ORIGINAL ARTICLE

Clinico-Microbiological Correlation of Vaginal Discharge

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Abstract

Aims and Objectives: To establish clinical diagnosis of vaginal discharge and the type of vaginitis, to confirm the type of vaginitis with the help of microbiology of vaginal discharge and to establish clinico-microbiological co-relation of vaginal discharge. Methods: This prospective analytical study was undertaken in 200 patients from July 2010 to June 2012. Results: Clinical diagnosis has moderate sensitivity i.e. 70% and 53.84% for Bacterial vaginosis and candidial vaginitis respectively but has poor sensitivity i.e. 33.33% for Trichomonas Vaginalis. Clinical diagnosis has high specificity i.e. 97.46% and 81.60% for Candidial vaginitis and Trichomonial vaginitis respectively but has poor specificity i.e. 44.28% for Bacterial vaginosis. Wet mount shows highest sensitivity (83.33%) for diagnosis of Bacterial Vaginosis Wet mount was highly specific for all the three types of vaginitis with highest specificity (98.57%) for Bacterial Vaginosis Conclusions: Gram staining can be restricted to the patients in whom diagnosis cannot be made or in those not responding to routine line of treatment or recurrent vaginitis. If we add simple bed side tools like pH, Whiff test and wet mount microscopy to the diagnosis of all the three type of vaginitis we could increase both sensitivity and specificity.
Keywords: Bacterial vaginosis, candidial vaginitis, Trichomonial vaginitis

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Introduction

The commonest patients encountered by the gynecologist and even general practitioners, in day to day practice are of vaginal discharge in reproductive age group. 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[1] 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]. Nearly 25 to 30% of women attending outpatient department of gynecological clinic are having vaginal discharge as presenting symptom, and recurrent nature of it in many cases; hence it is important to conduct the study on clinico microbiological correlation of vaginal discharge. Successful management of symptomatic vaginal discharge lies in the diagnostic approach. The traditional approach to diagnosis is through laboratory diagnosis of the aetiological agents. This approach is expensive and not available at all health centers or dispensaries. Most of the time a presumptive diagnosis is made based on the nature of the discharge (Visual diagnosis), which is often inaccurate and incomplete. This eliminates the laboratory component (Microbiological diagnosis) leading to mismanagement of treatment. [2,3]

To address the limitations of both aetiological and visual diagnosis, the World Health Organisation (WHO) developed and advocated the Syndromic management approach[4,5] The addition of a simple microscopic evaluation by Gram's stain of the vaginal smear has evolved as a sensitive non-culture diagnostic technique for bacterial vaginosis[1,6] and candidiasis[6]. The present study was conducted to determine the accuracies of clinical and visual presumptive diagnosis of symptomatic vaginal discharge and to evaluate if addition of simple microscopic techniques such as wet smear & Gram's

Stain can aid in the accurate diagnosis of this common condition.

Materials & Methods

The prospective analytical study was undertaken at outpatient department of obstetrics and gynecology of Government Medical College & Hospital, Aurangabad from July 2010 to June 2012. 200 women attending gynecology OPD c/o abnormal vaginal discharge which fits into inclusion criteria were studied. Informed consent was taken from all the patients. Patients were subjected to detailed history taking, per speculum examination, microscopy and gram staining of vaginal discharge.

pH test was done by directly dipping pH stick in discharge present in vagina. pH stick range (0-6). It is colure fixed indicator stick. pH changes were noted i.e whether ≤ 4.5 or > 4.5 and discharge categorized accordingly.

Whiff test was also done at the time of per speculum examination. Discharge from vagina taken on slide & immediate fishy odour on addition of 1-2 drops of KOH noted, it indicates positive whiff / amine test.

Microscopic examination of saline wet mount
a) Saline wet mount preparation
b) KOH wet mount preparation

Gram stain slide preparation –Large gram positive bacilli were assumed to be the lactobacilli spp. smaller gram variable rods were assumed to be the Gardenella vaginalis. Other microorganisms were categorized by morphology only gram positive bacilli, curved bacilli, gram positive cocci in chains and fusiforms. When lactobacillus species are present alone or only in combination with Gardenella morphophytes the smear is interpreted as negative. When more mixed flora including not only Gardenella morphophytes but also other bacteria are present and lactobacillus species are absent or present only in low number (1+ to 2+) the smear was interpreteted as consistent with bacterial vaginosis. Gram positive budding yeast cells were interpreted as consistent with candidial vaginitis.

Microbiological Criteria for Vaginal Discharge

	Normal	Bacterial vaginosis	Candidial vaginitis	Trichomonial vaginitis
Wet mount preparation	Lactobacilli, normal epithelial cells	Clue cells >20%	Budding yeast cells	Motile trichomonads
Gram staining	Lactobacilli, Normal epithelial cells	Gram stain score of 7 or > based on the scoring system by Nugent et al	Gram positive budding yeast cells and pseudohyphae	Not applicable

Results

Table 1: Distribution of cases according to clinical symptoms

Symptoms	Number of cases	Percentage of cases
Excessive vaginal discharge	37	18.05
Itching	13	6.5
Malodour	17	8.5
Excessive vaginal discharge with itching	42	21
Excessive vaginal discharge with malodour	69	34.5
Excessive vaginal discharge with itching with malodour	22	11
Total no of cases	**200**	**100**

Total of 34.05% women presented with excessive vaginal discharge with malodour and 22 (11%) of women were presented with all the three symptoms i.e. excessive vaginal discharge with itching with malodour. 60% of patients were having grey and homogenous discharge and only 3% of patients were having yellowish frothy discharge.

Table 2: Distribution of cases according to clinical diagnosis of vaginal discharge.

Type of vaginitis	Number of cases	Percentage of cases
Normal	28	14
Bacterial Vaginosis	120	60
Candidial Vaginitis	46	23
Trichomonial vaginitis	06	03
Total	**200**	**100**

On clinical examination of vaginal discharge, 60% of women were diagnosed to have bacterial vaginosis and 3% of women were diagnosed to have trchomonas vaginitis. Out of 100 women having pH≥

4.5 and positive Whiff test 58 women were positive microbiologically for Bacterial Vaginosis (true positive) and 42 women were negative microbiologically for Bacterial Vaginosis(false positive). Out of 100 women having negative Whiff test, 2 women were positive microbiologically (false negative) and 98 women were negative microbiologically (true negative).

Table 3: Distribution of cases according to Wet mount microscopy

Wet mount microscopy	Number of cases	Percentage of cases
Lactobacilli and epithelial cells	109	54.5
Clue cells	52	26
Motile Trichomonads	03	1.5
Budding yeast cells(Hyphae)	24	12
Clue cells +Budding yeast Cells (Hyphae)	06	03
Motile Trichomonads + Clue Cells	05	2.5
Budding Yeast cells and Trichomonads	01	0.5
TOTAL	200	100

On Wet mount examination of vaginal discharge Lactobacilli with epithelial Cells were seen in 54.5% of women, 26% of women were having clue cells and 12% of women were having budding yeast cells. 3% of women were having clue cells with budding yeast cells, 2.5% of women were having motile trichomonads and clue cells and 0.5% of women were having budding yeast cells and trichomonads.

On gram staining examination 30% of women were having nugent score > 7 i.e. positive for bacterial vaginosis, 19% of women were having intermediate flora. Nugent score <7 and other non specific organisms and 4% of women were having mixed flora I.e. positive for both Bacterial Vaginosis and Candidial Vaginitis

Table 4: Distribution of cases according to Microbiological diagnosis of Vaginitis

Type of Vaginitis	Number of cases	Percentage of cases
Normal	97	48.05
Bacterial Vaginosis	60	30
Candidial Vaginitis	26	13
Trichomonial Vaginitis	03	1.5
Mixed Vaginitis	14	7
Total	200	100

Out of 200 cases maximum no of 97 (48.05%) cases were showing normal flora on microbiology, significant no of cases 60 (30%) were having positive microbiology for bacterial vaginosis, 26 case were having positive microbiology for Candidiasis. Least no of cases i.e only 3 (1.5%) were having positive microbiology for trichomonal Vaginitis.

Out of 14 cases with mixed vaginitis 8 cases were having positive microbiology for both candidiasis and bacterial Vaginosis and 5 cases were having positive microbiology for bacterial vaginosis and candididsis and 1 case having positive microbiology for both candidiasis and Trichomoniasis.

Table 5: Distribution of Gram staining result in clinically diagnosed type of vaginal discharge

Vaginal Disharge	Gram staining Results				
	Gram +ve bacilli	Nugent score > 7	Intermediate Flora (Nugent score 4-7)	Gram positive budding yeast cells	Mixed Flora
Normal(n=28)	14	06	05	03	00
B.V. (n=120)	36	50	27	01	06
C.V. (n=46)	12	04	06	22	02
T.V. (n=06)	06	00	00	00	00
Total (n=200)	68	60	38	26	08

Out of 120 clinically diagnosed B.V. only 50 women were having Nugent score >7 on gram staining diagnostic of bacterial vaginosis and 27 women were having Nugent score 4-7 s/o Intermediate flora. Out of 46 clinically diagnosed C.V. 22 women were having gram positive budding yeast cells on gram staining. 6 women from clinically diagnosed B.V.

group and 2 women from clinically diagnosed C.V. group were having mixed flora i.e. positive for both bacterial vaginosis and candidiasis. Out of 120 women diagnosed clinically as Bacterial Vaginosis, 42 women were positive microbiologically (true positive) and 78 women were negative microbiologically (false positive). Out of 80 women

which were negative on clinical diagnosis, 18 women were positive microbiologically (false negative) and 62 women were negative microbiologically (true negative). Out of 46 women diagnosed clinically as Candidial Vaginitis, 14 women were appositive microbiologically (true positive) and 32 women were negative microbiologically. (False positive) Out of 154 cases which were negative on clinical diagnosis, 12 women were positive microbiologically (false negative) and 142 women were negative microbiologically (true negative). Out of 6 women diagnosed clinically as Trichomonial Vaginitis, 1 woman was positive microbiologically (true positive) and 5 women were negative microbiologically. (False positive) Out of 194 women which were negative on clinical diagnosis, 2 women were positive microbiologically (false negative) and 192 women were negative microbiologically (true negative).

Table 6: Validation of clinical diagnosis of Vaginal Discharge with Microbiological diagnosis

Clinical Diagnosis	Bacterial Vaginosis	Candidial Vaginitis	Trichomonial Vaginitis
Sensitivity	70%	53.84%	33.33%
Specificity	44.28%	81.60%	97.46%
Positive predictive value	35%	30.43%	16.66%
-Ve predictive Value	77.5%	86.58%	98.96%

Clinical diagnosis has moderate sensitivity i.e. 70% and 53.84% for Bacterial vaginosis and candidial vaginitis respectively but has poor sensitivity i.e. 33.33% for Trichomonas Vaginalis. Clinical diagnosis has high specificity i.e. 97.46% and 81.60% for Candidial vaginitis and Trichomonial vaginitis respectively but has poor specificity i.e. 44.28% for Bacterial vaginosis.

Discussion

Out of 200 cases 28 women were diagnosed to have normal vaginal discharge and 172 women were diagnosed clinically to have vaginitis of three types that include bacterial vaginosis, candidial vaginitis and trichomonial vaginitis.

Table 7: Distribution of cases according to symptoms

Symptom	Kantida et al [7] (2004)(%)(n=217)	Deokinandan et al[8] (2007)(%)(n=600)	S. Rekha et al[9] (2010)(%)(n= 203)	Present study (2012)(n=200)
Excessive vaginal discharge	79(36)	170(28.3)	40(19.70)	37(18.05)
Itching	42(19.4)	90(15)	10(4.9)	13(6.5)
Malodour	-	22(3.6)	12(5.9)	17(8.5)
Excessive vaginal discharge with itching	31(14.28)	36(6)	52(25.62)	42(21)
Excessive vaginal discharge with malodour	51(22.46)	252(42)	75(36.94)	69(34.5)
Excessive vaginal diharge with itching with malodor	20(9.21)	30(5)	18(4.92)	22(11)

Above table 7 shows the frequency of the symptoms with which cases presented. Cases presented with multiple complaints and frequency of these complaints is different in each study. There is variation in the frequency of the presenting symptoms in patients of our study and group and other studies; however the most common symptom was excessive vaginal discharge with malodour 69 (34.5%) which is comparable to other studies which also shows that it was the most common complaint. The present study shows that out of total 120 clinically diagnosed Bacterial Vaginosis cases it could be confirmed microbiologically only in 60 (50%) cases. Which is comparable to study of S. Rrekha et al [9] (40.67%). In other studies of Karaca M et al[10] and Esra Esim Buyukbayrak et al [11] Microbiological confirmation was possible in only 11.11% and 30.87% respectively.

This study also shows that out of total 46 clinically diagnosed Candidial Vaginitis cases it could be confirmed microbiologically in 26 (56.52%) cases. which is almost comparable to other two studies. So it can be concluded that in almost more than half of the cases the clinical diagnosis was accurate. Out of total 6 clinically diagnosed Trichomonas Vaginitis cases it could be confirmed microbiologically only in 3 (50%) of cases. Therefore it appears that almost 50% cases of clinical diagnosis Trichomonas vaginalis may not be confirmed on wet smear preparation. Results of study are not comparable

with other two studies; it could be due to delay to mount the discharge. Kingston et al [12] states that Slides must be read immediately after collection because looked at samples that were positive for trichomonads on initial reading and then reevaluated them every 10 minutes. At 10 minutes, 20% of samples became negative; by 30 minutes, 35% were negative; and by 2 hours, 78% had become negative. (Samples in this study were mounted within 2 hours of collection.)

Table 8: Validation of clinical diagnosis & microbiological diagnosis.

Infection	Sensitivity (%)				Specificity (%)			
	Roochika Ranjan et al [13] (2003) (n=300)	Andreas Schwiertz et al [14] (2006) (n=246)	S. Rekha et al [9] (2010) (n=203)	Present study (2012) (n=200)	Roochika Ranjan et al [13] (2003) (n=300)	Andreas Schwiertz Et al [14] (2006) (n=246)	S.Rekha et al [9] (2010) (n=203)	Present study (2012) (n=200)
B.V	32.5	68.9	78.5	70	85.6	67.8	35.8	44.28
C.V	56.2	54.3	52.8	53.84	82.7	44.4	81.4	81.60
T.V.	21.3	-	33.33	33.33	76.3	-	96.6	97.46

In the present study sensitivity of clinical diagnosis against the microbiological diagnosis were highest for Bacterial Vaginosis, with similar results of the study by S.Rekha et al [9] which also show highest sensitivity of clinical diagnosis for bacterial vaginosis. The sensitivity of clinical diagnosis against the microbiological diagnosis was lowest for trichomonas vaginitis in present study and rest of all study. This study shows moderate sensitivity for Bacterial vaginosis and Candidiasis, moderate specificity for Candidiasis and Trichomonas vaginalis but lower sensitivity for Trichomonas Vaginalis and lower specificity for Bacterial vaginosis. This implies that if the clinical approaches used to diagnose the infections Bacterial Vaginosis and Candida will be over treated and Trichomonas Vaginalis will be under teated. In the study specificity was highest for trichomonas vaginitis comparable to the results of S.Rekha et al [9]. Symptoms alone should not be used to direct treatment in instances in which resources permit more complete evaluation with office based testing includes microscopy.

Conclusion

In our study incidence of symptomatic vaginal discharge is 10.46%. Out of 200 cases of vaginal discharge studied most common type of vaginitis is Bacterial Vaginosis (30%) and 7% of women with vaginal were having mixed Vaginitis.

Our study shows that the diagnosis of vaginal discharge based on clinical findings i.e. symptoms and clinician's visual impression is capable of diagnosing only 50% of Bacterial vaginosis, 50% of Trichomonas vaginalis and 43.48% of Candidal vaginitis. Thus we concluded that after subjecting this vaginal discharge to bed side tests like pH, Whiff test and wet mount microscopy the diagnostic accuracy improved.

Conflict of Interest: None declared
Source of Support: Nil
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