

# FREQUENCY AND ANTIMICROBIAL SUSCEPTIBILITY OF GRAM NEGATIVE RODS IN HIGH VAGINAL SWABS

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## ABSTRACT

**Background:** The normal vaginal flora contains a variety of microorganisms. Vaginal discharge is a common gynaecologic problem especially among sexually active females. Pathological vaginal discharges are usually due to infection or inflammation of vagina and/or cervix. **Objective:** To find out the frequency of aerobic gram negative rods in high vaginal swabs and to determine their antimicrobial susceptibility profile. **Materials and Methods:** This study was conducted in Microbiology laboratory, Pathology Department, SZMC/H, Rahim Yar Khan from 1<sup>st</sup> January, 2012 to 30<sup>th</sup> June, 2012. High vaginal swabs were collected from 100 females visiting antenatal clinics and gynae OPD of Sheikh Zayed Medical College/Hospital, Rahim Yar Khan. Samples were cultured on blood and MacConkey agar plates. Plates were incubated aerobically at 35-37°C. All positive cultures were identified by gram staining, cultural characteristics and biochemical reactions. The antimicrobial susceptibility testing of all isolates was done by standard disc diffusion method. **Results:** Majority of culture positive females were between 25 to 30 years of age. *Escherichia coli* (72%) was the predominant organism, followed by *Klebsiella* spp (16%), *Enterobacter* (6%), *Proteus* spp (2%), *Morganella* (2%), *Pseudomonas* spp (2%). All these isolates showed good sensitivity towards imipenem and cefoperazone-Sulbactam. **Conclusion:** In this study, *E.coli* were the predominant organism, followed by *Klebsiella* spp. Imipenem and cefoperazone-sulbactam were the most effective antimicrobials against all isolates.

**Keywords:** Bacterial vaginosis, Vaginal candidiasis, High vaginal swabs, Imipenem, Cefoperazone-sulbactam

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## INTRODUCTION

The normal vaginal flora contains a variety of microorganisms. *Lactobacillus* spp predominate the vaginal flora of a healthy premenopausal women.<sup>1</sup> These play a protective role against a variety of pathogens by maintaining an acidic vaginal pH.<sup>2</sup>

Vaginal discharge is a common gynaecologic problem, especially among sexually active females. Physiological vaginal discharge comprises of secretions from endocervix and Bartholin's gland with cells shed from the vaginal mucosa. Pathological discharge in sexually active women is usually caused by infection which may or may not be sexually transmitted. Pathological vaginal discharges are usually due to infection or inflammation of vagina and/or cervix (caused by *Gardenerella vaginalis*, *Candida albicans*, *Trichomonas vaginalis*, *Chlamydia trachomatis*, *Neisseria gonorrhoeae* and *Herpes simplex*). The pathogens involved in vaginal discharge may vary

in different regions.<sup>3</sup> The most common causes of vaginitis in symptomatic women are bacterial vaginosis (40-45%), vaginal candidiasis (20-25%), and trichomoniasis (15-20%), although 7-72% of women with vaginitis may remain undiagnosed.<sup>1</sup> Bacterial vaginosis is a polymicrobial disease caused by an overgrowth of commensal anaerobic bacteria mainly *Gardenerella vaginalis*. Women will notice a foul smelling and thin whitish gray vaginal discharge that is milky in consistency. Dysuria and perineal itching may also occur. There is no obvious vulvovaginitis and culture is usually not helpful.<sup>4</sup> Vaginal candidiasis produces a discharge that resembles cottage cheese. Pruritus, burning, soreness, and a thick odorless white vaginal discharge are most common sign and symptom. This is a very common infection in women of childbearing years.<sup>5</sup> In a study, *Candida albicans* was responsible for 80 to 92 percent of episodes of vulvovaginitis.<sup>6</sup> Trichomoniasis is a sexually transmitted infection caused by the protozoa *Trichomonas vaginalis*. It may be asymptomatic or may cause various symptoms, including a frothy yellow-green vaginal discharge and vulval irritation. The vulva may appear erythematous and edematous, with excoriation. Local pain, dysuria and pruritus are common. Small punctuate cervical and vaginal hemorrhages with ulcerations may be observed. So-called strawberry

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cervix, or colpitis macularis, is highly specific for Trichomonas infection. Trichomoniasis increases the risk of HIV transmission.<sup>7,8</sup> It is also associated with adverse pregnancy outcomes, infertility, postoperative infections, and cervical neoplasia.<sup>9</sup> Vaginal discharge is a common but often neglected problem. Therefore this study was conducted to elucidate the prevalence of various aerobic gram negative bacilli in high vaginal swabs and their susceptibility pattern towards currently used antibiotics.

## MATERIALS AND METHODS

A total of 100 high vaginal swabs were collected from symptomatic females of reproductive age visiting antenatal and gynaecologic clinics of SZMC, Rahim Yar Khan.

Females having Diabetes Mellitus, any other chronic disease and who were taking any antibiotic in previous one week were excluded.

All relevant information was collected on a questionnaire. Samples were collected and transported to Microbiology laboratory of Sheikh Zayed Medical College/Hospital, following standard operating procedures. All the samples were cultured on blood and MacConkey agar plates. Plates were incubated aerobically at 35-37°C for 24-48 hrs. All positive cultures were identified by Gram staining and biochemical reactions. The antimicrobial susceptibility testing of all isolates was done by Kirby Baur disc diffusion method. The pure culture was obtained and then inoculated on nutrient agar and antibiotic discs were applied. After overnight incubation plates were examined to read the susceptibility zones.<sup>10</sup> The frequency and susceptibility different micro-organisms was presented as percentages. The data was entered & analyzed in SPSS version 15.

## RESULTS

In this study, majority (63%) of the females were in age group 25-30 years, 33% in 31-35 years and 4% in 36-40 years.

In this study normal vaginal flora was isolated from 11 (11%) specimens. Out of 89 positive cultures, aerobic Gram negative bacilli were isolated from 50 (56%) cases, while in 39 (44%) cases candida and other bacterial species were present. The frequency of isolated aerobic Gram negative bacilli is shown in Table I. Escherichia

coli was the predominant organism isolated from 36 (72%) samples, Klebsiella spp were present in 8 (16%) specimens. Other Gram negative bacteria of lower prevalence were Proteus, Enterobacter, Morganella and Pseudomonas spp.

**Table I: Frequency of aerobic gram negative rods in high vaginal swabs.**

Organisms	No of isolates (%)
Escherichia coli	36 (72)
Klebsiella spp	8 (16)
Enterobacter	3 (6)
Proteus spp	1 (2)
Morganella	1 (2)
Pseudomonas spp	1 (2)

The details of the percentage sensitivity of the isolates against various antibiotics are shown in Table II.

**Table II: Sensitivity of the isolates against various antibiotics.**

Antimicrobial Agent	Escherichia coli (%)	Klebsiella spp (%)	Enterobacter (%)	Proteus spp (%)	Morganella (spp %)	Pseudomonas (spp%)
Ampicillin	18	12	15	76	54	-
Ceftriaxone	22	23	10	44	39	37
Cefoperazone-sulbactam	87	76	85	95	92	90
Imepenem	99	98	100	100	100	92
Gentamicin	73	78	89	98	96	48
Ciprofloxacin	78	84	82	95	98	68

## DISCUSSION

Vaginal discharge is a common problem among sexually active females. Alteration in balance of normal vaginal organisms can cause colonization or overgrowth of the bacteria that creates vaginal discharge.<sup>2</sup> It is quite a common problem yet there still remain gaps in our knowledge of this infectious disorder.

Frequency of microorganisms causing vaginitis varies from age to age and place to place. Vaginitis causing organisms isolation and determination of susceptibility pattern is investigated in patients at Sheikh Zayed Medical College/Hospital Rahim Yar Khan. In our study, total of 100 high vaginal swabs were collected from antenatal clinic and gynecology OPD.

In the current study, the age of females suffering from vaginitis caused by gram negative rods was between 25 to 39 years. According to our study mean age of patients was 30 ± 2.8 year. The percentage of E.coli was 72% among gram -ve rods. Similar, results were found in another study where E. coli was the most

prevalent organism 39.45%.<sup>1</sup> The antibiotics used in our study were ampicillin, ceftriaxone, cefoperazone-sulbactam, imipenem, gentamicin and ciprofloxacin. Most of the samples showed sensitivity to imipenem and cefoperazone-sulbactam. Similarly, in a previous study, most gram negative rods were sensitive to imipenem.<sup>10</sup> In contrast to our study, Tariq N & colleagues, reported that normal baginal flora was isolated in 30% patients.<sup>14</sup>

A hospital based study of frequency of aerobic pathogens in vaginal infections showed that most prone age group was 15-45 years, with percentage of E.coli, was 72%.<sup>15</sup>

## CONCLUSION

*Escherichia coli* was the most prevalent microorganism in high vaginal swabs, with highest sensitivity to imipenem and cefoperazone-sulbactam.

The high prevalence of vaginal gram negative colonization in the current study demands that culture for both aerobic and anaerobic bacteria must be done. Moreover, there must be an antibiotic policy according to local sensitivity patterns to prevent antibiotic resistance.

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