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Comparative Study of Local Pathogenic Bacteria in High Vaginal Swabs and Vaginal Swabs in Iraqi Women

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Abstract:
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. Lactobacillus species constitute the predominant microorganism among the normal vaginal flora and it is responsible for maintaining the acidic vaginal pH.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. The high prevalence of bacterial vaginitis demands thorough investigation of all symptomatic patients. Culture & sensitivity should be done invariably.Hence this study was conducted to throw light on the prevalence of (60)samples of local pathogenic bacteria in high vaginal swabs and vaginal swabs in Iraqi women and their invitro antibiotic susceptibility pattern. In Vaginal swab samples:The microorganisms isolated were *Escherichia coli* 66.6 % (20), *Streptococcus* spp.23.4% (7) and *Staphylococcus aureus* 10% (3), while in the High Vaginal Swabs(HVS) samples:The microorganisms isolated were *Candida albicans* 56.667% (17), *Klebsiella spp.* 16.667% (5), *Streptococcus* spp 13.333%(4), *Haemophiles spp.* 6.667% (2) and *Escherichia coli* 6.667% (2).
Keywords:high vaginal swabs, vaginal swabs, Antibiotic sensitvity, *Escherichia coli* , *Streptococcus* spp, *Staphylococcus aureus* , *Candida albican*s, *Klebsiella spp.*

I- Introduction:

Vaginal infection is a common disease of women. Causes of vaginal discharge include physiological, infective (e.g. bacterial vaginosis, candidiasis, trichomoniasis) and noninfective (foreign bodies, cervical ectopy and genital tract malignancy [Mitchell, 2004]. Although after 40 years, there is a fall in estrogen production. An estrogen deficient state in vagina and the immunocompromised status due to diabetes or other associated factors can lead to growth of abnormal flora which may in turn lead to infections[Ravel ,et al.,2011 ,Narayana-Swamy *et al*., 2015]. Bacterial vaginal infections are often least understood and empirical antifungal therapy for any vaginal infection without high vaginal swab culture is still in practice[Kumar &Singh,2015 & Ayesh *et al.*2014].

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 . 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, 1993, Caillouette, 1997, UK national guidelines, 1999, FFPRHC and BASHH Guidance, 2006].

The aim of the study is to analysethe 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:

(60)samples which were collected which : (30) high vaginal swabs (HVS) and (30) of vaginal swabs from women in the age group (20-40) years were taken from the patients attending to the Teaching laboratory / Medical city of Baghdad from 1st Feb. to 1st May of 2015.with various gynaecological complaintsof burning micturition, pain in abdomen, low backache and dyspareunia .High vaginal swab samples were cultured aerobically on blood agar and Mac Conkey agar and incubated at 37°C. Biochemical tests were performed and the microorganisms identified and analysed.

2- Antibiotic sensitvity:
were done for bacterian by disc diffusion method using Mueller Hinton agar and sheep blood agar for fastidious organisms [Sandhiya *et al,*2014]. The antibiotics tested were Cephalothin-CLT (30/100µg), Ticarcillin-TI(75/100µg), Aztreonem- AT30(30/100µg), Ampicillin- AMC30 (30/100µg), Piperacillin- PI (100 µg), Amikacin- AK30 (30/100µg), Ipmenemcotrimaxzole –IPMCO(10/100µg), Gentamycin- CN(25/100µg), Ceftriaxone- CTR30(30/100µg), Cotrimaxzole-CO25(25/100µg) and Tricotrimaxzole- TCO (75/100µg).Interpretation of the diameter of zone of inhibition was done using CLSI guidelines. Zones (circles) were measured in(mm) and in case of resistance there was no growth.

III- Results:
1- Vaginal swab samples:
The microorganisms isolated were *Escherichia coli* 66.6 % (20), *Streptococcus* spp.23.4% (7) and *Staphylococcus aureus* 10% (3) shown in table-1 and fig-1. In fig-2 and table -2 shown the results of antibiotic sensitvity.
Table-1 Results of Vaginal swabs samples

No.	Bacteria	Number of patients	(%)
1-	*Escherichia coli*	20	66.6
2-	*Streptococcus* spp	7	23.4
3-	*Staphylococcus aureus*	3	10
		30	100%

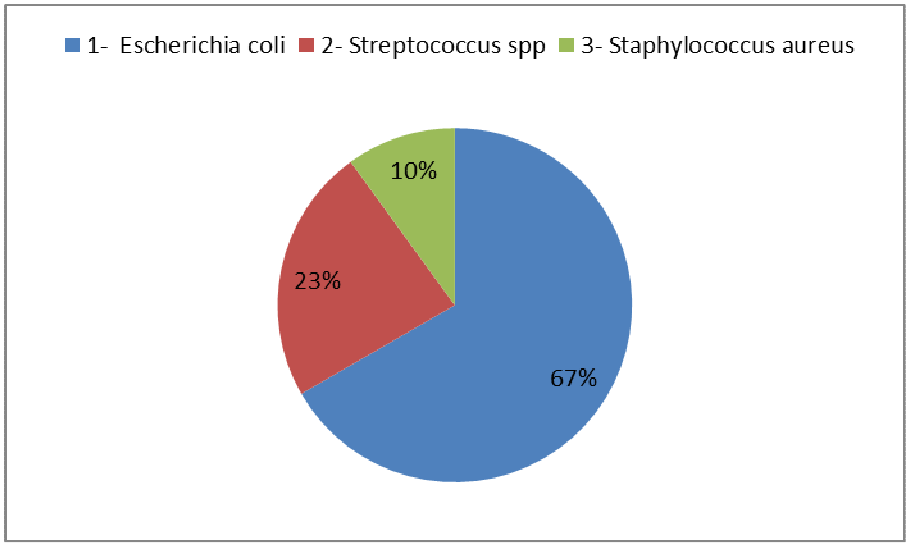

Fig -1- The percentage of Vaginal swabs culture


Fig -2 Antibiotic sensitvity of bacteria in Vaginal swabs culture

Table-2 Antibiotic sensitvity of bacteria in Vaginal swabs culture

	Antibiotics	***Escherichia coli***	***Streptococcus* spp.**	***Staphylococcus aureus***
1-	**Cephalothin-CLT 30/100µg**	**N.G.**	**13**	**14**
2-	**Ticarcillin-TI 75/100µg**	**N.G.**	**18**	**20**
3-	**Aztreonem- AT30 30/100µg**	**10.5**	**10**	**13**
4-	**Ampicillin- AMC30 30/100µg**	**10**	**N.G**	**29**
5-	**Piperacillin- PI 100 µg**	**N.G.**	**N.G**	**N.G**
6-	**Amikacin- AK30 30/100µg**	**20.5**	**11**	**15**
7-	**Ipmenemcotrimaxzole –IPMCO 10/100µg**	**30.5**	**17**	**20**
8-	**Gentamycin- CN 25/100µg**	**20**	**45**	**50**
9-	**Ceftriaxone- CTR30 30/100µg**	**23**	**14**	**12**
10-	**Cotrimaxzole-CO25 25/100µg**	**40.3**	**20**	**23**
11-	**Tricotrimaxzole- TCO 75/100µg**	**44**	**24**	**26**

*Zones (circles) were measured in mm and in case of resistance there was no growth(N.G.).

2- High Vaginal Swabs(HVS) samples:

The microorganisms isolated were *Candida albicans* 56.667% (17), *Klebsiella spp.* 16.667% (5), *Streptococcus* spp 13.333%(4),*Haemophiles spp.* 6.667% (2) and *Escherichia coli* 6.667% (2), shown in table-3 and fig-3. In table -4 shown the results of antibiotic sensitvity.

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

No.	Bacteria	Number of patients	(%)
1-	*Candida albicans*	17	56.667
2-	*Klebsiella spp.*	5	16.667
3-	*Streptococcus* spp.	4	13.333
4-	*Haemophiles spp.*	2	6.667
5-	*Escherichia coli*	2	6.667
		30	100

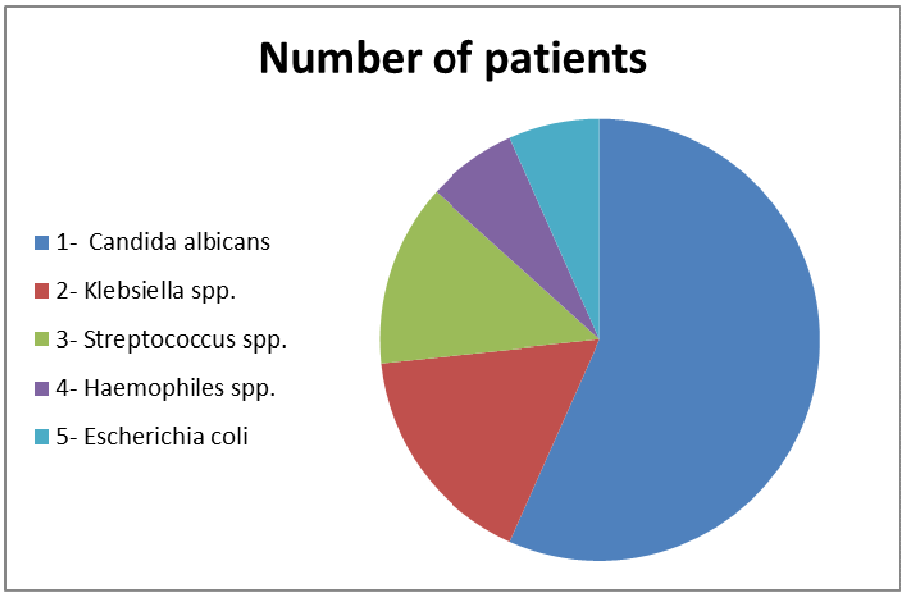

Fig -3- The percentage of High Vaginal Swabs(HVS) samples

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

	Antibiotics	*Klebsiella spp.*	*Streptococcus* spp.	*Haemophiles spp.*	*Escherichia coli*
1-	Cephalothin-CLT 30/100µg	N.G	15	22	N.G.
2-	Ticarcillin-TI 75/100µg	N.G	20	12	N.G.
3-	Aztreonem- AT30 30/100µg	25	15	16	12.5
4-	Ampicillin- AMC30 30/100µg	N.G	N.G	N.G	15
5-	Piperacillin- PI 100 µg	16	N.G	N.G	N.G.
6-	Amikacin- AK30 30/100µg	30.5	12	N.G	23
7-	Ipmenemcotrimaxzole –IPMCO 10/100µg	55	19	21	35
8-	Gentamycin- CN 25/100µg	27	46	18	21
9-	Ceftriaxone- CTR30 30/100µg	N.G	18	N.G	26
10-	Cotrimaxzole-CO25 25/100µg	32	23	17	45.1
11-	Tricotrimaxzole- TCO 75/100µg	30	28	22	48

*Zones (circles) were measured in mm and in case of resistance there was no growth(N.G.).

V- Discussion:

The microbial ecology of vagina plays a crucial role in the prevention of any vaginal infection in women. Lactobacillus is mainly responsible for maintaining the acidic vaginal pH (below 4.5) and thereby preventing the multiplication of potentially pathogenic microorganisms. Usage of antimicrobials like broad spectrum penicillins and tetracyclines can suppress or eliminate the helpful bacteria in the genital tract there by leading to overgrowth of resistant organisms [Sandhiya *et al.,*2014]**.**

In this research ,in Vaginal swab samples the microorganisms were isolated : *Escherichia coli* 66.6 % (20), *Streptococcus* spp.23.4% (7) and *Staphylococcus aureus* 10% (3), while in the High Vaginal Swabs(HVS) samples:The microorganisms isolated were: *Candida albicans* 56.667% (17), *Klebsiella spp.* 16.667% (5), *Streptococcus* spp 13.333%(4), *Haemophiles spp.* 6.667% (2) and *Escherichia coli* 6.667% (2). *Escherichia coli* (66.6 % (20)) was the most prevalent vaginal pathogen this may be Isolation of faecal microflora from vagina was correlated with unhygienic bowel practices in the past [Tariq *et al.* 2006]. When the female introitus is colonized with these organisms there is a strong predisposition to recurrent urinary tract infection[Mumtaz *et al.*, 2008]. While *Streptococcus* spp.23.4% (7) was the second prevalent vaginal pathogen and the thrid prevalent vaginal pathogen is *Staphylococcus aureus* 10% (3) When the vaginal mucosa is colonized with this microorganism, 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]).

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 [Mumtaz *et al.*, 2008]. Lactobacillus species constitute the predominant microorganism among the normal vaginal flora and it is responsible for maintaining the acidic vaginal pH [Klebanoff *et al.* 1991]. This gives protection from various pathogens which can invade the vaginal mucosa [Lakshmi, *et al.* 2012]. The other microorganisms which are part of normal vaginal flora include Coagulase negative *Staphylococcus* (CONS), *Diphtheroids and Micrococcus*. The microorganisms in the vagina which are potential pathogens include *Staphylococcus aureus*, *Enterococcus* species, beta haemolytic *Streptococcus, Neisseria* species, *Escherichia coli, Klebsiella* species & Candida species [Lakshmi *et al.* 2013]. Vaginitis is one of the most common infections in women. Approximately 5-10 million females every year seek gynaecologic advice for vaginitis [5, Donder *et al.*, 2002]. The most common etiology of infectious vaginitis is attributed to bacterial vaginosis, vulvovaginal

candidiasis and trichomoniasis [Kent ,1991, Lakshmi *et al.*, 2013]. Etiological diagnosis may not be arrived in 7-72% of females with symptoms of vaginitis and such types of abnormal vaginal flora which can neither be considered as normal flora nor as bacterial vaginosis have been grouped as intermediate flora [Ison & Hay 2002 & Ling *et al.* 2013].

As conclusion there is a high prevalence of bacterial vaginitis, all patients with gynaecological symptoms should be investigated thoroughly. Antibacterial vaginosis medications will not be helpful in patients with aerobic bacterial vaginitis. So culture and sensitivity has to be done invariably to find out the etiologic agent and should be treated accordingly.

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