

“Bacteriological Profile And Antibiogram Of High Vaginal Swabs Collected From Women Of Reproductive Age Group Attending A Tertiary Care Hospital”.

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I. Introduction:

The vaginal microflora constitutes a complex microecological environment composed of different microbiological species in variable quantities and relative proportions⁽¹⁾. It is mainly dominated by members of the genus *Lactobacillus*, which maintains the generally acidic vaginal pH⁽²⁾. Among the women of reproductive age group, the most common complaint is discharge per vaginum⁽³⁾. The common cause of vaginal discharge is usually physiological i.e., use of contraceptives, menstruation and pregnancy⁽⁴⁾. The infectious causes of vaginal discharge are sexually transmitted infections, bacterial vaginosis, aerobic vaginitis and Candidiasis⁽⁵⁾.

Bacterial vaginosis is the invasion of the vagina with anaerobic bacteria. It occurs when there is alteration of the vaginal ecology with gross depletion of the normal bacteria flora lactobacilli with overgrowth of anaerobic polymicrobial organisms^(6, 7).

Aerobic vaginitis corresponds to a type of disturbed microflora, in which the lactobacilli are replaced by aerobic facultative pathogens like *Escherichia coli*, *Staphylococcus aureus*, Group B *Streptococcus* (GBS), *Klebsiella pneumoniae*, and *Enterococcus* species. Disruptions of the vaginal ecosystem during aerobic vaginitis cause an increase in pH to >6, a decrease in lactate concentration and an increase in leucocytes and pro-inflammatory cytokines concentration in the vaginal discharge. The common presenting features are yellowish vaginal discharge and dyspareunia with red inflammation of vagina⁽⁸⁾. For the treatment of vaginitis, the normal flora disturbances must be restored by avoiding the use of wrong antibiotic that disturbs the normal vaginal flora⁽⁹⁾.

These infections if not treated or ignored can lead to infertility, ectopic pregnancy and risk for HIV transmission. These patients may become a source of infection for the neonates especially in case of reproductive age group women. Hence the present study is designed to isolate and identify the aerobic bacterial pathogens associated with vaginitis in the reproductive age group women and to study their latest antibiotic susceptibility patterns.

II. Material and Methods

The present study included a total number of 240 women of reproductive age group who reported to hospital with complaints of discharge per vagina. The study was conducted in the Department of Microbiology, Sri Venkateswara Medical College, Tirupati with the approval from the Institutional Ethics Committee.

Study type: Cross-sectional study.

Study period: January 2019 to December 2019.

Inclusion criteria:

- Women with history of discharge per vagina.
- Women belonging to the reproductive age group (15 years to 50 years).

Exclusion criteria:

- Pregnant women with history of discharge per vagina were excluded.
- Menstruating women were excluded.
- Women who did not give consent to participate in the study

Sample collection & processing:

From the patients attending the Gynecology OPD with history of discharge per vagina, a sterile speculum was inserted and two high vaginal swabs were collected in sterile saline solution to prevent the swabs from drying. One swab is for Gram staining and the second swab is for culture and sensitivity. Informed written consent was obtained from the patient before the procedure. The samples were sent to the laboratory as soon as possible.

In the laboratory the details of the patients were noted. Direct Gram staining was done from the first swab. The second swab was inoculated on Nutrient agar, Blood agar and MacConkey agar. The plates were incubated aerobically at 37°C overnight. The growth was identified and speciation done by standard biochemical reactions⁽¹⁰⁾. The antibiotic susceptibility testing of the isolates were performed by Kirby-Bauer disc diffusion method⁽¹¹⁾ and the antimicrobial discs were obtained from Hi Media Laboratories Private Limited, Mumbai.

III. Results:

A total of 240 high vaginal swabs collected from the patients with complaints of discharge per vagina from the Gynecology OPD were sent to Microbiology laboratory for Gram stain and aerobic bacterial culture. Among the 240 specimens, 64(26.6%) swabs yielded pure growth under aerobic conditions, commensals were isolated from 68 swabs whereas *Candida* species were isolated from 56 swabs. Other 52 swabs showed no growth.

This study included women belonging to reproductive age group between 15 to 50 years. The maximum number of cases belong to the age group between 26 to 30 years (42.18%), followed by 31-35 years (28.57%) (Table:1).

AGE GROUP (in years)	NO. OF SAMPLES OBTAINED (n=170)	NO. OF SAMPLES WITH CULTURE POSITIVE (n=64)
15 – 20	17	3 (17.64%)
21 – 25	38	10 (26.31%)
26 – 30	64	27 (42.18%)
31 – 35	49	14 (28.57%)
36 – 40	30	7 (23.33%)
41 – 45	23	2 (8.69%)
46 – 50	19	1 (5.26%)

In the present study, 64 vaginal swabs (26.66%) were positive for aerobic organisms on bacteriological culture. The most common causative agent of this study was *Escherichia coli* (31.25%), followed by *Klebsiella pneumoniae* (23.43%), and *Staphylococcus aureus* (15.63%).

In the present study Gram negative organisms were isolated predominantly than Gram positive organisms (figure-1).

The most predominant Gram negative organisms *Escherichia coli* and *Klebsiella pneumoniae*, were highly sensitive to Aztreonam, Imipenem and Ceftazidime/Clavulanic acid, and were least sensitive to Ciprofloxacin, Ceftriaxone and Ampicillin. *Pseudomonas aeruginosa* isolates showed maximum sensitivity to Piperacillin/Tazobactam and least sensitivity to Ceftriaxone (Table-2). The most effective antibiotics against Gram positive organisms were Vancomycin followed by Ceftazidime/Clavulanic acid (Table-3)

Figure 1: Distribution of the total isolates

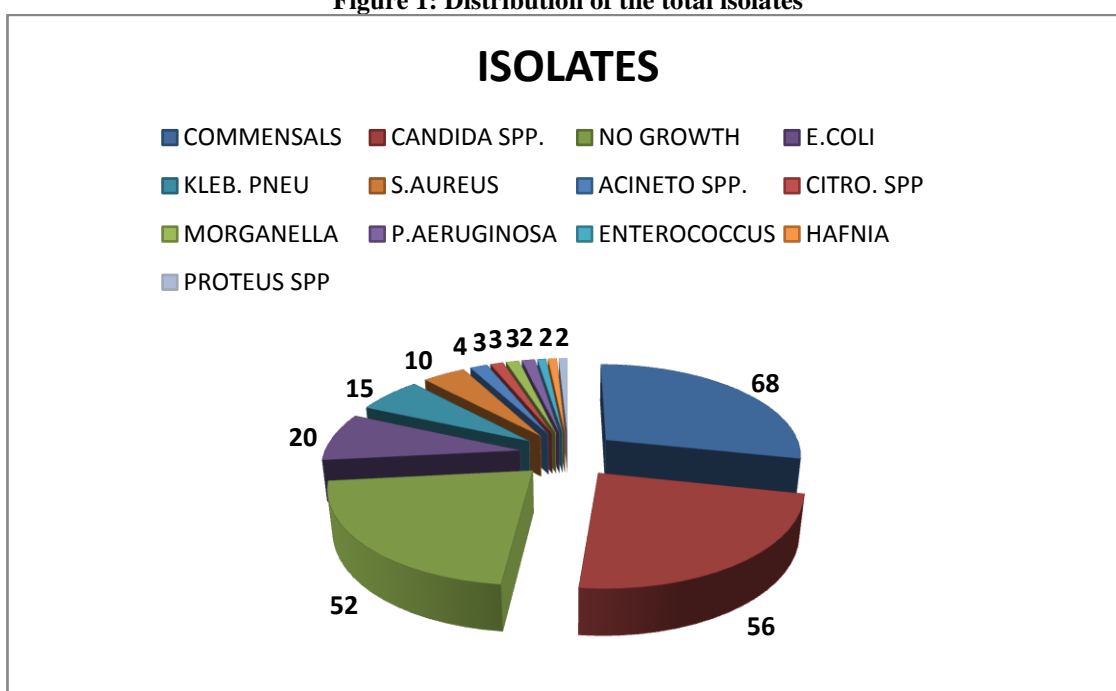


TABLE-2Antibiogram of Gram negative isolates (n=52)

MICROBIAL AGENT	SUSCEPTIBILITY (%)	RESISTANCE (%)
Aztreonam	52(100%)	0(0%)
Imipenem	47(90%)	5(10%)
Ceftazidime + Clavulanic acid	45(86.5%)	7(13.5%)
Cotrimoxazole	17(32.6%)	35(67.4%)
Ciprofloxacin	14(27%)	38(73%)
Ceftriaxone	12(23%)	40(77%)
Ampicillin	6(11.5%)	46(88.5%)

TABLE-3Antibiogram of Gram positive isolates (n=12)

MICROBIAL AGENT	SUSCEPTIBILITY (%)	RESISTANCE (%)
Vancomycin	12(100%)	0(0%)
Ceftazidime + Clavulanic acid	9(75%)	3(25%)
Levofloxacin	8(66.6%)	5(33.4%)
Ceftriaxone	3(25%)	9(75%)
Cotrimoxazole	3(25%)	9(75%)
Oxacillin	2(16.6%)	10(83.4%)
Ampicillin	2(16.6%)	10(83.4%)

IV. Discussion:

Bacterial vaginosis, candidiasis, trichomoniasis are common in women of reproductive age group presenting frequently as vaginal discharge. The prevalence of vaginal infections in the present study was 26.6% which is in concordance with DeepmalaNahar et al⁽¹²⁾, Fan et al⁽¹⁾, who reported 26% and 23.74% respectively.

In this study highest percentage of vaginal infections was observed among the age group of 26-30 years i.e.,(41.28%) followed by 31-35years (28.57%) & 21-25 years (26.31%) which corresponds with the studies done by DeepmalaNahar et al⁽¹²⁾, Sangeetha KT et al⁽¹³⁾, Mumtaz et al⁽¹⁴⁾, Khan et al⁽²⁾. The frequency of culture positivity appears to be declining with the increase in the age of the patients.

In our study, predominant organism was *Escherichia coli* (31.25%), followed by *Klebsiella pneumoniae* (23.43%), and *Staphylococcus aureus* (15.63%). Similar findings noted by VernerNdudiriOrish et al⁽¹⁵⁾, Gram negative organisms were isolated predominantly than Gram positive organisms. Studies done by DeepmalaNahar et al⁽¹²⁾, Mumtaz et al⁽¹⁴⁾, Tansarli et al⁽¹⁶⁾ showed *Staphylococcus aureus* as the predominant organism which is in contrast to our study. *Escherichia coli* and *Staphylococcus aureus* are very much associated with aerobic vaginitis, as they are frequently isolated in aerobic vaginitis than in the normal flora⁽¹⁴⁾. *Candida* species were isolated in 56(23.3%) swabs.

In the present study, all the isolated Gram negative organisms were highly sensitive to Aztreonam (100%) followed by Imipenem(90%) and Ceftazidime/Clavulanic acid(86.5%), showed high resistance to

Ceftriaxone(77%) and Ampicillin(88.5%) which is in correlation with *ShamimMumtaz et al*⁽¹⁷⁾ & *Tariq et al*⁽¹⁸⁾. The most effective antibiotics against Gram positive organisms were Vancomycin (100%) followed by Ceftazidime/Clavulanic acid (75%). High resistance against Ampicillin (83.4%) was observed in this study, which can be attributed to β -lactamase production. Hence β lactamase inhibitors give better results⁽¹⁹⁾.

V. Conclusion:

The infectious causes of vaginal discharge should be investigated thoroughly. It is mandatory to diagnose all the cases of vaginal discharge with laboratory techniques and antibiotic sensitivity testing. Proper diagnosis and therapy helps in avoiding complications like recurrence, resistance, ectopic pregnancy, infertility etc. It is also important to investigate the *Candida* up to species level to ensure appropriate management.

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