
Isolation and Identification of Some Bacteria and *Candida albicans* Causing Vaginitis

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Abstract:

Background: The vagina normally contains harmless bacteria which help to clear out unwanted germs. If these usually harmless bacteria increase in numbers and change the concentration of bacteria in the vagina a condition known as bacterial vaginitis can result.

Objective: The aim of this study was to isolate and identify microorganisms that may cause vaginal infection and then testing their antimicrobial sensitivity.

Methods: Vaginal swabs from 210 women (pregnant and non pregnant women) that attending Al-Yermouk Teaching Hospital in Baghdad from September 2007 to December 2009. Swabs identified and tested for antimicrobial resistance by well known established microbiological methods.

Results: Out of 210 isolates, 186 were positive. These are 82(44%) Gram positive isolates and 66 (35.43%) Gram negative isolates, in addition 38 (20.5%) *Candida albicans*. The number of isolates was 50(26.88%) Gram positive in pregnant women and 32(17.20%) in non pregnant, while 42 (22.58%) were Gram negative in pregnant women and 24(12.9%) in non pregnant. The highest isolate is *Escherichia coli* 28(15%) and it was highly sensitive to cefotaxime (90%), while it was resistant to chloromphenical (20%). On the other side *Staphylococcus aureus* which was rack the second among the isolates 25 (13.44%) was mostly sensitive to cloxacillin (85%). The majority of Gram negative isolates were resistant to the co-trimoxazole except *Klebsiella*.

Conclusion: It can be concluded that the Gram positive bacteria are more predominant than Gram negative bacteria in vaginal infections. The highest prevalence isolate is *Escherichia coli* followed by *Staphylococcus aureus* and *Candida albicans*. Also this study indicated that vaginitis is more common in pregnant women (in first and second trimesters) than in non pregnant one as a result of many factors such as hormonal factors and low socioeconomic status.

Keywords: Vaginal infections, bacteria and *Candida* spp., antibiotics sensitivity.

Introduction:

Bacterial vaginitis (BV) is a vaginal condition that can produce vaginal discharge and results from an overgrowth of normal bacteria in the vagina [1, 2]. The vaginal flora is a complex environment containing colonies of microbial species in variable quantities and relative proportion [3] and it is mainly dominated by members of the genus *Lactobacillus* which maintains the generally acidic vaginal pH [4]. BV is considered a common vaginal disorder in women at reproductive age, hence the interest in BV has increased lately because of the evidence on adverse sequelae to this disorder, such as amniotic fluid infections, clinical chorioamnionitis, premature rupture of membranes delivery and postpartum endometritis [5].

There are a number of microorganisms that may cause vaginal infections and several may co-exist e.g thrush infection caused by yeast organisms that are found in vagina in 25% of women usually without symptoms. The most common species of *Candida* to be found in the vagina is *Candida albicans* which lives in the bowel and can be transferred from back to front passage and can produce vaginitis characterized by intense irritation and thick white discharge [6]. The frequent cause of vaginal discharge is an infection or colonization with different microorganism and that vaginitis whether infectious or not, constitutes one of the most common problems in gynecology [7].

Patients and Methods:

i. Patients: Two hundred and ten women (pregnant and non pregnant women) were included in this study suffering of symptoms indicating bacterial vaginal infection of those attending Obstetrics and Gynecology Department of Al-Yarmouk Teaching Hospital in Baghdad during the period from September 2007 till December 2009. The age of the women ranging between 18 to 60 years.

ii. Methods: Two vaginal swabs were taken from each women, the first swab was subjected to a microscopically wet smear examination and Gram staining method [8], while the second was cultured. All vaginal swabs were collected carefully examined and cultured aerobic and facultative an aerobic on different media: on Blood agar, MacConkey agar, chocolate agar, Manitol salt agar, Sabouroud Dextrose agar (for fungi), Thioglycollate media and broth for *Gardnerella vaginalis*. All isolates were diagnosed according to well known established microbiological methods, principally based on morphological characters, Gram- staining method and biochemical reactions. Isolated organisms were subjected to sensitivity testing to the commonly used antimicrobial agents by Kirby- Bauer method [9] and their results were obtained compared with zone of growth inhibition with those of an International Standards Zone of growth inhibition as in table1.

Table 1: Interpretation of zone inhibition by using Kirby & Bauer method (disc diffusion method).

Antimicrobial agent	DiscMcg/ Disc	Diameter of zone inhibition		
		Resistant	Intermediate	Sensitive
Ampicillin	10	≤11	12-13	≥20
Cefotaxime	30	≤14	15-22	≥23
Cephalexin	30	≤14	15-17	≥18
Chloramphenicol	30	≤12	13-17	≥18
Ciprofloxacin	10	≤15	16-20	≥21
Clindamycin	2	≤12	13-17	≥18
Tobramycin	10	≤13	13-14	≥15
Erythromycin	15	≤13	14-17	≥18
Ampiclox	30	≤14	15-16	≥17
Gentamycin	10	≤12	13-14	≥15
Co-Trimoxazole	25	≤18	19-23	24-32
Amoxicillin	10	≤19	-	≥29
Amikacin	30	≤14	15-16	≥17

Results:

Out of one hundred and eighty six vaginal swabs there were 148 bacterial isolates (79.5%) and 38 isolates (20.5%) with *Candida albicans*. The bacterial isolates after thorough identification revealed that 82 (44%) were Gram positive, while 66 (35.5%) were Gram negative. From Gram negative bacteria it was found that 28 isolates (15%) were *Escherichia coli* which is the highest among the collection followed by *Staphylococcus aureus* 25

(13.44%) (Gram-positive); *Staphylococcus epidermidis* ranks the third, which constitute 21 (11.29%) isolates. The least isolated microorganism in this study was *Klebsiella* spp, *Pseudomonas aeruginosa* and *Lactobacillus* spp. (Table 2). Also this table show that the number of isolates were more prevalence in pregnant women 117 (62.90%) than in non pregnant women 39 (37.09%) and the *Candida albicans* 25 (13.44%) isolates in pregnant women while 13 (7.0%) in non pregnant.

Table 2: The distribution of bacteria & *Candida albicans* from 186 women with abnormal vaginal discharge.

Type of organisms	Pregnant (n=117)	Non pregnant (n=69)	Total isolates (n=186)	
			No	%
Gram positive	50	32	82	44.07
<i>Staphylococcus aureus</i>	15	10	25	13.44
<i>Staphylococcus epidermidis</i>	13	8	21	11.29
<i>Streptococcus faecalis</i>	11	7	18	9.62
<i>Streptococcus pyogenes</i> (β-hemolytic)	7	5	12	6.45
<i>Lactobacillus</i> spp.	4	2	6	3.22
Gram negative	42	24	66	35.43
<i>Escherichia coli</i>	18	10	28	15
<i>Klebsiella</i> spp	4	3	7	3.76
<i>Proteus</i> spp.	4	2	6	3.22
<i>Pseudomonas aeruginosa</i>	3	2	5	2.68
<i>Gardnerella vaginalis</i>	13	7	20	10.75
<i>Candida albicans</i>	25	13	38	20.55

Table 3 indicated the pattern of the antimicrobial, which revealed that *Staphylococcus aureus* 28 (13.44) is highly sensitive to cloxacillin 85% and moderate sensitive to amoxicillin (70%). *Staphylococcus epidermidis* is 21 (11.29%) moderately sensitive to the drug lincomycin (75%),

and highly resistant to drug tetracycline (15%). It is seen also that *Streptococcus pyogenes* is highly sensitive to the drug cefotaxime (88%) and amoxicillin (85%), while it resistant to tetracycline (25%).

Table 3: Anti- microbial susceptibility of Gram positive bacterial isolates in percentage.

Bacterial isolates	Amoxicillin	Ampicillin	Lincomycin	Vacomycin	Chloramphenicol	Tetracycline	Erythromycin	Cefotaxime	Cloxacillin
<i>Staphylococcus aureus</i>	70	68	80	55	75	65	60	70	85
<i>Staphylococcus epidermidis</i>	55	55	75	65	79	15	45	55	65
<i>Streptococcus faecalis</i>	40	65	45	80	65	20	55	75	50
<i>Streptococcus pyogens</i>	85	82	55	75	55	25	70	88	75
<i>Lactobacillus</i> spp.	70	75	15	45	65	60	70	60	60

From table 4 it can be observed that *Escherichia coli* is highly sensitive to cefotaxime (90%), while it was highly resistant to chloramphenicol (20%) and amoxicillin (15%). Also the result indicated that all isolates except *Klebsiella* spp. are highly resistant to

the drug co-trimoxazol ranging from (10% - 30%) and that all isolates are sensitive to drug gentamicin and amikacin and it showed that all isolates were sensitive to cefotaxime except *Pseudomonas aeruginosa* (20%).

Table 4: Anti- microbial susceptibility of Grams negative bacterial isolates in percentage.

Bacteria isolates	Gentamycin	Ceftriaxon	Amikacin	Co-trimoxazole	Ceftazidime	Tobramycin	Chloramphenicol	Cefotaxime	Tetracycline	Ampicillin
<i>Escherichia coli</i>	82	25	70	15	50	40	20	90	60	15
<i>Gardnerella vaginalis</i>	80	30	75	20	60	67	70	80	68	70
<i>Proteus</i> spp.	60	40	80	30	75	30	20	70	55	35
<i>Klebsiella</i> spp.	72	20	85	65	80	65	50	60	60	40
<i>Pseudomonas aeruginosa</i>	55	65	70	10	20	50	60	20	10	-

Discussion:

Escherichia coli in vaginal infections is one of the most persistent pathogens of human at all ages and even in the in the later ages of life^[10]. *Escherichia coli* incidence was followed by *Staphylococcus aureus* which is one of the most prevalent vaginal pathogen and has remind one of the most common cause infections, incidence of which has been steadily increasing^[11].

The third rack was *Staphylococcus epidermidis* and *Candida albicans* and that different pattern of incidence of isolation in this study may be due to several conditions like health education, sanitation and medical coverage available at the area of this country. The vaginal mucosa of females is colonized by this organism in which predisposes them to toxic shock syndrome^[12].

Although the vaginal flora of adult females contains *Lactobacillus* responsible maintaining the vaginal pH and preventing the over growth of potent

pathogens, therapy reducing the frequency of infections, but antibiotics like broad-spectrum antibiotics can kill or suppress helpful bacteria in the genital tract allowing resistant organisms to grow^[13].

Our results indicated high incidence of *Escherichia coli* and *Staphylococcus aureus* in vaginal infection agrees with other who found similar results^[14]. Isolation of *Gardnerella vaginalis* is an indication of bacterial vaginitis since this organism can be found in more than 50% of health women, but when it increase in concentration it indicates bacterial vaginitis. *Lactobacillus* in our study is the least among the isolates 6 (3.22%) this reduced number is an indication that the infection is bacterial vaginitis. Also the application or using of intra uterine contraceptive device (IUCD) is the one of the causative factors of bacterial vaginitis^[15].

Candida spp. infection is associated with risk factors including; estrogenization status^[16].

The incidence of vaginal candidiasis in pregnancy occur more frequently in women who are uncontrolled diabetic pregnant and who suffer from vaginal itch or soreness, thick, cheese- like vaginal discharge^[17].

The pattern of antimicrobial susceptibility which revealed that *Escherichia coli* is highly sensitive to cefotaxime (90%), while is resistant chloramphenicol (20%).

It can be concluded that the Gram positive bacteria are the predominant than Gram negative bacteria in vaginal infections. The highest prevalence isolate is *Escherichia coli* followed by *Staphylococcus aureus* and *Candida albicans*. Also this study indicated that vaginitis is more common in pregnant women than in non pregnant one as a result of many factors such as hormonal factors and low socioeconomic status.

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