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Original Research Article

Profile of infection in women with vaginal discharge in North India

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ABSTRACT

Background: The objective of the present study was to observe the profile of infection in women with vaginal discharge.
Methods: The present study was conducted between October 2013 and September2014. The respondents were females in reproductive age group (15-45 years) attending Obstetrics and Gynaecology OPD with history of vaginal discharge. After detailed clinical examination of the patient, pH was determined, and the posterior fornix was swabbed with a cotton tip applicator. Further a Whiff (amine) test done; wet mount was immediately prepared and examined. Another swab was sent for Gram's stain and culture.
Results: A total of 200 women with vaginal discharge were studied, of which 146 were diagnosed with pathogens. The most common form of infection was mixed infection which was diagnosed in 69 patients (34.5%). As a single pathogen, the next most common infection was Bacterial vaginosis seen in 43 patients (15.5%) and Trichomonas vaginalis seen in 3 patients (1.5%).
Conclusions: The clinical manifestations of vaginits are diverse. By knowing the microbiology of the vaginal flora, we could come to the conclusion of the etiology of vaginitis.

Keywords: North India, Profile, Vaginal infections

INTRODUCTION

Vaginitis is an ancient disease and was described by Hippocrates. Vaginal discharge is one of the most common reason for Gynecological consultation being among the 25 most common reasons for consulting physicians in private office practice in the USA. Not all women with vaginal symptoms will have some type of Vaginitis. Vaginitis is found in more than one-quarter of women attending sexually transmitted disease (STD) clinics.[1] Normal Vaginal flora (lactobacilli) colonizes the vaginal epithelium and may have role in defence against infection. They maintain the normal Vaginal pH between 3.8 and 4.4. The quality and quantity of Vaginal discharge may alter in the same woman in cycles and over time; each woman has her own sense of normality and what is acceptable or excessive for her.[2] Despite the control over the vaginal micro-environment exerted by the lactobacilli, many other microorganisms can be cultivated from the Vaginal samples of healthy women. These organisms do not trigger a pathological state, but when one class of them dominates, the resulting imbalance precludes to vaginosis/ vaginitis.[3] The pH of the vagina averages about during reproductive life.[4,5] The acidity is estrogen dependent, falls after the menopause to neutral or even alkalinity. Common symptoms of these include vaginal discharged, odor, introital itching or irritation with all its physical discomforts and socio-economic connotations, vaginitis constitutes a medical enigma which deserves concern and attention.

Discharge of a substance from the vagina can in consistency that is thick or thin, clear, cloudy or colored and odorless or foul smelling. Vaginal discharge that suddenly differs in color, odor or consistency, significantly increases or decreases in amount, may indicate an underlying problem like an infection.[4] Abnormal vaginal discharge predisposes to significant morbidity in the form of vaginal itching, dysparenunia, emotional irritability, pelvic inflammatory disease, infertility, cuff cellulitis, urethral syndrome, pregnancy loss, preterm labor, premature rupture of membranes and chorioamnionitis, to enumerate a few.[4]

Most common causes of symptomatic vaginal discharge are bacterial vaginosis (33-47%), followed by candidiasis (20-40%) and trichomoniasis (8-10%). These three conditions account for 90% of all etiologies of abnormal vaginal discharge. Multiple infections can also coexist.[5]

The uncommon infectious causes include atrophic vaginitis with secondary bacterial infection, foreign body with secondary infection, desquamative inflammatory vaginitis, streptococcal vaginitis (Group A), ulcerative vaginitis associated with Staphylococcus aureus and idiopathic vulvovaginal ulceration associated with human immunodeficiency virus (HIV).[6]

METHODS

This was a hospital based longitudinal study conducted between October 2012 and July 2014. The study was done on 200 female patients, who attended the Obstetrics and Gynaecology outpatient's department, with complaints of vaginal discharge. Informed consent was taken from the patients identified to be part of this study.

Inclusion criteria

- Sexually active women of age between 15 and 45 years presenting with vaginal discharge.

Exclusion criteria

- Women older than 45 years
- Unmarried women
- Pregnant women
- Postmenopausal women
- Patients who have delivered or aborted six weeks prior
- Patients with vaginal bleeding.

A detailed history was recorded and a thorough genital examination was conducted to look for any abnormalities in the vulva, vagina and cervix. The amount, odor, color and consistency of vaginal discharge were noted. The vaginal pH was measured directly using pH indicator strips against the posterior fornix. A bimanual examination was done to look for any Adnexal tenderness.

Clinical investigation

Two vaginal swabs form the posterior vaginal fornix were collected before bimanual examination for each patient examined during this study. One of swabs was sent for amine test and preparation of wet mounts. The second swab was sent for Gram staining and Culture. This minimized the number of swabs collected from woman

The objective of the above tests was as below:

- Amine test: To identify the presence of fishy odor as an evidence of Bacterial vaginosis.
- Wet mount: To identify the presence of the motile Trichomonas and Clue cells.
- Gram Staining: To Confirm the presence of Clue cells, budding yeast cells and psuedohyphae.
- Culture:

For secondary bacterial infection: Swab was inoculated on Blood Agar and Mac Conkey agar, incubated at 37 C for 18 hours. Plates were read next day for isolation and confirmed by a battery of biochemical reactions.

For Fungus: Swab was inoculated on SDA, incubated at 37 C and observed till 4weeks. Growth was confirmed by germ tube test.

Statistical analysis

The data collected was tabulated in Microsoft Excel Worksheet and computer- based analysis was performed using the SPSS 22.0 software (SPSS, Chicago, IL, USA). For comparison of means, unpaired t-test and one-way ANOVA were used for two and more than two groups respectively. For comparison of proportions, Chi-square test was used. In cases where any one of cell value was less than five, Fisher's exact test was used.

RESULTS

The means age of the subjects was 30.92 years (ranging from 20 to 45years with a median of 30years). The difference between the mean age for an infected patient and normal person is statistically significant ($p= 0.048< 0.05$) Majority (191, 95.5%) of the patients belonged to lower socio- economic class (class II or below) (< Rs.5113 per month). The difference between the mean family income between the infected patients and a normal person is statistically significant ($p= 0.030<0.05$). Majority (134,67%) of the cases were poorly educated (Primary and below) and the educational status has a definite influence on collected in present study did not support the hypothesis as p- value was 0.474> 0.05 and was statistically insignificant. The mean duration of vaginal discharge in present study was 14.78 months (ranging from 1 month to 5 years with a median of 3 months).

The calculated p- value is 0.010 (<0.05) and hence statistically significant. Lower abdominal pain was the most common associated symptom seen in 145 (72.5%) of cases, followed by vulvar itching in 62.5% dysuria in 50% foul smelling discharge in 37%.

Of the 200 women who reported discharge, most commonly reported discharge was Homogenous thin discharge in 45.5% cases which can be associated with Bacterial vaginosis, followed by Thick white in 27% Curdy white in 19% and Greenish Yellow in 8.5%. Majority of present study subjects was multiparous (147,73.5%). The p-value of 0.007 was statistically significant.

The different causes of vaginal discharge as analyzed after studying the symptoms, signs and investigations revealed that individually Bacterial vaginosis to be the most common pathogen (43cases, 21.5%) followed by Vulvovaginal Candidiasis (31cases, 15.5%) and Trichomonas vaginalis (3 cases, 1.5%). However, when looking at an overall picture, the most common infection was mixed infections which include cases of simultaneous existence of BV, VVC, or TV and other secondary infections. A total of 69 cases (34.5%) were diagnosed with mixed infections.

Amongst the 146 infected patients, 68 Patients (34.0%) were diagnosed with secondary infections. Most common secondary infection was Staphylococcus aureus diagnosed in 30 patients (15%), followed by Escherichia Coli in 20 (10%), Klebsiella in 15 (7.5%) and Enterococcus in 2 (1.5%).

Bacterial vaginosis was identified as an infectious pathogen responsible for vaginal discharge in 87cases. The most common symptom was abdominal pain found in 70 patients (80.4%), followed by itching in 63 patients (72.4%), foul smelling discharge in 52 patients (59.8%), homogenous grey white discharge in 45 patients (51.7%), dysuria in 44 patients (50.6%), thick white discharge in 33 patients (37.9%) and 27 patients (31.0%) reported congested and oedematous vagina.

Bacterial vaginosis was diagnosed if the patients were positively diagnosed ant 3 of the 4-criterion mentioned above. It was observed that all 87 cases (100%) had pH > 4.5, followed by 71cases (81.6%) were found to have clue cells in the wet mount and 45 cases (51.7%) complained of homogenous grey white discharge.Majority of patients with candidiasis presented with vulvar itching which was observed in 48 patients (85.7%) followed by 43 patients (76.8%) who complained of abdominal pain. 38 patients (67.8%) who were diagnosed with Candidiasis had curdy white discharge and dysuria. Per speculum examination revealed congested and oedematous vagina in 35 patients (62.5%). In 16 patients (28.6%) the discharge was homogenous grey white in characteristic and 14 patients (25.0%) had discharge with a foul odor. Candidiasis was diagnosed by either Wet mount, Gram Stain on Culture. 56 patients (100%) were tested +ve in the culture, followed by 47 patients (83.9%) whose sample revealed budding yeast cells with pseudohyphae in the Gram Stain and 34 patients (60.7%) sample contained budding yeast cells in the wet mount. Majority of the patients (19,90.5%) diagnosed with Trichomonas vaginalis had dysuria and on examination revealed congested and oedematous vagina. The discharge was Greenish Yellow in 17 (80.9%), foul smelling in 12 patients (57.1%), 18 patients (85.7%) had Vulvar itching and only 13 patients (61.9%) had associated abdominal pain.

DISCUSSION

Vaginitis is a common medical problem in women that is associated with substantial discomfort, significant morbidity and hence frequent medical visits. These infections if not treated or ignored could debilitate the patients and could become a source of infection for the neonate especially in case of women belonging to the childbearing age.[7,8]

Table 1: Prevalence of mixed infection in different studies.

Study group	Year	Mixed infections
Sivaranjini et al[6]	2013	5.5
Zimba et al [8]	2011	11.0
Sobel al [9]	2013	20.0-30.0
Thulkar et al[11]	2010	36.8
Present Study	2014	34.5

Although a common condition identifying the cause of vaginitis remains a challenging task. The clinical presentations of various vaginal conditions are not specific enough to permit establishing the etiologic diagnosis. So, we designed this stud to profile the infections in women with vaginal discharge and understand the common causes of vaginitis.

Among the 200 women who participated in this study, at the Outpatient department of Department of Obstetrics and Gynecology, MMU, with the complaints of vaginal discharge, a total of 146 (73%) women were found infected while the remaining 54 (27%) women were having physiological vaginal discharge. This correlates to Zimba et al. who reported no definite diagnosis in 22% cases.[8] Amongst the 146 infected women, it was established that endogenous infections were relatively common. The most commonly infections were mixed infections as observed in 69 patients (34.5%). This correlates to Sobel et al. who reported that although data remain sparse, mixed vaginitis occurs rarely (<5 %). By contrast, pathogen mixed infections occur frequently in women with vaginitis.[9] Approximately 20% - 30% of women with Bacterial vaginosis are co- infected with Candida- Coexistence of Bacterial vaginosis and Trichomonas vaginalis is even more common; with co infection rates of 60 % - 80%.[10]

Table 2: Prevalence of BV, VVC and TV in different studies.

Study Group	Year	Bacterial vaginosis	Candidiasis	Trichomonas vaginalis
Vishwanath et al[12]	2000	26.0%	-	10.0%
Bhalla et al[13]	2007	32.8%	16.9%	2.8%
Patel et al [14]	2006	17.8%	8.5%	-
Dan et al[15]	2003	23.5%	35.5%	8.1%
Puri et al[16]	2003	45.0%	31.0%	2.0%
Fonck et al[17]	2000	9.0%	50.0%	23.0%
Zaki et al[18]	2010	39.1%	1.0%	30.0%
Present study	2014	21.5%	15.5%	1.5%

Table 3: Prevalence of Staphylococcus aureus, Escherichia coli, Klebsiella and Enterococcus in different studies.

Study group	Year	Staphylococcus aureus	Escherichia coli	Klebsiella	Enterococcus
Khamees[19]	2012	21.8%	14.2%	13.6%	-
Demba et al[20]	2005	20.5%	-	-	-
Present study	2014	15.5%	10.0%	7.5%	1.5%

Thulkar et al also reported a much higher prevalence of mixed infection (147/400, 36.8%) as compared to the present study.[11] However this is in contrast to Sivaranjini et al who reported a mixed infection of 5.5% (22/400)6 and Zimba et al. who found mixed infections in 11% cases.[6,8] Bacterial vaginosis in 34% cases, Trichomonas vaginalis in 2% and mixed infections in 11% cases with. Amongst other infections observed, Bacterial vaginosis was in majority in 43 (21.5%) cases followed by Vulvovaginal Candidiasis in 31 (15.5%) cases and Trichomonas vaginalis infection was identified in 3 (1.5%) cases. This correlates to the studies conducted by Vishwanath et al., Bhalla et al. Patel et al. and Dan et al.[12-15]

The similar trends in Indian studies may be attributed to a conservative Indian society, where premarital or extramarital sexual contact is an exception rather than the rule. Hence, Bacterial vaginosis and Candidiasis, whose spread by sexual transmission is doubtful, are more prevalent when compared to Trichomonas vaginalis. In their study, Vishwanath et al, observed that the most common infection among 319 women was Bacterial vaginosis (26%). They also observed that 10% of the patients were diagnosed with Trichomonas vaginalis.[12] Similarly, in a population based study from both rural and urban communities by Bhalla et al on women in reproductive age group, the most common infection was bacterial vaginosis (32.8%), followed by Candidiasis (16.9%); Trichomonas vaginalis was diagnosed in 2.8% cases.[13] Patel et al reported a lower prevalence of these infections in his study , 26.3% cases (from a population of 2494 women) were infected by endogenous infections (Bacterial vaginosis 17.8%; Candidiasis 8.5%).[16] Dan et al, in their study on symptomatic women of reproductive age recuited from a gynecologic clinic in Israel also reported Candidiasis as the most common infection, 35.5% of the total population was diagnosed as infected with Candidiasis, followed by Bacterial vaginosis in 23.5% of women and Trichomonas vaginalis in 8.1% women.[15]

This was in contrast to the study by Puri et al. In their study on 100 sexually active women presenting with vaginal discharge, they found a much higher prevalence of Bacterial vaginosis in 45% cases and Candidiasis in 31%. The prevalence of Trichomonas vaginalis was reported to in 2%, which is in concurrence with our present study.[16]

Fonck et al. conducted a study in Kenya, where Candidiasis was most prevalent at 50%, followed by Trichomonas vaginalis 23% and Bacterial vaginosis 9%. The higher percentage of Trichomonas vaginalis in this study was probably because the study population was recruited from major sexually transmitted infection (STI) referral clinics in Kenya and 54% of the total population (621) was pregnant.[17] Zaki et al found Bacterial vaginosis in 39.1% of patients, Trichomonas vaginalis in 30% and Candidiasis in 1% of patients.[18] In present study secondary bacterial infections were found to be present in 34% (68 patients) of the study population. Among these the most common organism was found to be Staphylococcus aureus seen in 15% (30 patients) followed by Escherichia coli in 10% (20 patients), Klebsiella in 7.5% (15 patients) and Enterococcus in 1.5% (3 patients). This correlates with Khamees patients with Escherichia coli and 13.6% patients with Klebsiella.[19] Demba et al who found Staphylococcus aureus in 20.5% patients.[20] The pH of vaginal secretions was recorded as > 4.5 and < 4.5.A large than 4.5, these included women with Bacterial vaginosis, Trichomonas vaginalis and mixed infection but women with Candidiasis had pH which was slightly near the normal value. These results are in agreement with Caillouette et al, who demonstrated that pH value in patients with

anaerobic bacterial infection is higher than that obtained from patients with either normal flora or yeast infection.[21]

In the present study, Bacterial vaginosis was diagnosed in 35% cases (70 patients) and was the most prevalent infections of all. It was diagnosed using Amsel's Criteria where 3 of the 4 patients had homogeneous thin confirming the diagnosis.[22] 41 of the 70 patients had homogeneous thin discharged, 54 gave positive whiff test with KOH (Amine test), in 45 cases the presence of clue cells was identified during wet mount and all 70 cases had pH >4.5 In the present study, abnormal vaginal discharge was most prevalent in the age group of 21-40 years. The higher prevalence of pathogen infection Sobel who reported that at least 55% of the subjects have had at least one healthcare provider diagnosed episode to vaginal by age of 25 years.[23] Similarly Khan and Khan showed that vaginal infections were common at the age of 15-30years.[7]

In the present study, we observed that majority of the patients (95.5%) belonged to lower socio- economic class with monthly income less than Rs. 5113. This could also be attributed to the location of MMIMSR which is located in rural area. This correlates to a similar study conducted by Ifthikar et al who found that 85.3% of the patients belong to class II or below.[24] Their study also followed the BG Prasad scale of classification and reported that all 100% of infected population belong to the lower socio- economic class (< Rs 5113/month income).[25]

In the present study we also observed that majority of the study population was poorly educated, 67% were either illiterate or attended primary school. This also correlates with Thulkar et al who found that 20% of their study population was uneducated and 53% had attended primary education.[26]

CONCLUSION

our findings show that Bacterial vaginosis is the most common Single infection followed by Candidiasis and Trichomonas vaginalis. There were also cases of mixed infections that were diagnosed.

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