



Our Experience on Vaginal Discharge in Reproductive Age Groups Causing By Microorganisms in a Tertiary Care Indian Teaching Hospital

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Abstract

Background: *The abnormal vaginal discharge in reproductive age group is a common clinical problem for female. It is the second most common problem after abnormal uterine bleeding. It is a neglected health problem, most commonly caused due to vulvovaginal candidiasis, and bacterial vaginosis (BV).*

Objectives: *The present study was studied to know the prevalence of common organisms causing vaginal discharge and also to know the variety of clinical presentation.*

Materials and Methods: *In this prospective study 100 women in the reproductive age were participated who were complained unusual discharge at Out patients department of Ostetrics and Gynaecology, IMS and SUM hospital, Bhubaneswar, between September 2012 and September 2014. A total of 100 women in the reproductive age group who had symptoms of vaginitis were examined. Data were coded and analyzed.*

Results: *Out of the 100 patients examined, 77 (77%) cases were organism positive. Among the positive cases, BV (27%) was the most common microbiological cause of abnormal vaginal discharge, followed by trichomoniasis (25%), vaginal candidiasis (22%), combined infection (Candida and BV) (3%), and nonspecific cases (23%).*

Conclusion: *Out of 100 cases, few cases showed discordance between clinical and laboratory diagnosis. This discordance can be due to pitfalls in identifying the causative agent clinically or obscuring of the findings due to improper treatment received for other ailments. Thus, clinico-investigative correlation is more important than other clinical findings alone.*

Keywords: *Bacterial vaginosis, candidiasis, nonspecific vaginitis, trichomoniasis.*

Introduction

Abnormal vaginal discharge is a common clinical problem among women of reproductive age group

with multiple etiologies. It is the second most common problem after menstrual disorders.^[1] One in ten women will present with vaginal discharge

in the course of a year.^[2] Approximately, ten million office visits each year are attributed to vaginal discharge complaints.^[3] Many women with vaginal complaints self-treat incorrectly with over-the-counter drugs.^[4] Health-care providers themselves may miss the correct diagnosis if they fail to confirm the diagnosis with the proper laboratory test.^[5]

The vagina, ectocervix, and endocervix are all susceptible to various pathogens, depending on type of epithelium and other factors in the microenvironment.^[6] The stratified squamous epithelium of the vagina and ectocervix is susceptible to infection with *Candida* species and *Trichomonas vaginalis* (TV).^[6] The columnar epithelium of endocervix is susceptible to *Neisseria gonorrhoeae* and *Chlamydia trachomatis*.^[6] Herpes simplex virus may infect both types of epithelium.^[4] Infection caused by any of these organisms can lead to vaginal discharge. Identifying its specific cause can be a challenging task because a large number of pathogens cause vaginal and cervical infections, and several infections may coexist.^[6]

Abnormal vaginal discharge is usually related to one of the three conditions, such as bacterial vaginosis (BV), vulvovaginal candidiasis (VC), and trichomoniasis.^[3] Apart from the above-mentioned reasons, we should also consider cytolytic vaginosis.

Lactobacilli resulting in lysis of vaginal epithelial cells; and therefore, it is called as cytolytic vaginosis.^[7] The signs and symptoms were similar to VC characterized by pruritus, dyspareunia, and vulvar dysuria.

BV, which is primarily characterized by a malodorous discharge, is common in women with multiple sex partners and is caused by the overgrowth of several facultative and anaerobic bacterial species.^[6] VC is characterized by pruritus and a curd-like discharge. Vaginal trichomoniasis is associated with a copious yellow or green, sometimes frothy, discharge.^[5] The present study is carried out to find the characteristics of vaginal discharge and the

prevalence of various pathogenic agents causing vaginal discharge.

Materials and Methods

The material for this study was from the patients attending the Obstetrics and Gynaecology Department of IMS and SUM Hospital, Bhubaneswar with abnormal vaginal discharge during the period of Aug 2014–July 2016. This was a cross-sectional descriptive study. All the patients clinically having the symptoms of vaginitis and with discharge were included in this study. Postmenopausal women and pregnant women were excluded from the study.

Method of collection

A total of 100 women of reproductive age group with the complaints of vaginal discharge were selected for this study at random after applying the criteria mentioned above. With the prior consent, a comprehensive history, general examination, and gynecological examination were initially carried out. After making a clinical diagnosis, a sterilized Cusco's speculum was inserted into the vagina to visualize the vagina and cervix. Any pathology of vagina and cervix such as vaginitis, discharge, cervicitis, and cervical erosions was looked for. The amount, color, character, and smell of the vaginal discharge were noted. The discharge was then collected by three sterile swabs from the upper part of posterior fornix. The pH was measured using indication papers ranging from 2 to 10 by directly dipping pH strip in vagina. Color change was observed and matched against the indicator. One swab was used for making wet mount to look for the motility of TV. The second swab was used for making smears for Gram staining to find out clue cells, Gonococci. The third swab was used to do potassium hydroxide (KOH) mount to look for *Candida*.

Laboratory procedures

For *Candida*

1. KOH preparation: a drop of 10% KOH was added to the vaginal secretions taken

on a clean glass slide and mounted with a coverslip. *Candida* was identified as round or oval budding yeast cells

2. Gram-stained vaginal smears were examined which showed Gram-positive budding yeast cells with pseudohyphae
3. Cultures on Sabouraud's dextrose agar (SDA) medium showed a growth of creamy, grayish moist colonies
4. For TV: wet mount preparation was immediately made – a drop of discharge was mixed with a drop of normal saline on a clean slide and topped with a coverslip. This was then examined under microscope for flagellate organisms with characteristic motility.

For BV

1. Whiff amine test was done as follows – one or two drops of vaginal discharge were taken on a clean glass slide, and one or two drops of freshly prepared 10% KOH solution were added to it. Both were mixed and smelt immediately
2. Wet film was examined for the presence of clue cells which are vaginal epithelial cells with a granular surface and blurred margins because of attached bacteria
3. Gram-stained smears were examined for the presence of altered vaginal flora in form of Gram-negative coccobacilli studding vaginal epithelial cells instead of normally predominant Gram-positive *Lactobacilli*.
4. For *Neisseria Gonorrhoeae*: Gram-stained smears were examined for the presence of intracellular Gram-negative diplococci. Data collection sheet included patient's demographic information, clinical features, examination findings, and laboratory investigation. Data were analyzed using appropriate statistical methods.

Results

In this study of 100 cases who presented with abnormal vaginal discharge, the following

observations were made. The demographic characteristics of patients with vaginal discharge. The patient's ages ranged from 18 to 50 years. Fifty percent of patients had completed at least elementary and intermediate education, and 60% of patients were employed (Table 1). Of the 100 patients who presented with abnormal vaginal discharge based on the signs and symptoms, a clinical diagnosis of nonspecific vaginitis was made in 60 (40%) patients, BV in 30 (20%) patients, VC in 25 (16.7%) patients, and trichomoniasis in 13 (8.7%) patients (Table 2). The different microbiological etiologies. Of the 100 patients, 77 (77%) cases were organism positive. Among the positive cases, BV (27%) was the most common microbiological cause of abnormal vaginal discharge, followed by trichomoniasis (25%), vaginal candidiasis (22%), combined infection (*Candida* and BV) (3%), and nonspecific other urogenital cases (23%) (Table 3). The association between demographic characteristics and the type of organism isolated. The peak age group for vaginal infections was 26–35 years (44%). Most of the specific vaginal infections occurred in this age group. Educational level does not influence the infection rate (Table 4). BV was found in high frequency in the age group of 26–35 years (48%) followed by 40–50 years (22%), then by 36–40 and 18–25 years (15%). The most common age group affected by vaginal candidiasis was 26–35 and 18–25 years (27%) followed by 40–50 and 36–40 years (23%). Trichomoniasis was detected in the highest rate at the age group of 40–50 years (32%) followed by 36–40 and 26–35 years (28%), then by 18–25 years (12%). Nonspecific vaginitis where no organism was found seen in high frequency in the age group of 36–40 years (44%) followed by 26–35 years (35%). Mixed infection of *Candida* and BV was seen in three patients mainly in the age group 26–35 years (67%) followed by 40–50 years (33%) (Table 5). Characteristics of vaginal discharge of patients differed according to pathogenic agents. The pH of vaginal secretions was >5 in a large proportion

of examined cases which included women with BV and TV, but women with *Candida* infection, the pH was slightly below the normal value. Whiff amine test was positive in 27 cases, most of them having BV.

Table. 1 Demographic Characteristic of Patients Complaining Of Vaginal Discharge

Characteristics	Percent (%)
Age:	
18-25	19
26-35	32
36-40	29
40-50	20
Education Level:	
Illiterate	50
Literate	50
Occupation:	
Employed	700
Unemployed	30

Table: 2 Clinical Diagnosis of patients presenting with vaginal discharge

Clinical diagnosis	Percent (%)
Non specific vaginitis	30
Bacterial vaginosis	38
Candidiasis	32

Table: 3 Aetiology of Abnormal vaginal discharge

Aetiology of abnormal vaginal discharge	Percent (%)
Bacterial vaginosis	27
Vaginal candidiasis	22
Combined infection (Candida and Bacterial)	3
Organism not found	23
Total	100

Table: 4 Demographic Characteristics of Patients by type of Organism

Characteristics	Frequency (%)	BV	VC	TV	Combined (BV+VC)
Age					
18-25	19	4	6	3	-
26-35	44	13	6	7	2
36-40	26	4	5	7	-
40-50	24	6	5	8	1
Education Level:					
Illiterate	50	15	10	10	2
Literate	50	12	12	15	1
Occupation:					
Employed	60	10	10	11	2
Unemployed	40	10	10	11	2

Table: 5 Prevalence of Pathogens causing vaginal discharge in different age groups

Pathogens	No	18-25	26-35	36-40	40-50
		No %	No %	No %	No %
Bacterial Vaginosis	27	4 15	13 48	4 15	6 22
Vaginal Candidiasis	22	6 27	6 27	5 23	5 23
Combined(Candida and Bacterial vaginosis)	3	- -	2 67	- -	1 33
No Organism	23	3 13	8 35	10 44	2 9

Discussion

A total of 100 cases who presented with abnormal vaginal discharge were examined during the period of study. Vaginal discharge is a common health problem among women in the reproductive age group. Whether asymptomatic or symptomatic, it is usually neglected by women making the diagnosis more difficult. The incidence of pathogens in vaginal discharge varies in different regions of the world (Kumar, 1994). Vaginal discharge may be either physiological or pathological in origin. It is difficult to know what proportion of discharges belong to either category. Although many cases of abnormal vaginal discharge are not caused by sexually transmitted infections, common curable sexually transmitted infections can present with this symptom. Among the 100 cases with abnormal vaginal discharge, majority of the patients were in the age group 26–35 years (34%) because they belong to the sexually active age group. However, this was not statistically significant. There was also no significant association with both literacy level and employment status in contrast to Al Quaiz^[8] study where the infection rates were highest among secondary school and university graduates. This may be attributed to the smaller sample size of ours when compared to Al Quaiz^[8] study. The majority of BV (56%) occurred in illiterates which in contrast to Al Quaiz^[8] study where BV was common among educated people because educated patients are more likely to be informed about physiological and pathological vaginal discharge and thus more likely to seek health services. Most of the vaginal candidiasis (55%) cases occurred in literates which are similar to Al

Quaiz^[8] study, and about 60% of TV infections were isolated from the literate group. In this study, organisms responsible for abnormal vaginal discharge were found in 77% of the cases. Among the positive cases, BV (27%) was the most common microbiological cause of abnormal vaginal discharge, followed by trichomoniasis (25%), vaginal candidiasis (22%), combined infection (*Candida* and BV) (3%), and nonspecific other urogenital causes (23%). BV (27%) was the most common microbiological cause of abnormal vaginal discharge in our study. Figure 4 shows the clue cells. This is comparable to the study of Koumans *et al.*^[9] who had also found a 29.2% prevalence of BV. In Pawanarkar and Chopra study,^[10] BV was the most common cause of genital tract infections as it was prevalent in 19% of women similar to our study. In a study by Gupta *et al.*,^[11] 2005 of 139 women reported that BV was the most common cause of genital tract infections as it was found in 44.6% of women which is little bit higher than our study. Nessa *et al.*^[12] in Bangladesh reported 48.1% cases of BV among the sex workers which is also on the higher side. This high prevalence may be the result of disturbance of vaginal microflora resulting from frequent sexual intercourse and the subsequent frequent washing with water and disinfectant. The variations in the prevalence could be related to geographical distribution or systematic differences in the various population samples; however, there is continuing controversy about its importance as a pathogen and its ability to cause vaginitis. BV was found in high frequency in the age group of 26–35 years (48%) followed by 40–50 years (22%), then by 36–40 and 18–25 years (15%). The peak age of BV in this study was 26–35 years, similar to the findings of Chowdhury *et al.*,^[13] but there was no statistically significant association found between age and infection such as Al Quaiz,^[8] Madhivanan *et al.*,^[14] and Bukusi *et al.*^[15] also reported that BV is more common in younger age group. The reason is mainly due to the increased sexual activity which causes disruption of normal vaginal flora.

Vaginal candidiasis (22%) was the third most common microbiological etiology of abnormal vaginal discharge in our study. Figures 5 and 6 illustrate the KOH mount which shows budding yeast cells, pseudohyphae, and culture on SDA medium showing the growth of *Candida* as creamy white colonies respectively. Although the vaginal candidiasis is the highest diagnosed disease, the reason for low incidence in this study may be due to geographical variation. The most common age group affected by vaginal candidiasis was the 26–35 and 18–25 years (27%) followed by 40–50 and 36–40 years (23%). Nwadioha *et al.*^[18] and Verbalis *et al.*^[19] also reported a similar result of increased prevalence in younger age group because of increased sexual activity in this age group. Candidiasis is not usually a sexually transmitted disease; however, male contacts could be possibly involved.

The combination of two pathogens has been investigated in the present study. In our study, 3% of cases presented with combined infection (BV + vaginal candidiasis). In 23 specimens out of the 100 cases, there were no pathogenic organisms isolated in spite of the infection in the speculum examination. These cases might have been caused by Chlamydia, *Mycoplasma*, or viral agents for which methods of isolation were not available in the present study. In short, abnormal vaginal discharge was most prevalent in the age groups 23–33 years. In the present work, the highest prevalence of sexually transmitted infection (44%) has been found in the age group of 26–35 years. This is in agreement with Saxena and Yadav^[20] (2001) that attributed to the higher sexual activities in this age group.

Characteristics of vaginal discharge of patients differed according to pathogenic agents and sometimes its properties give impression about the causative agents that would be isolated and identified. The pH of vaginal secretions was >5 in a large proportion of examined cases which included women with BV (27%) and TV (25%), but women with *Candida* infection (22%), the pH was slightly below the normal value. These results

are in agreement with Caillouette *et al.*,^[21] who demonstrated that pH value in aerobic bacterial infection is higher than that obtained from patients with either normal flora or yeast infection. In the present study, positive Whiff test with KOH (amine test) was positive in 27 cases, most of them having BV. We chose Nugent scoring as the gold standard test for diagnosis of BV because the Nugent scoring system is an excellent method for laboratory evaluation of cases of BV, and it is more reliable than Amsel criteria.

Conclusion

It is recommended that prevention, early diagnosis, and prompt treatment of abnormal vaginal discharge especially among the sexually active women should be done to avoid the complications and reduce HIV transmission. There is a need for creating community awareness about health-care facilities and self-concern in women for their own health needs. Hence, this study was done to emphasize the role of laboratory investigations in patients of vaginitis as clinical diagnosis alone can lead to false interpretation.

References

1. Yudkin G. Vaginal discharge. In: McPherson AA, editor. *Women's Problems in General Practice*. 2nd ed. Oxford: Oxford University Press; 1988.
2. O'Dowd TC, West RR, Ribeiro CD, Smail JE, Munro JA. Contribution of *Gardnerella vaginalis* to vaginitis in a general practice. *Br Med J (Clin Res Ed)* 1986;292:1640–2.
3. Fox KK, Behets FM. Vaginal discharge. How to pinpoint the cause. *Postgrad Med*. 1995;98:87.
4. Macsween KF, Ridgway GL. The laboratory investigation of vaginal discharge. *J Clin Pathol*. 1998;51:564–7. Epidemiology and clinico-investigative study of organisms causing vaginal discharge <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5389219/?report=printable> 9 of 23 11/27/2017 10:09 AM
5. Cullins VA, Dominguez L, Guberski T, Secor RM, Wysocki SJ. Treating vaginitis. *Nurse Pract*. 1999;24:46, 49.
6. Abdullah Yusuf Md, Chowdhury M, Shahidul Islam KM, Eva EO, Sharif AR, Khalilur Rahman Md, et al. Common microbial etiology of abnormal vaginal discharge among sexually active women in Dhaka, Bangladesh. *South East Asia J Public Health*. 2011;1:35–9.
7. Cerikcioglu N, Beksac MS. Cytolytic vaginosis: Misdiagnosed as candidal vaginitis. *Infect Dis Obstet Gynecol*. 2004;12:13–6.
8. Al Quaiz JM. Patients with vaginal discharge: A survey in a university primary care clinic in Riyadh city. *Ann Saudi Med*. 2000;20:302–6.
9. Koumans EH, Sternberg M, Bruce C, McQuillan G, Kendrick J, Sutton M, et al. The prevalence of bacterial vaginosis in the United States, 2001–2004; associations with symptoms, sexual behaviors, and reproductive health. *Sex Transm Dis*. 2007;34:864–9.
10. Pawanarkar J, Chopra K. Health and population – Prevalence of lower reproductive tract infection in infertile women. *Perspect Issues*. 2004;27:67–75.
11. Gupta N, Zahn MM, Coppens I, Joiner KA, Voelker DR. Selective disruption of phosphatidylcholine metabolism of the intracellular parasite *Toxoplasma gondii* arrests its growth. *J Biol Chem*. 2005;280:16345–53.
12. Nessa A, Nahar KN, Begum SA, Anwar SA, Hossain F, Nahar K. Comparison between visual inspection of cervix and cytology based screening procedures in Bangladesh. *Asian Pac J Cancer Prev*. 2013;14:7607–11.

13. Chowdhury MN, Jabbar FA, Kambal AM. Isolation of *Gardnerella vaginalis* from high vaginal swabs. Trop Geogr Med. 1985;37:328–33.
14. Madhivanan P, Hari A, Kumarasamy N, Kausalya AG, Suniti Solomon LJ, YR Gaitonde. Profile of HIV infected pregnant women and interventions used in prevention of vertical transmission of HIV in tertiary HIV care centre. J Obstet Gynaecol India. 2002;53:3–7.
15. Bukusi EA, Cohen CR, Stevens CE, Sinei S, Reilly M, Grieco V, et al. Effects of human immunodeficiency virus 1 infection on microbial origins of pelvic inflammatory disease and on efficacy of ambulatory oral therapy. Am J Obstet Gynecol. 1999;181:1374–81.
16. Bachmann LH, Hobbs MM, Seña AC, Sobel JD, Schwebke JR, Krieger JN, et al. *Trichomonas vaginalis* genital infections: Epidemiology and clinico-investigative study of organisms causing vaginal discharge <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5389219/?report=printable> 10 of 23 11/27/2017 10:09 AM progress and challenges. Clin Infect Dis. 2011;53:S160–72
17. Lally P, van Jaarsveld CH, Potts HW, Wardle J. How are habits formed: Modelling habit formation in the real world. Eur J Soc Psychol. 2010;40:998–1009.
18. Nwadioha SI, Egah DZ, Banwat EB, Alao OO. Microbial agent of abnormal vaginal discharge in pregnant mothers attending primary health care centers of Jos, Nigeria. J Clin Med Res. 2010;2:7–11.
19. Verbalis JG, Mangione MP, Stricker EM. Oxytocin produces natriuresis in rats at physiological plasma concentrations. Endocrinology. 1991;128:1317–22.
20. Saxena U, Yadav S. STD prevalence in sexually active women attending the STD clinic of a tertiary level general hospital. J Obstet Gynaecol India. 2001;51:134–7.
21. Caillouette JC, Sharp CF, Jr, Zimmerman GJ, Roy S. Vaginal pH as a marker for bacterial pathogens and menopausal status. Am J Obstet Gynecol. 1997;176:1270–5.