

Clinico-microbiological retrospective study of abnormal vaginal discharge in women coming to obstetrics and gynecology out patient department at a tertiary care hospital

Sujata Dhaded¹, Roopa C^{2,*}, Siddesh B.S³

¹Professor, ²Assistant Professor, ³Professor and HOD, ¹Dept. of Obstetrics and Gynecology, ^{2,3}Dept. of Microbiology, Khaja Bandanawaz Institute of Medical Sciences, Gulbarga, Karnataka, India

***Corresponding Author: Roopa C**

Email: drroopachiremath@yahoo.co.in

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Abstract

Introduction: Vaginal discharge is a normal physiological discharge which is usually white or clear, non-offensive and varies with menstrual cycle. Abnormal vaginal discharge if untreated can lead to cervicitis, pelvic inflammatory disease, urinary tract infection and also infertility. As abnormal vaginal discharge presents vaguely in a clinical set up, diagnosis is made by laboratory confirmation for rapid identification of causative pathogens and appropriate treatment.

Materials and Methods: This is a retrospective study where records of clinically suspected vaginitis/cervicitis cases from Jan 2016 till June 2018 were studied. History, general examination findings, per speculum and pelvic examination findings, investigations performed and treatment given were collected for these cases and the data was analyzed.

The amount, odor, color, pH and consistency of vaginal discharge were noted. Three high vaginal swabs were taken from every patient using sterile swab sticks and labeled. The tests include: saline wet mount, KOH mount and Grams stain. Bacterial vaginosis was diagnosed using the Amsel's clinical criteria and standard microbiological techniques. The collected samples were also cultured on MacConkey's agar, Blood agar and Sabouraud's Dextrose agar for aerobic bacterial and fungal cultures respectively. The antibiotic sensitivity testing of all isolates was performed by Kirby Bauer's disc diffusion method on Muller Hinton agar and interpreted as per CLSI guidelines.

Results: This is a retrospective study where records of clinically suspected vaginitis/cervicitis cases were studied. A total of 1680 clinically suspected vaginitis/cervicitis case records were collected in this study. Out of 1680 cases, only 475 (28.27%) cases were positive for growth of a pathogen and the remaining 1205 (71.72%) cases either showed no growth or no pathogens were isolated. Bacterial vaginosis was diagnosed in 120 (7.14%) cases and trichomoniasis was diagnosed in 51 (3.03%) cases. Out of the 475 samples positive for growth, most common isolate was *Escherichia coli* (195, 41.05%), followed by Coagulase negative staphylococcus (130, 27.36%).

Conclusion: *Escherichia coli* was the most common organism causing infection in our study population followed by Coagulase negative staphylococcus. Clinical diagnosis along with complete microbiological evaluation is necessary to determine the causative agents of vaginal infections for appropriate management.

Keywords: Abnormal vaginal discharge, Vaginitis, Cervicitis, High vaginal swabs.

Introduction

Vaginal discharge is a normal physiological discharge which is usually white or clear, non offensive and varies with menstrual cycle.¹ This discharge may increase physiologically at puberty, during pregnancy and at ovulation and may be perceived abnormal by the patient. The complaint of vaginal discharge is a common complaint encountered in Obstetrics and Gynecology OPD and abnormal vaginal discharge is usually associated with itching and irritation.²

Abnormal vaginal discharge if untreated can lead to cervicitis, pelvic inflammatory disease, urinary tract infection and also infertility. As abnormal vaginal discharge presents vaguely in a clinical set up, diagnosis is made by laboratory confirmation for rapid identification of causative pathogens and appropriate treatment.

Our hospital is a tertiary care center catering to patients largely from the low socioeconomic population prone for such genital infections. In addition, poverty, malnutrition, high population density, the unavailability of clean water, low health status and a lack of personal hygiene provide optimal conditions for the growth and transmission of such infections in women.³ Hence this study was undertaken to

identify the common clinical profiles of women presenting with abnormal vaginal discharge to the obstetrics and gynecology outpatient department at our hospital and the prevalence of common pathogens causing abnormal vaginal discharge at our hospital.

Materials and Methods

This is a retrospective study where records of clinically suspected vaginitis/cervicitis cases from Jan 2016 till June 2018 were studied. Ethical committee clearance has been obtained for the study. Patient details including serial number, date, age, address, educational status, occupation, menstrual history, obstetric history, religion, ethnicity, marital status, diabetes mellitus, and history of vaginal discharge in the past, history of urinary tract infection and history of hospitalization in the recent past were collected. General examination findings, per speculum and pelvic examination findings, investigations performed and treatment given were collected for these cases and the data was analyzed to identify the common clinical profiles of women presenting with abnormal vaginal discharge to the obstetrics and gynecology outpatient department at our hospital and the prevalence of common pathogens causing

abnormal vaginal discharge at our hospital. Patients aged less than 18 years and more than 70 years, in whom per speculum and pelvic examination was not possible, who were menstruating, who were on antibiotics and pregnant women were excluded from the study.³

A vaginal examination using a sterile Cusco's speculum was performed. The amount, odor, color and consistency of vaginal discharge were noted. The pH of the discharge was also taken in the same setting. Three high vaginal swabs were taken from every patient using sterile swab sticks and labeled. High vaginal swabs were subjected to further analysis for identification of the pathogen causing infection. The tests include: saline wet mount, KOH mount and Grams stain. Bacterial vaginosis was diagnosed using the Amsel's clinical criteria and standard microbiological techniques. The Amsel's clinical diagnosis requires three of four criteria to be met: the first is a vaginal pH greater than pH 4.5; the second is the presence of clue cells; the third is a milky, homogeneous vaginal discharge; and the fourth is the release of amine (fishy) odor after addition of 10% potassium hydroxide to the specimen. The pH was determined directly by applying a swab on a pH paper in the range covering pH 4.0 to pH 6.5. The swab was then inserted into 0.2 mL of normal saline in a test tube; a drop of this extract was placed on a glass slide. A 10% potassium hydroxide drop was put on another glass slide. The swab was then stirred in the 10% potassium hydroxide and immediately evaluated for the presence of a fishy odor. Both drops were then covered with a cover slip and examined at 400x magnification under a light microscope. Clue cells were identified as vaginal epithelial cells with a heavy coating of bacteria that the peripheral borders are obscured.^{4,8} The collected samples were also cultured on MacConkey's agar, Blood agar and Sabouraud's Dextrose agar for aerobic bacterial and fungal cultures respectively.³ Identification of isolate from positive cultures was done using standard microbiological techniques which include motility testing by hanging drop preparation, Gram staining and biochemical reactions such as catalase, coagulase, indole, methyl red, Voges-Proskauer, citrate, urease, phenyl pyruvic acid test and oxidase test. The antibiotic sensitivity

testing of all isolates was performed by Kirby Bauer's disc diffusion method on Muller Hinton agar and interpreted as per CLSI guidelines.⁵

Standard antibiotics were used for antibiotic sensitivity testing which included ampicillin (30mcg), amoxycylav (50/10 mcg), cefoxitin (30mcg), cefoperazone/sulbactam (75mcg/10mcg), amikacin (10mcg), gentamicin (10mcg), meropenem (10mcg), imipenem (10mcg), linezolid (30mcg), norfloxacin (5mcg), clindamycin (2mcg), vancomycin (10mcg), piperacillin/tazobactam (100/10mcg), teicoplanin (30mcg) and cotrimoxazole (25mcg) were tested. S.aureus ATCC 25923 and E.coli ATCC 25922 were used as quality control. Yeast growth on SDA was further identified by Gram's stain, KOH mount and germ tube test. Germ tube test was done to differentiate albicans candida from non albicans candida species. All the culture media, biochemical media and antibiotics used were obtained from Hi Media. Results obtained were analyzed by counts and percentages using MS Excel, 2007 version.

Results

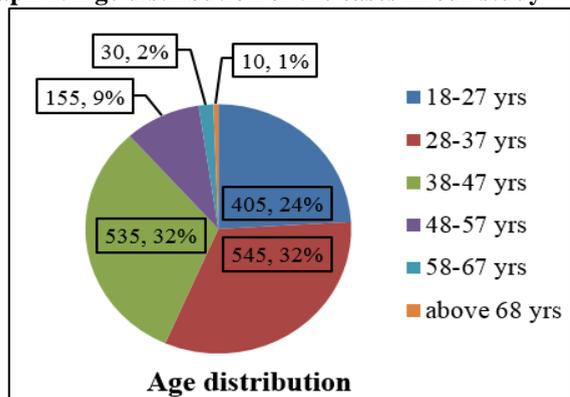
This is a retrospective study where records of clinically suspected vaginitis/cervicitis cases from Jan 2016 till June 2018 were studied. Patient details including age, present complaints, marital status, past medical history, past obstetric history, menstrual history, general examination findings, per speculum and pelvic examination findings, investigations performed and treatment given were collected for these cases. Patients aged less than 18 years and more than 75 years, in whom per speculum and pelvic examination were not possible, who were menstruating, who were on antibiotics and pregnant women were excluded from the study. A total of 1680 clinically suspected vaginitis/cervicitis case records were collected in this study. Most of the cases presented with increased vaginal discharge with no foul smell and 445 cases (26.48%) presented with abnormal vaginal discharge associated with itching, backache, dysuria and dysperunia. The clinical presentations with common complaints of the cases are listed in Table 1.

Table 1: Complaints of the cases in our study

Complaint	Number of cases	Percentage
Increased vaginal discharge with no foul smell	925	55.05%
Abnormal vaginal discharge with itching and abdominal pain	186	11.07%
Abnormal vaginal discharge with itching, backache, dysuria and dysperunia	445	26.48%
Abnormal foul smelling discharge with itching	94	5.59%
White curdy discharge with itching and dysuria	25	1.48%
Greenish foul smelling discharge with itching and dysuria	5	0.29%
Total	1680	

The maximum number of patients presenting with abnormal vaginal discharge to the OBG OPD at our hospital belonged to the age group of 28 to 47 years. The age distribution of cases in our study has been demonstrated in the Graph 1 below.

Graph 1: Age distribution of the cases in our study



In the 1680 cases studied, 1546 (92.02%) were married and the remaining 134 (7.97%) cases were single. Out of the 1546 married women, 1206 (78%) women were multiparous and average number of children per woman was 2. Significant past history of diabetes mellitus was given by 59 (3.51%) cases out of 1680 cases studied. The vaginal pH was more than 4.5 in 730 (43.45%) cases and less than 4.5 in 950 (56.54%) cases of the total cases studied.

Out of 1680 cases, only 475 (28.27%) cases were positive for growth of a pathogen and the remaining 1205 (71.72%) cases either showed no growth or no pathogens were isolated. Isolation of lactobacilli and diphtheroids were considered as non pathogenic. Bacterial vaginosis was diagnosed in 120 (7.14%) cases and trichomoniasis was diagnosed in 51 (3.03%) cases. Out of the 475 samples positive for growth, most common isolate was Escherichia coli (195, 41.05%), followed by Coagulase negative staphylococcus (130, 27.36%). The different pathogens isolated in our study have been listed in Table 2.

Table 2: Pathogens isolated in our study

Pathogen isolated	Number of samples	Percentage
Escherichia coli	195	41.05%
Coagulase negative staphylococcus	130	27.36%
Staphylococcus aureus	50	10.52%
Enterococcus fecalis	50	10.52%
Klebsiella pneumoniae	15	3.15%
Candida non albicans	15	3.15%
Candida albicans	10	2.10%
Proteus mirabilis	5	1.05%
Pseudomonas aeruginosa	5	1.05%



Fig. 1: Picture shows pus cells with gram positive cocci in singles, pairs and chains



Fig. 2: Picture shows gram negative bacilli in singles and groups

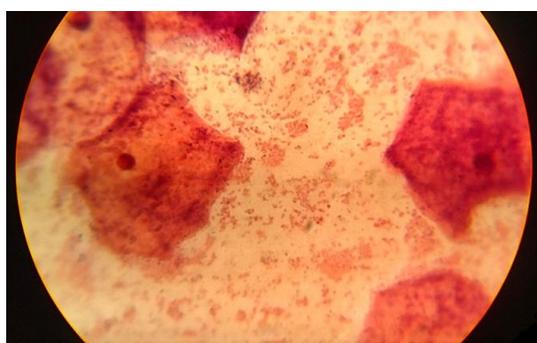


Fig. 3: Picture shows clue cells in a bacterial vaginosis case in our study

All the gram positive isolates in our study were sensitive to Linezolid, Vancomycin and Teicoplanin. All the gram negative isolates in our study were sensitive to Cefoperazone/sulbactam, Carbapenems and Piperacillin/tazobactam. The antibiotic sensitivity patterns of gram positive and gram negative pathogens isolated in our study have been displayed in Table 3 and Table 4 respectively.

Table 3: Antibiotic sensitivity patterns of gram positive isolates

Organism isolated	Coagulase negative staphylococcus n=130	Staphylococcus aureus n=50	Enterococcus faecalis n=50
Antibiotic tested			
Ampicillin	30.76%	30%	60%
Amoxyclav	75.38%	88%	96%
Amikacin	80.76%	96%	96%
Clindamycin	80.76%	60%	60%
Cefoxitin	30.76%	30%	60%
Gentamicin	80.76%	96%	96%
Linezolid	100%	100%	100%
Norfloxacin	43.07%	60%	72%
Piperacillin/ tazobactam	92.30%	96%	96%
Teicoplanin	100%	100%	100%
Vancomycin	100%	100%	100%

Table 4: Antibiotic sensitivity patterns of gram negative isolates

Organism isolated	E.coli n=195	Klebsiella pneumoniae n=15	Proteus mirabilis n=5	Pseudomonas aeruginosa n=5
Antibiotic tested				
Ampicillin	0	0	20%	0
Amoxyclav	50.25%	73.33%	80%	20%
Amikacin	77.94%	80%	80%	80%
Cotrimoxazole	80%	66.66%	100%	0
Cefoperazone/sulbactam	100%	100%	100%	100%
Gentamicin	78.97%	86.66%	80%	80%
Imipenem	100%	100%	100%	100%
Meropenem	100%	100%	100%	100%
Norfloxacin	48.71%	53.33%	80%	20%
Piperacillin/tazobactam	100%	100%	100%	100%

Discussion

A total of 1680 clinically suspected vaginitis/cervicitis case records were collected in this study. Most of the cases presented with increased vaginal discharge with no foul smell and 445 cases (26.48%) presented with abnormal vaginal discharge associated with itching, backache, dysuria and dysperunia. This finding correlates with several studies done on abnormal vaginal discharge like study by Vijayalakshmi D et al⁶ and Ibrahim B et al.⁷

The maximum number of patients presenting with abnormal vaginal discharge to the OBG OPD at our hospital belonged to the age group of 28 to 47 years. Similar findings have been displayed in many studies denoting the high prevalence of reproductive tract infections in the age group of 15-45 years.¹⁻³ The increased prevalence of infection in reproductive age group is because this is a period of maximum sexual and reproductive activity. Previous studies have reflected upon the various factors influencing the occurrence of vaginal/cervical infections mainly marital status, parity more than 2, socioeconomic status, poor hygiene especially use of cloth during menstruation.¹⁻³ In the 1680 cases studied, 1546 (92.02%) were married and the remaining 134 (7.97%) cases were single. Out of the 1546 married women, 1206 (78%) women were multiparous and average number of children per

woman was 2. Significant past history of diabetes mellitus was given by 59 (3.51%) cases out of 1680 cases studied. Association of vaginal candidiasis with uncontrolled diabetes mellitus has been established by many prior studies.¹⁰ The vaginal pH was more than 4.5 in 730 (43.45%) cases and less than 4.5 in 950 (56.54%) cases of the total cases studied. This finding is similar to the study done by Vijayalakshmi et al.⁶

Out of 1680 cases, only 475 (28.27%) cases were positive for growth of a pathogen and the remaining 1205 (71.72%) cases either showed no growth or no pathogens were isolated. Isolation of lactobacilli and diphtheroids were considered as non pathogenic. Bacterial etiology for vaginal discharge in our study for about 28 percent of all cases studied comparable to study done by Ibrahim B et al where bacterial infection has caused vaginal discharge in about fifty percent of the cases studied.⁷ Bacterial vaginosis was diagnosed in 120 (7.14%) cases and trichomoniasis was diagnosed in 51 (3.03%) cases. These rates are comparable to similar studies done by Yusuf et al, Madhivanan et al and Busuki et al.¹¹⁻¹³

Out of the 475 samples positive for growth, most common isolate was Escherichia coli (195, 41.05%), followed by Coagulase negative staphylococcus (130, 27.36%). These organisms have been the most common

etiology of infection in several studies on genital infections.¹⁴⁻¹⁶ These organisms are commonly encountered in urinary and genital infections in females due to the proximity of the anus to the female genitalia. Lack of personal hygiene predisposes for fecal contamination of the genital area from gut commensals, especially E.coli.

All the gram positive isolates in our study were sensitive to Linezolid, Vancomycin and Teicoplanin. All the gram negative isolates in our study were sensitive to Cefoperazone/sulbactam, Carbapenems and Piperacillin/tazobactam. Similar findings have been displayed by study done by Mehta VJ et al.¹⁷ These findings clearly suggest that the pathogens causing genital infections are becoming resistant to commonly used antibiotics due to their indiscriminate use. This also stresses the importance of microbiological investigations before treating such cases to prevent antibiotic abuse.

Conclusion

Abnormal vaginal discharge is a common complaint encountered in the Obstetrics and Gynecology outpatient department and is associated with vaginal/cervical infection. Escherichia coli was the most common organism causing infection in our study population followed by Coagulase negative staphylococcus. Health education regarding personal hygiene is a must for every female patient coming to the OBG OPD to prevent occurrence of genitourinary infections. Clinical diagnosis along with complete microbiological evaluation is necessary to determine the causative agents of vaginal infections for appropriate management of such cases.

Conflict of Interest: None.

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