Original Research Article

Clinical and microscopic correlation of abnormal vaginal discharge

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ABSTRACT

Background: Vaginal discharge in the reproductive age group is the most common complaint encountered everyday both by gynaecologists and general practitioners. The prevalence of vaginal discharge in India is estimated to be 30%. Bacterial vaginosis is the most common cause, followed by Candidiasis and Trichomonasis. Aims and objectives of the study were to correlate clinical and microscopic methods for diagnosing abnormal vaginal discharge and to find out the most common cause of abnormal vaginal discharge in our set up.

Methods: The study was carried out in Gynaecological OPD of VIMS, Ballari. After thorough history and gynecological examination, three samples were collected from the posterior fornix of vagina using sterile cotton swabs. The first swab was used to detect trichomonas vaginalis using wet mount microscopy. The second swab was used to determine amine/fishy odour (Whiff test). The third swab was used for gram staining to diagnose Bacterial vaginosis and Candida. The Gram-stained slides was evaluated using Nugent's scoring system for detection of BV.

Results: Bacterial vaginosis constitutes the most common cause of vaginal discharge, followed by Candidiasis and then Trichomoniasis in our set up. The sensitivity of clinical diagnosis is 71.93%, 88.9%, and 33.3% and specificity are 54.65%, 92.15% and 99.49% for Bacterial vaginosis, Candidiasis, and Trichomoniasis respectively.

Conclusions: The most ideal approach is the microbiological approach for the etiological diagnosis of symptomatic vaginal discharge. The most common cause of abnormal vaginal discharge is Bacterial vaginosis followed by Candidiasis and Trichomoniasis.

Keywords: Bacterial vaginosis, Candidiasis, Trichomoniasis, Vaginal discharge

INTRODUCTION

Vaginal discharge in the reproductive age group is the most common complaint. Encountered everyday both by gynaecologists and general practitioners. Symptomatic vaginal discharge is caused by inflammation due to infection of the vaginal mucosa. It occurs in 1-14% of all women in the reproductive age group and is responsible for 5-10 million OPD visits per year throughout the world. The prevalence of vaginal discharge in India is estimated to be 30%.[1] Abnormal vaginal discharge is the second most common problem after menstrual disorders.[2] One in ten women will present with vaginal discharge in the course of a year.[3] Almost every fourth woman in gynaecological outpatient department has the complaint of vaginal discharge.[4] Abnormal vaginal discharge also predisposes to significant morbidity in the form of pelvic inflammatory diseases, infertility, endometriosis, cuff cellulitis, urethral syndrome, pregnancy loss, preterm labour, to enumerate a few. Most common cause of symptomatic vaginal discharge is *Bacterial vaginosis* (33-47%) followed by Candidiasis (20-40%) and Trichomoniasis (8-10%).[5-7] These three conditions account for 90% of all etiologies of abnormal vaginal discharge. Multiple infections can also coexist.[6]

Most of the time a presumptive diagnosis is made based on the nature of the discharge (clinical diagnosis), which

is often inaccurate and incomplete. This eliminates the laboratory component (Microbiological diagnosis) leading to treatment mismanagement.[8,9] To address the limitations of clinical diagnosis, the World Health Organisation (WHO) developed and advocated the Syndromic management approach. This approach is based on the identification of a relatively constant combination of symptoms and signs (syndrome) and on the knowledge of the most common causative organisms of these syndromes and their antimicrobial susceptibility. Antimicrobial regimens are chosen to cover the major pathogens responsible for the syndromes.

The main disadvantage of this management is the cost of over diagnosis and over treatment when multiple antimicrobials are given to patient where infection is caused by none or only one organism. Also to be considered are the risks of adverse drug reactions, alteration of normal vaginal flora and also the potential for developing antibiotic resistance in the community.[8,9] The addition of a simple microscopic evaluation by Gram stain of the vaginal smear has evolved as a sensitive noncultural diagnostic technique for *Bacterial vaginosis* and Candidiasis.[1,5] Direct microscopy (wet smear) of the vaginal discharge to visualize the motile Trichomonas vaginalis has been determined to be as accurate as culture for the diagnosis of Trichomoniasis.[5] Objectives were to correlate clinical and microscopic methods for diagnosing abnormal vaginal discharge and to find out the most common cause of abnormal vaginal discharge in our set up.

METHODS

The study was conducted in patients attending Gynaecology OPD, Vijayanagar Institute of Medical Sciences, Ballari, for a period of one and half year (from November 2016 to April 2018). These were the patients who complained of abnormal vaginal discharge as their main or subsidiary symptom. It is a cross sectional study.

Inclusion criteria

Age group of 18-45 years, complaining of abnormal vaginal discharge were included in the study.

Exclusion criteria

Pregnancy, Puerperium, Post abortal women within 6 weeks, Women during menstrual bleeding, Women who have taken antibiotics or antifungals in past 1 week, Benign and malignant tumors of uterus and cervix, Women with laboratory confirmed STD, Women with IUCD/ proven foreign body, Women with predisposing factors like diabetes/ immunosuppression.

Statistical analysis

The data collected from the study variable was entered into a excel sheet. After appropriate data filtration, the data sheet was transferred to and analysed using SPSS Version 20.0 software. Descriptive statistics like percentages, mean and standard deviation were used to describe the study variables. Considering the microbiological diagnosis of vaginal discharge as gold standard, the utility of clinical diagnosis was assessed by calculating the sensitivity, specificity, PPV and NPV.

Clinical observation

The study included the examination of the vaginal status of all women in conjunction with gross characteristics of vaginal discharge. It was possible to classify the patients into four categories on the basis of vaginal discharge characteristics. The gross characteristics of the discharge were considered as of diagnostic value included volume, colour, odour, frothiness and consistency.

Tenderness of vaginal walls with inflammation of vulva and a green or yellow offensive irritating discharge associated with or without multiple small punctuate strawberry spots on the vaginal vault and portio vaginalis of the cervix and often with superficial erosion of the cervix was characteristic of Trichomonas infection. Cases revealing redness of vaginal wall with white patches or plaques of cheesy material adherent to the vagina, which when removed showed multiple petechial haemorrhagic areas. Also there was edema and soreness of the vulva associated with profuse irritating curdy type of vaginal discharge constituting monilial infections. Cases revealing thin, frothy, homogenous, irritating discharge which is malodorous but showed no gross pathological changes of the vagina and of vulva was suggestive of bacterial vaginosis. The remaining were assigned to undiagnosed category since the discharge presented mixed characteristics.

Microbial examination

Patient was placed in lithotomy position. Cusco's speculum was introduced per vaginally and then vaginal material was obtained from the posterior fornix with a sterile swab stick for Wet mount, Whiff test and Gram stain.

Gram stain slide is interpreted by using Nugent score. The diagnostic criteria used for microbiological diagnosis are: Bacterial vaginosis- A Gram stain score of seven or more based on the scoring system by Nugent et al. Candidiasis- If gram positive budding yeasts and pseudohyphae are seen on Gram stain or wet mount with 10% KOH. Trichomoniasis- If wet mount is positive for motile Trichomonas vaginalis. Haemoglobin estimation, peripheral blood smear examination, urine routine examination and microscopic examination carried out for each patient in OPD.

Samples size of estimation

200 patients presented with abnormal vaginal discharge.

RESULTS

The present study was carried out to determine the correlation between the clinical and microscopic diagnosis of abnormal vaginal discharge. White discharge per vagina was the chief complaint in 200 cases attending Gynaec OPD.

The mean age of the study cases were 31.27 years. 50% were in the age group of 21-30 years followed by 38.5% between 31-40 years, 8% between 41-45 years, 3.5%, <20 years, which is depicted in Table no-1.Majority of the subjects had completed their primary school (60%) followed by high school (25%), 10% illiterate, 3.5% completed 12th standard, 1.5% completed their degree. 94.5% of the subjects were housewives, 2.5% were

farmers, 1.5% were teachers, 0.5% were staff nurse, 0.5% were tailor, 0.5% had business. 49% of the study population belong to lower middle class, followed by 27% middle class, 17% lower class, 7% upper middle. Majority (33.5%) of the cases were para 2, followed by para 3 in 31%, 16.5% were para 1, 9% para 4. 5% patients were nulliparous and 5% are > para 5 and maximum parity was 6 seen in 1 women as depicted in Table 1. Maximum cases (42%) are seen between 1-6months, followed by 31% seen within <1 month, 13.5% in 6-12 months, 7% in > 24months, 6.5% in 12-24 months as depicted in Table 1. The most common associated symptom was itching seen in 50.5% cases, followed by pain abdomen seen in 45.5% and burning micturition 45%, dysuria in 15.5%. Less common complaint was backache seen in 5% of cases, which is depicted in Table 2.

Table 1: Age, parity distribution and duration.

Age group	Frequency	Percent	Parity	Frequency	Percent	Duration	Frequency	Percent
≤ 20 years	7	3.5	Para 0	10	5	≤ 1 month	62	31
21-30 years	100	50	Para 1	33	16.5	1-6 months	84	42
31-40 years	77	38.5	Para 2	67	33.5	6-12 months	27	13.5
≥ 40 years	16	8	Para 3	62	31	12-24 months	13	6.5
			Para 4	18	9	>24 months	14	7
			Para ≥5	10	5			
Total	200	100	Total	200	100	Total	200	100

Table 2: Associated symptoms.

Symptom	Frequency	Percent
Burning micturition	90	45
Pain abdomen	91	45.5
Itching	101	50.5
Dysuria	31	15.5
Backache	10	5

Table 3: Comparison of clinical and microbiological diagnosis with respect to bacterial vaginosis.

Clinical diagnosis	Microbiological diagnosis		Total
	Positive	Negative	
Positive	82 (71.9)	39 (45.3)	121 (60.5)
Negative	32 (28.1)	47 (54.7)	79 (39.5)
Total	114 (100)	86 (100)	200 (100)

Out of 200 cases, clinically *Bacterial vaginosis* was found to be positive in 121 cases and microscopically in 114 cases. 82 cases were both clinically and microscopically positive for bacterial vaginosis. 39 cases were clinically positive but microscopically negative (39 cases were undiagnosed). 32 cases were clinically negative but microscopically positive (among 32 cases, Candidiasis were 9, Trichomonas were 2 and undiagnosed were 21). 47 cases out of 200 were both clinically and microscopically negative for bacterial

vaginosis, which is depicted in Table 3. Of 200 cases, clinically Candidiasis was found to be positive in 23 cases and microscopically in 9 cases. 8 cases were both clinically and microscopically positive for Candidiasis (Among these 8, 5 were mixed infections-*Bacterial vaginosis* with Candidiasis) Fifteen cases were clinically positive but microscopically negative (Among these 15 cases, 6 cases were Bacterial vaginosis, 9 cases were undiagnosed). 1 case was clinically negative but microscopically positive (which was mixed infection, Bacterial vaginosis with Candidiasis, which was clinically Bacterial vaginosis). 176 out of 200 were both clinically and microscopically negative for Candidiasis, which is depicted in Table 4.

Table 4: Comparison of clinical and microbiological diagnosis with respect to candidiasis

Clinical diagnosis	Microbiological diagnosis		Total
	Positive	Negative	
Positive	8 (88.9)	15 (7.9)	23 (11.5)
Negative	1 (11.1)	176 (92.1)	177 (88.5)
Total	9 (100)	191 (100)	200 (100)

Out of 200 cases, clinically Trichomoniasis was found to be positive in 2 cases and microscopically in 3 cases. 1 case was both clinically and microscopically positive for Trichomoniasis (which was mixed infection- *Bacterial vaginosis* with Trichomoniasis). 1 case was clinically

positive but microscopically negative (Bacterial vaginosis microscopically). 2 cases were clinically negative but microscopically positive (Both were mixed infection with Bacterial vaginosis, 2 cases were undiagnosed clinically). 196 cases out of 200, were both clinically and microscopically negative for Trichomoniasis, which is depicted in Table 5.

Table 5: Comparison of clinical and microbiological diagnosis with respect to trichomoniasis

Clinical diagnosis	Microbiological diagnosis		Total
	Positive	Negative	
Positive	1 (33.3)	1 (0.5)	2 (1.0)
Negative	2 (66.7)	196 (99.5)	198 (99.0)
Total	3 (100)	197 (100)	200 (100)

Out of 200 cases, clinically undiagnosed was found to be positive in 54 cases and microscopically in 82 cases. 34 cases were both clinically and microscopically undiagnosed. 20 cases were clinically positive but microscopically negative (among 20 negative, 19 were Bacterial vaginosis, one was mixed infection *Bacterial vaginosis* with Trichomoniasis).48 cases were clinically negative but microscopically positive (Among these 48, 38 were Bacterial vaginosis, 10 were Candidiasis). 98 cases out of 200 were both clinically and microscopically negative, which is depicted in Table 6.

Table 6: Comparison of clinical and microbiological diagnosis with respect to undiagnosed cases.

Clinical diagnosis	Microbiological diagnosis		Total
	Positive	Negative	
Positive	34 (41.5)	20 (16.9)	54 (27.0)
Negative	48 (58.5)	98 (83.1)	146 (73.0)
Total	82 (100)	118 (100)	200 (100)

Clinical diagnosis of *Bacterial vaginosis*, Candidiasis and Trichomoniasis have been validated with microbiological diagnosis as gold standard and found that clinical diagnosis had a sensitivity of 71.9%, 88.9%, 33.3% respectively and specificity of 54.7%, 92.2%, 99.5% respectively and PPV of 67.8%, 34.8%, 50.0% respectively and NPV of 59.5%, 99.4%, 98.99% respectively.

Table 7: Validation of clinical diagnosis with microbiological diagnosis as the gold standard.

Clinical diagnosis	Bacterial vaginosis	Candidiasis	Trichomoniasis	Undiagnosed cases
Sensitivity	71.93%	88.89%	33.33%	41.46%
Specificity	54.65%	92.15%	99.49%	83.05%
PPV	67.77%	34.78%	50.00%	62.96%
NPV	59.49%	99.44%	98.99%	67.12%

DISCUSSION

Reproductive health has gained importance recently as reproductive tract infections, if not treated cause morbidity such as recurrent urinary tract infections, dyspareunia, menstrual irregularities, infertility, chronic pelvic pain, ectopic pregnancy, abortion, preterm labour, PROM, stillbirth, neonatal deaths, transmission of HIV infection and even maternal mortality.[10]

Gynecological infections, if not diagnosed and treated in time may lead to severe or irreversible complications. Due to changing microbiological profile of infection and sensitivity of microorganisms and emergence of ß-lactamase and methicillin resistant pathogen and resistance to Azole group of drugs in non albicans is a major problem throughout the world in various clinical infections including Gynecological infections. Early microbiological diagnosis will help to plan accurate, appropriate and effective therapy.[11]

This prospective study included 200 women in whom criteria were assessed to compare the diagnosis of abnormal vaginal discharge by clinical and microbiological means. The most common associated symptom in the present study was vaginal itching (50.5%) followed by pain abdomen (45.5%) and burning micturition (45%) comparable to studies done by Rao PS et al5, French et al.[6] In present study patients sought medical help within 1-6months after the onset of symptoms, which was comparable to Rekha et al.[12] Etiology was found in 126 (63%) cases and was not found in 82 (41%) by microbiological diagnosis. Microbiological diagnosis included 8 cases of mixed infection. In the present study *Bacterial vaginosis* (57%) was the predominant cause of abnormal vaginal discharge followed by Vaginal candidiasis (4.5%) and Trichomoniasis (1.5%) which included mixed infections which is in correlation with the study of Rekha S et al, Sowjanya et al and Vijayalakshmi et al.[12-14]

In our study, with respect to Bacterial vaginosis, clinically 82 cases (71.9%) were correlating with microbiological diagnosis; with respect to Candidiasis, clinically 8 cases (88.9%) were correlating with microbiological diagnosis and with respect to Trichomoniasis, clinically only 1 case (33.3%) was correlating with microbiological diagnosis. Therefore *Bacterial vaginosis* and Trichomoniasis were more effectively diagnosed microscopically whereas clinically

Candidiasis had a higher correlation with respect to microbiological diagnosis.

Hence, we conclude that *Bacterial vaginosis* has moderate sensitivity and low specificity, if we give empirical treatment as identified by clinical diagnosis some cases will receive treatment unnecessarily. Candidiasis has high sensitivity and specificity, emprical treatment as identified by clinical diagnosis is appropriate but microbiological diagnosis is ideal. Trichomoniasis has very high specificity and low sensitivity, so emprical treatment of cases as identified by clinical diagnosis some cases would be missed, therefore microbiological diagnosis is ideal even for Trichomoniasis.

WHO recommends that all women complaining of abnormal vaginal discharge be treated empirically with metronidazole and when Candida noted, to treat for Candidiasis as well. This study showed that 41% of patients had no TV, BV or Candidiasis by the microbiological diagnostic approach. If blanket treatment is advocated to all the women complaining of abnormal vaginal discharge then majority of the women would receive metronidazole and antifungal therapy unnecessarily. Not only does over diagnosis place a financial burden on the health system but it also carries the risk of possible social consequences in the community. Also, adverse effects of drugs may occur.

Limitations

Large population to be included to know the most common causes of abnormal vaginal discharge in the community, follow up of the patients was not done.

CONCLUSION

As abnormal vaginal discharge is one of the most common complaint in the reproductive age group, this study was undertaken to know the most common causes like Bacterial vaginosis, Candidiasis, Trichomoniasis both clinically and microscopically. Microbiological diagnosis is the ideal approach for etiological diagnosis of vaginal discharge. Nugent scoring is the gold standard test for diagnosis of Bacterial vaginosis. In a resource constrained setting, at least a clinical diagnosis based on simple microscopy, pH and amine test with WHO algorithms to be made prior to treatment.

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