



Evaluation of Microbiological Profile and Antibiotic Susceptibility Pattern of Aerobic bacterial isolates in women of reproductive age group with vaginal infections attending tertiary care teaching hospital in Solapur, Maharashtra

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Abstract

Background: Vaginal microbiota is diverse and complex comprising of dozens of microbiological species in variable quantities and proportions. Alteration in microbial flora and infections caused by them may remain undiagnosed due to negligence, hesitation and shame among females, resulting in various Gynecological and Obstetrical complications. Aim of the study is to evaluate microbiological profile of organisms isolated from women's suspected of vaginal infections and to determine the antibiotic susceptibility pattern of aerobic bacterial isolates.

Material and Method: A total of 250 women of reproductive age group attending tertiary care hospital with signs and symptoms suggestive of vaginal infection were included in the study. Study was conducted from June 2018 to December 2018. Two high vaginal swabs were taken using all aseptic precautions, and transferred immediately to the laboratory. One swab was used for microscopic evaluation i.e. wet mount and gram stain for evaluation of bacteria, fungi, trophozoite of *Trichomonas vaginalis*, Clue cell. Second swab was used for culture for aerobic bacteria and fungi and identification was done using standard Microbiological techniques.

Results: Out of 250 women, 239 had vaginal infection. In the present study most common age group affected was 25-30 years (50.20%) followed by 31-35 (31.4%) age group, and 15-20 years (18.41%). Most common cause of vaginal infection were aerobic bacteria of which gram negative bacteria n=133 (76.43%) were most commonly isolated. Among gram negative bacteria *E.coli* 80 (46%) were most common cause of vaginal infection followed by *Klebsiella pneumoniae* 30 (17.24%), *Acinetobacter baumannii* 20 (11.5%), *Proteus vulgaris* 3 (1.72%). Among gram positive bacteria (n=41) *Staphylococcus aureus* 31 (75.60%) were most commonly isolated, of which MRSA 15 (48.4%), MSSA 13 (41.93%), MRCONS 6 (19.35%), MSCONS 1 (3.22%) were seen. Other gram positive bacteria seen was *Enterococcus faecalis* 10 (6.75%). Significant number of women were infected with *Candida spp.* 34 (13.6%) followed by *Trichomonas vaginalis* 20 (8.0%) and *Gardnerella vaginalis* 11 (4.4%). Antibiotic susceptibility of gram negative bacteria (n=133) showed overall high sensitivity to Meropenem 82% followed by Amikacin 75%, Piperacillin-tazobactam 58.4%, Ciprofloxacin 45.4% and Cefotaxime 30%. In case of gram positive bacteria n=41 (100%) sensitivity was seen for Vancomycin and Linezolid, Gentamicin 75%, Clindamycin 70%, and Ciprofloxacin 54%.

Keywords: MRSA (Methicillin resistant *Staphylococcus aureus*), MRCONS (Methicillin resistant Coagulase negative *Staphylococcus aureus*), MSSA (Methicillin sensitive *Staphylococcus aureus*), MSCONS (Methicillin sensitive Coagulase negative *Staphylococcus aureus*)

1. Introduction

The vaginal micro flora is a complex environment composed of varying species in variable quantities and proportion, vaginal flora undergoes changes throughout life, at different stages of life. Females are more prone to infection such as vaginitis or urinary tract infection (UTI) which can be attributed to anatomical and functional proximity to the anal canal and short length of urethra [2]. The complaint of abnormal vaginal discharge is the most common complain of females attending Gynecology OPD.

Abnormal vaginal discharge predisposes to PID (Pelvic inflammatory disease), infertility, endometriosis, urethral syndrome, preterm labor and still birth. It also increases susceptibility of an individual to disease like HIV [3]. These disorders have significant impact on female's reproductive health, mental health and ability to perform routine physical activities [4].

Common organisms implicated in vaginal infections are

Neisseria gonorrhoea, *Trichomonas vaginalis*, *Candida albicans* and *Non albicans Candida*, *streptococcus agalactiae* (GBS), *Chlamydia trachomatis*, *Mycoplasma spp.* [5]. Most common complaint of these patient includes pain, itching in the external genitalia, pain during sexual intercourse and abnormal vaginal discharge.

Many women's experience such infection, but do not seek medical care due to negligence, shame and lack of knowledge, which may lead to harmful effects not only to them but to their partner and if not treated during pregnancy may cause harm to the baby, in the form LBW (Low birth weight) of neonate leading to high perinatal mortality [6]. These infections can be easily detected by simple methods which includes wet mount of vaginal swab, Culture and sensitivity of the causative organism.

The present study aims to identify common microorganisms isolated from women's with signs and symptoms of vaginal infection and antibiotic susceptibility pattern of aerobic

bacterial isolates at a tertiary care teaching hospital in Solapur which will help in review of the recommendations for treatment protocol in such patients.

2. Material and Method ^[7]

The present study is done between June 2018 to December 2018 in Microbiology department at tertiary care teaching hospital in Solapur. Two high vaginal swabs were collected from 250 female patients with suspected vaginitis. Sample collection was done using all aseptic precautions. Two high vaginal swabs were taken and sent to the laboratory immediately. Direct saline mount and gram stain were helpful in detection of trophozoite of *Trichomonas vaginalis*, Clue cells using Amsel criteria, *Candida* spp was seen as gram positive budding yeast cells with pseudo-hyphae, while second swab was used for culture on blood agar, MacConkey Agar, Sabaraud's dextrose agar after appropriate incubation period, growth was noted and identification was done using standard protocols, in case of aerobic bacterial isolates antibiotic susceptibility testing was done using Kirby Bauer disc diffusion method as per CLSI guidelines ^[8].

3. Result

A total 250 women of reproductive age group (15-50 years) were included in the study. Most common vaginal infection was due to aerobic bacteria 174 (69.6%). Significant number of women were infected with *Candida albicans* 34(13.6%) followed by *Trichomonas vaginalis* 20 (81%) and *Gardnerella vaginalis* 11 (4.4%).

The most common aerobic bacterial isolate were gram negative bacteria of which most common isolate was *E coli* 80 (46%) followed by *Klebsiella pneumoniae* 30 (17.24%), *Acinetobacter baumannii* 20 (11.49%) and *Proteus vulgaris* 3(1.72%). Among gram positive bacteria *Staphylococcus aureus* 31 (18%) were most commonly isolated of which MRSA were 15 (48.36), MSSA (41.93%), MRCONS 6(19.35%) and MSCONS 01(3.22) other gram positive bacteria *Enterococcus faecalis* 10(5.74%) was also isolated. Antibiotic susceptibility of gram negative (n=133) showed overall high sensitivity Meropenem 82% followed by Amikacin 75%, Piperacillin tazobactam 58.4%, Ciprofloxacin 45.4% and Cefotaxime 30%. In case of gram positive bacteria (n=41), 100% sensitivity was seen for Vancomycin and Linezolid, Gentamicin 75%, Clindamycin 70%, Ciprofloxacin 54%.

4. Discussion

Vaginitis is common medical problem in women associated with symptoms like itching, pain, abnormal vaginal discharge, therefore it contributes to frequent medical visits, such infection must be detected early and prompt treatment should be instituted as this could significantly become a source of infection in neonates.

In the present study Females of reproductive age group (15-50years) with suspected vaginitis were included in the study of which most commonly cases were reported in age group 25-30 years (50.20%) followed by 31-35 (31.4%) age group, and 15-20 years (18.41%), of these majority of women's were non pregnant 145/239 (60.66%) similar results have been reported by Kritika pal et al ^[9].

In the present study majority of isolates were of aerobic bacteria of which gram negative bacteria were most common (n=133). Among gram negative bacteria *E-coli* 80 (46%) were most commonly isolated followed by *Klebsiella*

pneumoniae 30 (17.24%), *Acinetobacter baumannii* 20 (11.49%) and *Proteus mirabilis* 3(1.72%). Among gram positive bacteria *Staphylococcus aureus* 31(17.81%) was most commonly isolated of which MRSA were 15(48.38%) followed MSSA 13 (41.93%), MRCONS 6(19.35%), MSCONS 01(3.22%) and *Enterococcus faecalis* 10(5.74%) were isolated.

Studies done by Kritika Pal et al ^[9], Sadiya Shaikh et al ^[10] and Nagalakshmi Narayan et al ^[11] have shown variation in isolation rate however all the studies showed that gram negative isolates were predominant in the aerobic bacterial cultures.

In the present study *Candida spp* were isolated from 34 (13.6%) cases followed by *Trichomonas vaginalis* 20(8%) and *Gardnerella vaginalis* 11 (4.4%) studies done by Kritika Pal et al⁹ and Sadiya Shaikh et al¹⁰ have also shown similar results, however in case of co- infection of bacteria with candida/ *Trichomonas*, bacterial isolate was followed and budding yeast cell/ trophozoite of *Trichomonas* were also reported simultaneously.

Antibiotic susceptibility pattern of gram negative bacteria (n= 133) showed overall high sensitivity to Meropenem 109(82%) followed by Amikacin 100 (75%), Piperacillin – tazobactam 78(58.4%), Ciprofloxacin 60(45%) and Cefotaxime 40 (30%). In case of gram positive bacteria (n=41), 100% sensitivity was seen for Vancomycin and Linezolid followed by Gentamicin 31(75%), Clindamycin 29(70%) and Ciprofloxacin 25(60%). Studies by various workers have shown variation in antibiotic susceptibility pattern which may be different in different countries, cities and even institution, local antibiotic usage practice may also play important role in determination of antibiotic susceptibility pattern of specific area.

5. Conclusion

Present study was done to determine bacteriological as well as other etiological factors responsible to cause vaginal infection and to study antibiotic susceptibility pattern of aerobic bacterial isolates, since it is institution based study the results cannot be generalized, however this study will help in designing treatment protocol for the patients attending OPD and IPD of our hospital and will contribute in formulation of antibiotic policy for the hospital. As per CDC guideline the management includes therapy based on susceptibility pattern, partner notification, follow up and health promotion. It is also important to prevent misuse/overuse of commonly used antibiotics in order to prevent development of drug resistant isolates. Strict adherence to antibiotic stewardship program should be done and annual review of antibiotic policy should be done to understand local trend of antibiotic resistance.

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