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MICROBIAL PROFILE OF ENDOCERVICAL SWAB WITH ANTIMICROBIAL SUSCEPTIBILITY. A STUDY FROM SUB HIMALAYAN MEDICAL COLLEGE OF NORTH INDIA.

Microbiology

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ABSTRACT

Background: Pelvic inflammatory disease refers to any infection in the female lower reproductive tract that spreads to the upper reproductive tract. Despite the host defense mechanism microorganisms still cause infection leading to major consequences like infertility, ectopic pregnancy and scarring. AIm of the study was to determine the antimicrobial profile of isolated microorganisms from endocervical swabs. **Material and Method:** A descriptive analysis of culture results of endocervical swabs was performed at the Department of Microbiology at Dr. RPGMC Kangra at Tanda from November 2021 to October 2022. A total of 394 endocervical swabs with suspected PID were received to the Department of Microbiology from the Department of Gynaecology and Obstetrics ,Dr. RPGMC Kangra at Tanda. Culture and AST were performed as per CLSI guidelines. **Results:** Out of these 394 samples 174(44.2%) showed growth of pathogenic microorganisms followed by Sterile 126(32%), Commensals 91(23.1%), and Contaminants 3 (0.7%) respectively. Out of these pathogenic isolates 156(89.6%) showed growth of single microorganism isolate and 18(10.4%) showed mixed growth. Gram positives were 77(37.2%) ,109(52.7%) gram negative bacteria and yeast 21(10.1%).In gram positive isolates most resistance was seen in penicillin 47(61.1%) followed by erythromycin 33(42.9%). In gram negative enterobacterales most resistance was seen for ampicillin 40(48.1.%). **Conclusion:** The proximity between the genital tract and the urethra/anus facilitates endogenous transmission of enteric microbes. The antibiotic sensitivity pattern reveals very high levels of drug resistance. A proper guidelines must be made to start the antimicrobial after diagnosis and antimicrobial susceptibility results.

KEYWORDS

INTRODUCTION

Pelvic inflammatory disease(PID) is a female genital infection usually spread from the lower genital tract including vagina and cervix to upper genital tract.It collectively gives rise to endometritis, salpingitis and oophoritis. Etiology of pelvic inflammatory disease can refer to viral, fungal, parasitic & most commonly bacterial infections.The host defense mechanism protects the upper genital tract by cervical mucus plug which possesses antimicrobial activity along with cellular composition. Despite these defense mechanisms microorganisms still cause infection and lead to PID. [1]

Consequences of PID could result in infertility, tubal (ectopic) pregnancy, chronic abdominal pain and internal pelvic scarring. Pelvic inflammatory disease is generally restricted to women of menstruating age and seldom affects menopausal women. More than 10% of reproductive aged women reported a history of PID[2]

Specific diagnosis of Pelvic inflammatory disease is difficult to make because the upper pelvic organs are difficult to reach for sampling. Samples are taken directly from the cervix to identify the organisms that may be responsible for the infection.[3]

The objectives of this study were to determine the commonly isolated microorganisms from endocervical swab cultures of patients with suspected pelvic inflammatory disease, and to identify their in vitro responsiveness to tested antibiotics.

MATERIAL AND METHODS

A descriptive analysis of culture results of endocervical swabs was performed at the Department of Microbiology at Dr. RPGMC Kangra at Tanda from November 2021 to October 2022. The samples were inoculated on MacConkey and Blood agar plates and incubated aerobically at 37°C for 24 hours. Culture plates with colonies were considered for gram staining and identification is carried out by biochemical reactions.[4]

Antimicrobial susceptibility testing was done according to the standard operational procedures, in vitro antimicrobial susceptibility testing was done on Mueller-Hinton agar (Hi-Media Lab Ltd, India) using Kirby-Bauer disc diffusion method. A suspension of the test organism was made in sterile normal saline and turbidity adjusted to 0.5 McFarland standards. The test organism was uniformly seeded over the surface of Mueller Hinton agar plates. The plates were allowed to dry for 15 minutes before application of antibiotic discs. The plates were incubated at 37°C for 16-18 hours. After incubation clear zones around the antibiotic discs were measured with a ruler and recorded in millimeters. Susceptibility and resistance data was interpreted according to Clinical laboratory Standards Institute guidelines.and antimicrobial susceptibility was performed according to CLSI guidelines.[5]

RESULTS

During the period of one year i.e from November 2021 to October 2022. A total of 394 endocervical swabs with suspected PID were received to the Department of Microbiology from the Department of Gynaecology and Obstetrics ,Dr. RPGMC Kangra at Tanda. Out of these 394 samples 174(44.2%) showed growth of pathogenic microorganisms followed by Sterile 126(32%), Commensals 91(23.1%), and Contaminants 3 (0.7%) respectively. (fig. 1)

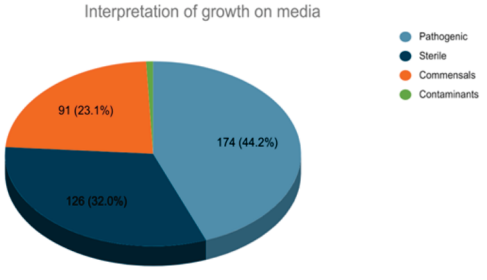

Figure 1: Interpretation Of Growth On Culture Media.

On culture pathogenic growth was observed in 174 samples. Out of these samples 156(89.6%) showed growth of single microorganism isolate and 18(10.4%) showed mixed growth. Gram positives were 77(37.2%) ,109(52.7%) gram negative bacteria and yeast 21(10.1%). (Fig.2)

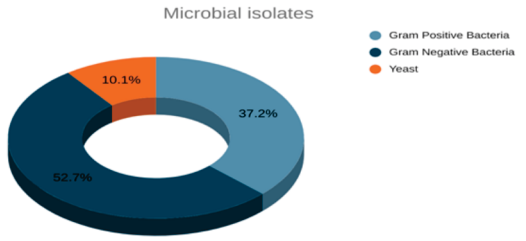

Figure 2: Microbial Isolates

In gram positive bacteria Staphylococcus species were 72(93.5%), which are further segregated to Coagulase negative Staphylococcus 8(11.1%) ,Staphylococcus aureus 64(88.9%) and Enterococcus faecalis 5(6.5%) respectively. Out of 64 Staphylococcus aureus isolates 27(42.2%) were methicillin resistant staphylococcus aureus (MRSA) and 37(57.8%) were Methicillin sensitive(MSSA).

Table 1: Distribution Of Gram Positive Bacterial Isolates

Gram Positive Bacterial Isolates	Frequency(n) percentage(%)
1. Methicillin sensitive Staphylococcus aureus	27(35.1%)
2. Methicillin resistant Staphylococcus aureus	37(48.1)
3. Coagulase negative Staphylococcus	8(10.3%)
4. Enterococcus faecalis	5(6.5%)
TOTAL	77(100%)

Out of 109 gram negative bacterias, Escherichia coli was in majority 54(49.6%)) followed by Klebsiella pneumoniae 12(11%) and least were Proteus vulgaris, Klebsiella oxytoca , Citrobacter and Enterobacter cloacae 1 isolate each.

Table 2: Distribution Of Gram Negative Bacterial Isolates

Gram Negative Bacterial Isolates	Frequency(n) percentage(%)
1. Escherichia coli	54(49.5%)
2. Escherichia coli (Variant)	12(11.1%)
3. Klebsiella pneumoniae	12(11.1%)
4. Pseudomonas aeruginosa	9(8.2%)
5. Acinatobacter baumanni	9(8.2%)
6. Non fermenter species	7(6.4%)
7. Acinetobacter lowoffii	1(0.9%)
8. Proteus vulgaris	1(0.9%)
9. Klebsiella oxytoca	1(0.9%)
10. Citrobacter spp.	1(0.9%)
11. Klebsiella aerogenes	1(0.9%)
12. Enterobacter cloacae	1(0.9%)
TOTAL	109(100%)

In 21(10.1%) yeast isolates all were identified as Candida. 16(76.2%)were Candida albicans, 4(19%) were Candida tropicalis and single isolate of Candida krusei

In 77 gram positive isolates most resistance was seen in penicillin 47(61.1%) followed by erythromycin 33(42.9%) and maximum sensitivity was seen against vancomycin(0%).

Table 3: Antimicrobial Susceptibility Of Gram Positive Bacterial Isolate

Antibiotics	Resistance percentage
1. Penicillin	47(61.1%)
2. Erythromycin	33(42.9%)
3. Cotrimoxazole	26(33.8%)
4. Clindamycin	24(31.2%)
5. Levofloxacin	10(13%)
6. Vancomycin	0(0%)

In 83 gram negative enterobacterales most resistance was seen for ampicillin 40(48.1.%) followed by cefazolin 29(35%) and ceftraixone29(35%) each. least resistance was seen against imipenem (6%)isolate.

Table 4: Antimicrobial Susceptibility Of Gram Negative Bacterial Isolate

Antibiotics	Resistance percentage
Ampicillin	40(48.1%)
Cefazolin	29(35%)
Ceftriaxone	29(35%)
Ceftazidime	27(32.5%)
Ciprofloxacin	24(28.9%)
Gentamicin	14(16.8%)
Imipenem	5(6%)

In 25 gram negative non fermenters bacteria's resistance was seen against ceftazidime 11(44%), ceftriaxone 5 (20) and least resistance was seen against Imipenem 2(8%).

Table 5: Antimicrobial Susceptibility Of Gram Negative Non Fermenter Bacterial Isolates

Antibiotics	Resistance percentage
1. Ceftazidime	11(44%)
2. Ceftriaxone	5(20%)
3. Ciprofloxacin	5(20%)
4. Piperacillin tazobactum	4(16%)
5. Amikacin	4(16%)
6. Imipenem	2(8%)

DISCUSSION

Pelvic inflammatory disease mainly caused due to ascending infection from the lower genital tract. Etiological organisms of pelvic inflammatory disease are usually bacteria pathogens. Ascending infection from the cervix causes PID in 85% cases.The proximity between the genital tract and the urethra/anus facilitates endogenous transmission. PID occurs most frequently in women ages 15 to 25 years.

In our studies the majority of the clinical suspected cases of pelvic inflammatory diseases showed growth of pathogenic bacteria on aerobic cultures. Majority of the pathogenic microbial growth were gram negative bacteria this may be due to close proximity of anus and urethra leading to infection from enteric bacterias.

Similarly the infection from Candida was seen in our study which could be due to the vaginal candidiasis which showed the ascending trend of infection leading to pelvic inflammatory disease.

In gram positive bacterial isolate majority showed resistance toward penicillin similar results were seen in study by BM Audu & AA Kudi "Microbial isolates and antibiogram from endocervical swabs of patients with pelvic inflammatory disease" with resistance in penicillin to 97.6%.[6]

In our study ampicillin showed least susceptibility in gram negative bacterial isolated. This result was in accordance with study by Goel et with susceptibility towards ampicillin at 47.7%.[7]

CONCLUSION

Pelvic inflammatory disease if not treated on time may lead to infection causing endometritis, salpingitis, parametritis, oophoritis, tubo ovarian abscess and/or pelvic peritonitis this collectively may lead to infertility. The antibiotic sensitivity pattern reveals very high levels of drug resistance. This may be due to the unregulated use of antibiotics for self-medication, as any antibiotic may be bought over the counter without a prescription.Obligate anaerobic bacteria and few other organisms associated with PID other than the ones isolated were not encountered in this study. A proper guidelines must be made to start the antimicrobial after diagnosis and antimicrobial susceptibility results.

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