

Microbial Pattern and Antibiotic Resistance in High Vaginal Swabs and Vaginal Swabs in Iraqi Women

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Abstract:

Background: Infections of the reproductive tract are a major problem of women's sexual health. They are commonly seen in women of reproductive age and usually present with vaginal discharge, which they include sexually transmitted infections (STI), bacterial vaginosis (BV), aerobic vaginitis and candidiasis. The microbial flora of vagina is a complicated environment, comprising of many microbiological species in variable proportions. The normal vaginal flora is usually well maintained by a complex balance of organisms. Bacterial vaginitis can occur in any age group but more commonly diagnosed in females of reproductive age group. Diagnosis and treatment can be misleading if based only on clinical symptoms and signs.

Methods: This study was conducted to throw light on the prevalence of (100) samples of local pathogenic bacteria in high vaginal swabs and vaginal swabs in Iraqi women and their invitro antibiotic susceptibility pattern.

Results: In Vaginal swab samples: The microorganisms isolated were *Staphylococcus aureus*, *Escherichia coli*, *Streptococcus spp.*, *Enterobacter spp.*, *Proteus spp* and *Citrobacter spp*, while in the High Vaginal Swabs (HVS) samples: The microorganisms isolated were *Candida albicans*, *Klebsiella spp.*, *Streptococcus spp.*, *Haemophiles spp.* and *Escherichia coli*.

Conclusion: The study shown candida and aerobic bacteria as the predominant pathogens isolated. It is important to note that vaginal discharges in some women are not caused by pathogenic organisms. The high prevalence of bacterial vaginitis demands thorough investigation of all symptomatic patients. Culture & sensitivity should be done invariably.

Key words: High Vaginal Swabs (HVS), vaginal swabs, Antibiotic sensitivity, *Escherichia coli*, *Streptococcus spp.*, *Staphylococcus aureus*, *Candida albicans*, *Klebsiella spp.*, *Citrobacter spp.*, *Proteus spp.*, *Enterobacter spp.*

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I. Introduction

Vaginal discharge in women is sometimes caused by candida or aerobic bacteria organisms like *Escherichia coli*, *staphylococcus aureus*, and β -haemolytic streptococcus. Culture and sensitivity testing are done from high vaginal swab (HVS) specimen collected from women who come to the clinic complaining of vaginal discharge. Isolation and antibiotic sensitivity of these organisms are key to the successful treatment of the cause of vaginal discharge [Orish, 2016]. Lactobacillus species constitute the predominant microorganism among the normal vaginal flora and it is responsible for maintaining the acidic vaginal pH. This gives protection from various pathogens which can invade the vaginal mucosa [Sandhiya *et al.*, 2014].

Women of reproductive age with vaginal discharge should have a high vaginal swab (HVS) cultured if:

- Postnatal or post miscarriage
- Vaginitis without discharge
- Pre or post gynaecological surgery
- Pre or post termination of pregnancy
- Symptoms not characteristic of Bacterial vaginosis
- Within 3 weeks of intrauterine contraceptive insertion [Blackwell *et al.*, 1993, Caillouette, 1997, UK national guidelines, 1999, FFPRHC and BASHH Guidance, 2006].

The aim of the study is to analyse the prevalence of local pathogenic bacteria in high vaginal swabs and vaginal swabs in Iraqi women patients attending Obstetrics and Gynaecology department with various complaints.

II. Methods

1- Samples:

(100) samples which were collected which : (50) high vaginal swabs (HVS) and (50) of vaginal swabs from women in the age group (18-45) years were taken from the patients attending to the Teaching laboratory /

Medical city of Baghdad from 1st Oct. of 2015 - 1st Feb.of 2016. With various gynaecological complaints of burning micturition, pain in abdomen, low backache and dyspareunia. High vaginal swab samples were cultured aerobically on blood agar and MacConkey agar and incubated at 37°C. Biochemical tests were performed and the microorganisms identified and analysed.

2- Antibiotic sensitivity:

were done for bacteria by disc diffusion method using Mueller Hinton agar and sheep blood agar for fastidious organisms [Sandhiya *et al*,2014]. The antibiotics tested were Tetracycline (75/100µg), Cephalothin-CLT (30/100µg), Aztreonam- AT30 (30/100µg), Ampicillin- AMC30 (30/100µg), Piperacillin- PI (100 µg), Amikacin- AK30 (30/100µg), Gentamycin- CN(25/100µg), Ceftriaxone- CTR30 (30/100µg) and Cotrimaxazole-CO25(25/100µg). Interpretation of the diameter of zone of inhibition was done using CLSI guidelines. Zones (circles) were measured in (mm).

III. Results

1- Vaginal swab samples:

The microorganisms isolated were *Staphylococcus aureus* 32% (16) *Escherichia coli* 28% (18), *Enterobacter spp* 18% (9), *Streptococcus spp*.10% (5), *Proteus spp* 6% (3) and *Citrobacter spp* 6% (3) shown in table-1 and fig-1. Table -2 shown the results of antibiotic sensitivity.

Table-1 Results of Vaginal swabs samples

No.	Bacteria	Number of patients	(%)
1-	<i>Staphylococcus aureus</i>	16	32
2-	<i>Escherichia coli</i>	14	28
3-	<i>Enterobacter spp</i>	9	18
4-	<i>Streptococcus spp</i>	5	10
5-	<i>proteus spp</i>	3	6
6-	<i>Citrobacter spp</i>	3	6
		50	100%

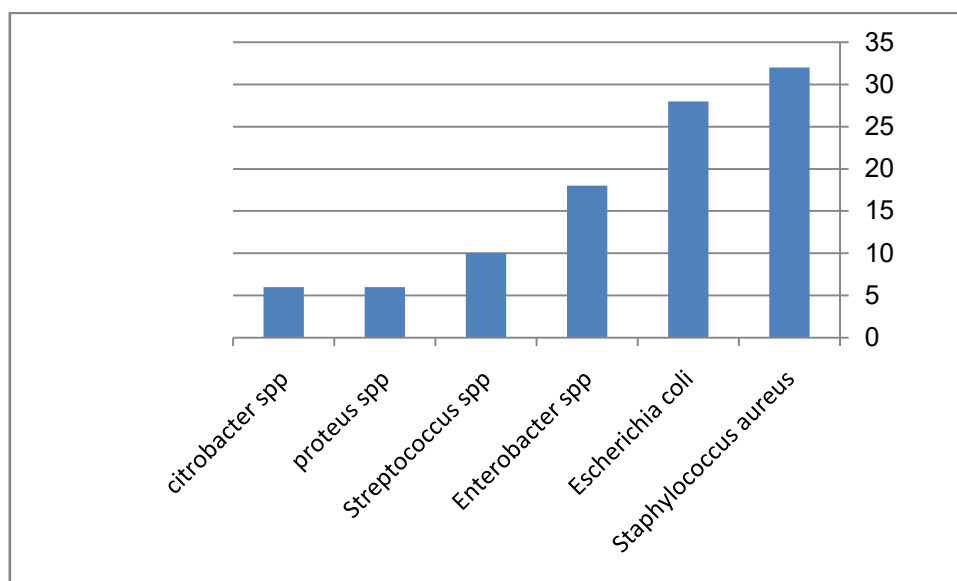


Fig-1- Results of Vaginal swabs samples

Table-2 Antibiotic sensitivity of bacteria in Vaginal swabs culture

	Antibiotics	Escherichia coli	Enterobacter spp	Streptococcus spp.	Staphylococcus aureus	proteus spp	Citrobacter spp
1-	Tetracycline 75/100µg	15	19	16	18	10	13
2-	Cephalothin-CLT 30/100µg	50	53	30	28	58	52
3-	Aztreonam-AT30 30/100µg	31	30	43	45	35	--
4-	Ampicillin-AMC30 30/100µg	20	15	45	23	15	18
5-	Piperacillin- PI	49	47	17	15	32	38

	100 µg						
6-	Amikacin-AK30 30/100µg	48	47	--	36	50	49
7-	Gentamycin-CN 25/100µg	30	28	--	31	49	46
8-	Ceftriaxone-CTR30 30/100µg	23	26	50	20	48	30
9-	Cotrimaxzole-CO25 25/100µg	15	13	12	10	20	18

*Zones (circles) were measured in mm.

2- High Vaginal Swabs(HVS) samples:

The microorganisms isolated were *Candida albicans* 52% (26), *Klebsiella spp.* 20% (10), *Streptococcus spp.* 14% (7), *Haemophiles spp.* 8% (4) and *Escherichia coli* 6% (3), shown in table-3 and fig-3. In table -4 shown the results of antibiotic sensitivity.

Table-3 Results of High Vaginal Swabs(HVS) samples

No.	Bacteria	Number of patients	(%)
1-	<i>Candida albicans</i>	26	52
2-	<i>Klebsiella spp.</i>	10	20
3-	<i>Streptococcus spp.</i>	7	14
4-	<i>Haemophiles spp.</i>	4	8
5-	<i>Escherichia coli</i>	3	6
		50	100

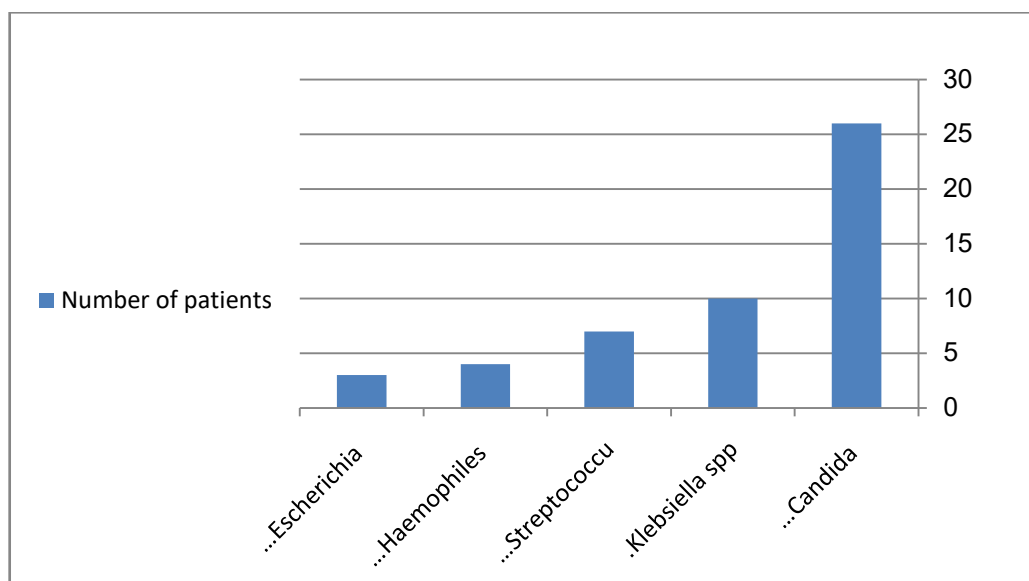


Fig-2- Results of High Vaginal Swabs(HVS) samples

Table-4 Antibiotic sensitivity of bacteria in High Vaginal Swabs(HVS) samples

	Antibiotics	<i>Klebsiella spp.</i>	<i>Streptococcus spp.</i>	<i>Haemophiles spp.</i>	<i>Escherichia coli</i>
1-	Cephalothin-CLT 30/100µg	52	55	22	43
2-	Tetracyclin 75/100µg	--	36	12	--
3-	Aztreonem- AT30 30/100µg	25	27	16	25
4-	Ampicillin- AMC30 30/100µg	30	28	--	15
5-	Piperacillin- PI 100 µg	--	--	--	18
6-	Amikacin- AK30 30/100µg	30	24	--	23
7-	Gentamycin- CN 25/100µg	27	46	18	37
8-	Ceftriaxone- CTR30 30/100µg	49	19	--	25
9-	Cotrimaxzole-CO25 25/100µg	22	25	19	42

*Zones (circles) were measured in mm .

IV. Discussion

Bacterial vaginosis (BV) is one of the most common urogenital infections among women of reproductive age that represents shifts in microbiota from *Lactobacillus* spp. Vaginal bacterial communities dominated by *Lactobacillus* spp. (CST I, II, III and V) are most frequently observed in Asian and White women whereas a diverse microbiome (CST IV) is more frequently observed in Black and Hispanic populations suggesting that the composition of the vaginal microbiome may be, in part, shaped by genetic differences between hosts but cultural and behavioural factors cannot be excluded to explain these associations (Mancuso & Ryan, 2015).

Out of (100) samples there were *Candida albicans* (26) which were the most prevalent organisms isolated in this study. This result is similar to other studies (Orish, 2016, Shaker, 2016), in Vaginal swab samples the microorganisms were isolated : *Staphylococcus aureus* 32% (16) *Escherichia coli* 28 % (18), *Enterobacter spp* 18%(9), *Streptococcus spp.* 10% (5), *Proteus spp* 6% (3) and *Citrobacter spp* 6% (3), while in the High Vaginal Swabs (HVS) samples: The microorganisms isolated were: *Candida albicans* 52% (26), *Klebsiella spp.* 20% (10), *Streptococcus spp.* 14% (7), *Haemophilus spp.* 8% (4) and *Escherichia coli* 6% (3) the most prevalent vaginal pathogen. When the vaginal mucosa is colonized with *Staphylococcus aureus*, it can predispose to a dreaded condition namely toxic shock syndrome [Reid & Bruce, 2003]. From the results of this research which infer that *S. aureus* and *E. coli* were isolated pathogens from patients with aerobic bacterial vaginitis and this correlates with Sandhiya *et al.*, 2014 study (Among the isolates of *Staphylococcus aureus* only 37.5% were sensitive to methicillin and 62.5% were methicillin resistant. All strains of MRSA were found to be 100% sensitive to vancomycin and linezolid. Most of the strains were multidrug resistant [Sandhiya *et al.*, 2014]).

As conclusion : The study shown candida and aerobic bacteria as the predominant pathogens isolated. It is important to note that vaginal discharges in some women are not caused by pathogenic organisms, and it is possible that some women who come to hospital with vaginal discharge are treated with empirical antibiotics without relying on culture and sensitivity.

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