67
Foul smell	25	8.33
Itching genitalia	53	17.67
Burning	28	9.33
Frequency	8	2.67
Dysuria	8	2.67
Pelvic pain	22	7.33
Lower abdominal pain	22	7.33
Backache	68	22.67
Total	300	100

According to the above table, out of 300 women studied on the basis of symptoms-38.67% of women were presented with vaginal discharge, 22.67% were presented with backache, 17.67% with itching genitalia, 9.33% with burning sensation, 8.33% had foul smell, 7.33% with pelvic pain, 7.33% with low abdominal pain, 2.67% with frequency of micturition and 2.33% with dysuria. So the major presenting symptoms were vaginal discharge

Table 4: Colposcopic findings in patients with normal and abnormal vaginal flora.

Colposcopic findings	Normal vaginal flora	Candida albicans	Bacterial vaginosis	Trichomonas vaginalis	(BV+T)	(BV+C)
	(n=207)	(n=36)	(n=42)	(n=10)	(n=4)	(n=1)
Normal	190 (91.79%)	28 (77.78%)	18 (42.86%)	6 (60%)	2 (50%)	0
Small iodine negative areas	7 (3.38%)	0	0	0	0	0
Chronic cervicitis	4 (1.93%)	2 (5.56%)	8 (19.05%)	0	1 (25%)	1 (100%)
Vaginal hyperemia	4 (1.93%)	6 (16.67%)	12 (28.57%)	4 (40%)	1 (25%)	0
Vaginal warts	0	0	0	0	0	0
Cervical polyp	2 (0.97%)	0	0	0	0	0
Keratoses or Leukoplakia	0	0	4 (9.52%)	0	0	0
Mosaics	0	0	0	0	0	0

followed by backache and itching genitalia. On statistical analysis results were found to be highly significant.

Table 2: Distribution of patients on the basis of per speculum findings.

Per speculum findings	No. of patients	%
Normal	259	86.33
Inflamed cervix/vagina	21	7
Erosion	7	2.33
Cervicitis	7	2.33
Keratoses/ Leukoplakia	4	1.33
Cervical Polyp	2	0.67
Bleed on touch	0	0
Genital ulcer	0	0
Genital wart	0	0
Total	300	100

The above table shows that the distribution of women according to per speculum findings. Normal looking cervix seen in 86.33% patients, inflamed/congested cervix in 7%, erosion in 2.33%, cervicitis in 2.33%, keratosis in 1.33% and cervical polyp in 0.67% of the women. So majority of the women were having normal per speculum findings which is found to be highly significant with p value <0.001 on statistical analysis.

Table 3: Distribution of patients on the basis of microbiological analysis of vaginal discharge.

Microbiological analysis	No. of patients	%
Normal vaginal flora	207	69
B. vaginosis	42	14
C. albicans	36	12
T. vaginalis	10	3.33
BV+T	4	1.33
BV+C	1	0.33
Total	300	100

Above table shows distribution of various micro-organisms present in analysed samples of the vaginal discharge.

Normal vaginal flora (where no abnormal microbiological agent was detected), seen in 69% of women, B.vaginosis (BV) in 14%, C.albicans (C) in 12%, T.vaginalis (T) in 3.33%, (BV+T) in 1.33% and (BV+C) in 0.33% of the women. So, majority of the women were having normal vaginal flora with highly significant p value of <0.001.

As evident from the above table that on comparing colposcopic findings in women with normal vaginal flora were; normal colposcopic appearance, vaginal hyperaemia and chronic cervicitis and found to be highly significant but keratosis was found to be a significant finding in women with abnormal vaginal flora.

As evident from the above table that on comparing colposcopic findings in women with Candida albicans infection to those with normal vaginal flora; vaginal hyperemia and normal colposcopic appearance were found to be significant finding in women with Candida albicans infection.

As evident from the above table that on comparing colposcopic findings in women with Bacterial vaginosis infection to those with normal vaginal flora; normal colposcopic appearance, vaginal hyperemia, chronic cervicitis and keratosis were found to be highly significant findings in women with Bacterial vaginosis infection.

As evident from the above table that on comparing colposcopic findings in women with Trichomonas vaginalis infection to those with normal vaginal flora; vaginal hyperemia and normal colposcopic appearance was found to be significant finding in women with Trichomonas vaginalis infection.

DISCUSSION

Vaginitis is significant cause of vaginal discharge and this highlights the importance of various microbiological investigations to find out the causative organisms for vaginal discharge, so that the specific findings can be correlated colposcopically and more specific treatment can be given accordingly. In our study the vaginal infections with one or the other organism detected in 31% of the patients. Go et al reported 57.4% and Sri Devi and Swarnalatha reported 26.5% of infection rate also support the same results.^{6,7}

The high infection rate in patients of vaginal discharge show the importance of treating both the partners simultaneously as infection can be easily transmitted from one partner to other. The most common presentation (Table1) among women with vaginal infections was vaginal discharge. In present study 38.67% of women had the complaint of vaginal discharge. Sharma and Gupta reported 51.9% and Rabi et al reported 21.8% of women with the similar complaint of vaginal discharge.^{8,9}

In addition to vaginal discharge other main complaints of patients were backache, itching genitalia and lower abdominal pain (Table1). In present study 22.67% patients had backache, 17.67% had itching genitalia and 7.33% had lower abdominal pain. Msuya et al reported lower abdominal pain in 47% and itching genitalia in 27% of patients. Sri devi and Swarnalatha reported lower abdominal pain in 4.9%, backache in 3.5% and itching genitalia in 4% of patients. Sharma and Gupta reported lower abdominal pain in 19.9% of patients.^{7,9,10}

The table 2 shows that the most common presentation among women with vaginal infections was vaginal discharge. In present study 38.67% of women had complaint of vaginal discharge. Sri Devi and Swarnalatha reported 21.3%, Sharma and Gupta reported 51.9% and Rabi reported 21.8% of women with vaginal discharge. So, results are in accordance with other studies also.

By grossly observing the type of vaginal discharge while doing per speculum examination (Table 2), we can have fairly good idea about causative organisms as many of organisms produce typical discharge. Frothy discharge is characteristic of Trichomonas infection especially when associated with the presence of strawberry spots on vagina and marked erythema and edema. Curdy white discharge is typical of Candidiasis often associated with intense pruritus, soreness and edema of vulva. In Bacterial vaginosis, vaginal discharge has typical fishy odour with minimal or no vulvar irritation.^{7,8,9} While studying the patients with vaginal infections (Table 3), it was found that B. vaginosis, Candida and Trichomonas were the leading cause of vaginal infections either singly or in combination.

In table 4 on colposcopy of patients with normal vaginal flora, 91.79% of patients had normal colposcopic appearance. The results are supported by Georgijevic et al which reported 89% of subjects with normal colposcopic appearance. Colposcopy of all patients with vaginal infections/Abnormal vaginal flora, 58.06% were having normal colposcopic appearance, 24.73% were having vaginal hyperaemia, chronic cervicitis in 12.90% and keratosis in 4.30%. The results are supported by Georgijevic et al which reported 60.34% of patients with normal colposcopic appearance, vaginal hyperemia in 17.24%, chronic cervicitis in 10.34% and keratosis in 6.9%.¹¹

The table 3 shows that in present study, *B. vaginosis* was the commonest organism isolated with prevalence rate of 14% which is supported by Georgijevic et al reported infection rate of 10%, Tchoudomirova et al reported infection rate of 17.5% and Sri Devi and Swarnalatha reported infection rate of 10.5%.

The Table 4 shows that on colposcopy of patients infected with Bacterial vaginosis, the normal colposcopic appearance was seen in 42.86%, vaginal hyperemia in

28.57%, chronic cervicitis in 19.05% and keratosis in 9.52% of the patients. The results are supported by Georgijevic et al which reported 30% of patients with normal colposcopic appearance, vaginal hyperemia in 30%, chronic cervicitis in 20% and keratosis in 20%.^{7,11}

The table 3 shows that the prevalence rate of *Candida* was found to be 12% in the present study which is in agreement with studies by Georgijevic et al which shows *Candida* in 16% cases, Prasad et al where prevalence was found to be 10% and Tchoudomirova et al where prevalence rate of *Candida* was found to be 7.5%.

The table 4 shows that on colposcopy of patients infected with *Candida albicans*, normal colposcopic appearance was seen in 77.78%, vaginal hyperemia in 16.67%, chronic cervicitis in 5.56% of the patients. The results are supported by Georgijevic et al which reported 88% of patients with normal colposcopic appearance, vaginal hyperemia in 6%, keratosis in 6% and none with chronic cervicitis.^{12,13}

The table 3 shows that *Trichomonas vaginalis* was detected in 3.3% cases with vaginal discharge in present study. Various studies have shown the different results. The present study is in accordance with Georgijevic et al which reported 1%, Xuequiang et al 2.9%, and Sri Devi and Swarnalatha reported 5% of infection rate with *T.vaginalis* infection. The table 4 shows that on colposcopy of patients infected with *Trichomonas vaginalis*, normal colposcopic appearance was seen in 60%, vaginal hyperemia in 40%, of the patients. In study by Georgijevic et al which reported 100% of patients with normal colposcopic appearance.^{7,11,14}

The table 3 shows that out of 93 patients in which infections were detected only 5 (1.66%) show the polymicrobial infection and in the remaining one or another organism was present singly. Polymicrobial/Mixed infection reported by Nigam et al in 4%, by Georgijevic et al in 12% of patients. The table 4 shows that on colposcopy of patients with polymicrobial infection (BV+T), normal colposcopic appearance was seen in 50%, vaginal hyperemia in 25% and chronic cervicitis in 25% of the patients.

In study by Georgijevic et al which reported 25% of patients with normal colposcopic appearance, 25% with vaginal hyperemia and 50% with chronic cervicitis. The table 3 shows that on colposcopy of patients with polymicrobial infection (BV+C), chronic cervicitis was seen in 100% of the patients. In study by Georgijevic et al which reported 29% of patients with normal colposcopic appearance, 43% with vaginal hyperemia, and 14% with chronic cervicitis and keratosis each.^{11,15}

Limitation of this study was that only few specific findings are associated with few micro-organisms like *Trichomoniasis* but most of the infections have nonspecific findings due to inflammatory changes

associated with them like hyperemia and iodine negative areas. Alone colposcopy cannot specifically diagnose a specific infection, it needs to confirm the cause by microbiological analysis. Thus, this study concluded that colposcopic examination could be a useful adjunct to cytology in screening for a variety of cervical and vaginal infections.

CONCLUSION

From the present study it was concluded that vaginal discharge is a common gynaecological complaint and vaginal infections are an important cause of vaginal discharge thus leading to significant proportion of female morbidity in sexually active age group. Bacterial vaginosis, *Trichomonas vaginalis* and *Candida* were found to be the three most important etiological agents singly or in various combinations. Changed vaginal flora due to various vaginal infections predisposes to significant upper genitourinary tract diseases and may result in abnormal colposcopic features.

Abnormal colposcopic findings in the form of vaginal hyperaemia, chronic cervicitis and keratosis were most commonly seen in women with vaginal infections. In present study pathological colposcopic features were found mostly among women with Bacterial vaginosis (single or associated) infection. So, Bacterial vaginosis was associated with an increased risk of objective evidence of acute upper genital tract infection. In conclusion, this study indicates that women with abnormal vaginal flora (vaginal infections) more often have pathological colposcopic findings, such as leucoplakia, vaginal hyperaemia, and chronic cervicitis.

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