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Surveillance of antibiotic susceptibility of vaginal microbiota in symptomatic women of tertiary care teaching hospital

Sujata Priyadarsini Mishra and Chandrabhanu Dalal

Abstract
Back ground: Bacterial vaginosis is the most pervasive lower genital tract contamination in ladies of regenerative age. The point of this investigation was to distinguish the causative life form in patients with vaginal release and to examine the affectability of the living being to anti-toxins.
Materials and Methods: This was an emergency clinic based forthcoming investigation in Department of Obstetrics and Gynecology in a tertiary consideration medical clinic over a time of two years. An aggregate of 2062 ladies with objections of vaginal release were exposed to a high vaginal swab and the example was refined, the living beings were distinguished and anti-microbial helplessness was tried.
Results: There was no development found in 40.7% of patients. *E. coli* was observed to be the most well-known life form confined pursued by Klebsiella pneumonia and Klebsiella oxytoca. Candida species was detached in 1.4 % of ladies. An expanded recurrence of vaginal contamination was found in the age bunch 26-35 years, trailed by age bunch 36-45 years. 73.2% of the creatures were delicate to Imipenam, 70.4 % to Amikacin and 65.7% to Gentamycin. There were 10 MRSA strains segregated which were all touchy to Vancomycin, Amikacin and Gentamycin.
Conclusions: Our examination gives data about the distinctive microorganisms present in ladies with vaginal release. Since pathogenic microorganisms were more typical than Candida species it is prescribed to offer treatment to patients in the wake of taking a high vaginal swab. Fitting anti-toxins dependent on culture and affectability must be given alongside antifungal specialists.

Keywords: bacterial vaginosis, culture and sensitivity, high vaginal swab, vaginal discharge

Introduction
Vagina is an intricate biological system comprising of an assortment of microorganism [1]. Females are progressively inclined to urinary and vaginal contaminations due to the anatomical and useful nearness to butt-centric trench and because of the short urethra [2]. Bacterial vaginosis is the most predominant lower genital tract disease in ladies of conceptive age all through the world.3 It influences a large number of ladies every year and is emphatically connected with a few unfavorable wellbeing results including preterm work and conveyance, pelvic provocative sickness, baby blues and postabortal endometriosis [4-7]. It is the most widely recognized reason for vaginal indications provoking ladies to look for therapeutic care [8].
The human body harbors several life forms of gram positive and gram negative assortments in the lower 33% of the vagina. 9 Infection or irritation of the vagina is called vaginitis. The two most regular reasons for vaginitis are bacterial vaginitis and Candida vaginitis [10]. The causative life forms might be explicitly transmitted, endogenous or iatrogenic. Unusual vaginal release might be the main side effect of bacterial vaginitis and many influenced ladies are asymptomatic [11]. Zhou *et al* have recommended that a specific number of ladies who don't have any side effects have vaginal networks that take after bacterial vaginosis. 12 As vaginitis makes heaps of inconvenience the lady and her personal satisfaction is influenced we ought to analyze and treat the condition accurately. Treating ladies with vaginal release observationally with antifungal treatment accepting that the causative life form is Candida without taking a high vaginal swab culture and affectability is still in practice.10 Another current treatment for bacterial vaginosis-oral or vaginal organization of metronidazole is tormented by high disappointment rates with repeat of side effects in 54%

of ladies inside a quarter of a year of anti-toxin treatment [13]. The point of this examination was to recognize the causative living being in patients with vaginal release and to consider the affectability of the creature to anti-toxins. By considering the affectability of these strains of living being we might most likely settle on an appropriate treatment convention for these ladies and lighten the wretchedness of these ladies with vaginal release.

Methods

This was a medical clinic based planned examination led in the Department of Obstetrics and Gynecology in a tertiary consideration showing emergency clinic over a time of two years from October 2016 to September 2018. A total of 2062 ladies matured somewhere in the range of 18 and 60 years who had exhibited to the gynecology OPD with grumblings of vaginal release were incorporated into the examination. Educated assent was taken from the patient. Amid the visit the patient was put into lithotomy position and a sterile Cusco's speculum was brought into the vagina and a high vaginal swab was avoided potential risk. The swabs were transported to the microbiology research facility promptly and handled.

The example was refined utilizing Mac Conkey agar for gram negative microscopic organisms and blood agar and chocolate agar for gram positive microbes at 37 ^{0}C and brooded for 48 hrs. Ordinary strategies and biochemical tests were performed and the life form was recognized according to NCCLS guidelines.14 Antibiotic defenselessness was tried utilizing plate dissemination techniques by brooding at 370C for 24 hrs. All ladies discovered positive for culture and affectability were treated with suitable anti-infection agents. Information acquired was investigated for dissemination of microorganism as for age, number and level of ladies from whom the specific microorganism was segregated and the anti-infection affectability. Investigation was finished utilizing Microsoft Excel Program. In light of the information investigation results were gotten with respect to the age explicit living being, infectivity example and anti-microbial affectability design.

Results

The information from the high vaginal swab culture and affectability consequences of the 2062 ladies were examined by rate investigation utilizing SPSS programming. Of the 2062 ladies around 1222 (59.3%) had positive vaginal societies. Aggregate of 23 microorganisms were secluded. Table 1 demonstrates the recurrence and level of symptomatic ladies in the distinctive age bunches in the investigation. There were 307 ladies (14.9%) in the age bunch 18-25 yrs, 793 ladies (38.5%) in the age bunch 26-35 yrs, 624 ladies (30.3 %) in the age bunch 36-45 and 338 ladies (16.4 %) matured over 45 years.

Table 1: Age distribution of the patients

Age group (Years)	Frequency	Percent (%)
18-25	307	14.9
26-35	793	38.5
36-45	624	30.3
Above 45	338	16.4
Total	2062	100.0

Table 2: Distribution of microorganism with respect to age.

Age group	No growth	K. pneumoniae	K. oxytoca	Acinetobacter	Chlamydia	E. coli
18-25	115(5.6%)	33(1.6%)	28(1.4%)	12(0.6%)	1(0.05%)	54(2.6%)
26-35	344(16.7%)	74(3.6%)	52(2.5%)	33(1.6%)	6(0.3%)	117(5.7%)
36-45	255(12.4%)	56(2.7%)	50(2.4%)	33(1.6%)	4(0.2%)	108(5.2%)
Above 45	126(6.1%)	22(1.1%)	20(1%)	12(0.6%)	1(0.05%)	96(4.7%)
Total	840(40.7%)	185(9%)	150(7.3%)	90(4.4%)	12(0.6%)	375(18.2%)

Table 3: Distribution of microorganism with respect to age.

Age group	Pseudomonas aeruginosa	Staphylococcus	Citrobacter	Enterococcus fecalis	Streptococcus pyogenes
18-25	12(0.6%)	21(1%)	8(0.4%)	4(0.2%)	6(0.3%)
26-35	46(2.2%)	48(2.3%)	15(0.7%)	19(0.9%)	11(0.5%)
36-45	24(1.2%)	38(1.8%)	11(0.5%)	10(0.5%)	15(0.7%)
Above 45	15(0.7%)		16(0.8%)	4(0.2%)	9(0.4%)
Total	97(4.7%)	123(6%)	38(1.8%)	42(2%)	38(1.8%)

Table 4: Distribution of microorganism with respect to age

Age group	Proteus vulgaris	Streptococcus pneumonia	MRSA	Coagulase negative staphylococcus	Proteus mirabilis	Enterobacter *aerogenes*
18-25	0	3(0.1%)	0	0		0
26-35	4(0.2%)	2(0.1%)	3(0.1%)	0	1(0.05%)	2(0.1%)
36-45	1(0.05%)	0	3(0.1%)	2(0.1%)	5(0.2%)	1(0.05%)
Above 45	4(0.2%)	0	1(0.05%)	0	3(0.1%)	2(0.1%)
Total	9(0.4%)	4(0.2%)	10(0.5%)	2(0.1%)	9(0.4%)	5(0.2%)

Table 5: Distribution of microorganism with respect to age.

Age group	C. Freundii	C. Koseri	Pseudomonas putida	Staphylococcus saprophyticus	Morganella morganii	Candida
18-25	0	0	1(0.05%)	1(0.05%)	0	6(0.3%)
26-35	1(0.05%)	1(0.05%)	0	0	1(0.05%)	13(0.6%)
36-45	0	0	0	0	0	8(0.4%)
Above 45	0	0	0	0	0	1(0.05%)
Total	1(0.05%)	1(0.05%)	1(0.05%)	1(0.05%)	1(0.05%)	28(1.4%)

Table 2 to 5 shows the distribution of the different organism with respect to age. There was no growth found in 40.7% of patients. The microorganism with the highest frequency of infection was *E. coli* which was found in 375 women (18.2%) followed by *Klebsiella pneumoniae* in 185 women (9%) followed by *Klebsiella oxytoca* in 150 women (7.3%). In the next order of frequency was found *Staphylococcus* in 123 women (6%) followed by *Pseudomonas aeruginosa* in 97 women (4.7%), *Acinetobacter* in 90 women (4.4%) followed by *Enterococcus fecalis* in 42 women (2%). Candida species was isolated in only 28 women - 1.4% of study patients with the highest prevalence in the age group 26-35 years.

Other organisms such as *Citrobacter*, *Streptococcus pyogenes*, *Streptococcus pneumoniae*, *Proteus vulgaris*, *Proteus mirabilis*, Coagulase negative *staphylococcus*, *Enterobacter aerogenes*, *Citro freundii*, *Citro koseri*, *Pseudomonas putida*, *Staphylococcus saprophyticus* and *Morganella morganii* were also isolated. *Chlamydia* species was isolated in 12 women (0.6%) and MRSA isolated in 10 women (0.5%).

Table 6 to 9 shows the frequency of the microorganisms in the different age groups. An increased frequency of infection was found in the age group 26-35 years followed by the age group 36-45 years.

Table 6: Frequency of microorganisms in the different age groups.

Age group	No growth	K. pneumoniae	K. oxytoca	Acinetobacter	Chlamydia	E. coli
18-25	115(13.69%)	33(17.84%)	28(18.67%)	12(13.33%)	1(8.33%)	54(14.4%)
26-35	344(40.95%)	74(40%)	52(34.67%)	33(36.67%)	6(50%)	117(31.2%)
36-45	255(30.36%)	56(30.27%)	50(33.33%)	33(36.67%)	4(33.33%)	108(28.8%)
Above 45	126(15%)	22(11.89%)	20(13.33%)	12(13.33%)	1(8.33%)	96(25.6%)
Total	840(100%)	185(100%)	150(100%)	90(100%)	12(100%)	375(100%)

Table 7: Frequency of microorganisms in the different age groups

Age group	Pseudomonas aeruginosa	Staphylococcus	Citrobacter	Enterococcus fecalis	Streptococcus pyogenes
18-25	12(12.37%)	21(17.07%)	8(21.05%)	4(9.52%)	6(15.79%)
26-35	46(47.42%)	48(39.02%)	15(39.47%)	19(45.24%)	11(28.95%)
36-45	24(24.74%)	38(30.89%)	11(28.95%)	10(23.81%)	15(39.47%)
Above 45	15(15.46%)	16(13.01%)	4(10.53%)	9(21.43%)	6(15.79%)
Total	97(100%)	123(100%)	38(100%)	42(100%)	38(100%)

Table 8: Frequency of microorganisms in the different age groups

Age group	Proteus vulgaris	Streptococcus pneumonia	MRSA	Coagulase negative staphylococcus	Proteus mirabilis	Enterobacter aerogenes
18-25	0	2(50%)	3(30%)	0	0	0
26-35	4(44.4%)	2(50%)	3(30%)	0	1(11.11%)	2(40%)
36-45	1(11.2%)	0	3(30%)	2(100%)	5(55.56%)	1(20%)
Above 45	4(44.4%)	0	1(10%)	0	3(33.33%)	2(40%)
Total	9(100%)	4(100%)	10(100%)	2(100%)	9(100%)	5(100%)

Table 9: Frequency of microorganisms in the different age groups.

Age group	C. Freundii	C. Koseri	Pseudomonas putida	Staphylococcus saprophyticus	Morganella morganii	Candida
18-25	0	0	1(100%)	1(100%)	0	6(21.4%)
26-35	1(100%)	1(100%)	0	0	1(100%)	13(46.43%)
36-45	0	0	0	0	0	8(28.57%)
Above 45	0	0	0	0	0	1(3.57%)
Total	1(100%)	1(100%)	1(100%)	1(100%)	1(100%)	28(100%)

Table 10 shows the sensitivity and resistance patterns of the microorganisms to the common antibiotics used. 73.2% of the microorganisms were sensitive to Imipenam, 70.4% were sensitive to Amikacin, 65.7% sensitive to Gentamycin and 47.2% sensitive to Ciprofloxacin. The microorganisms were most resistant to Cefotaxime (28.3%) followed by Imipenam (15.2%). There were 10 cases detected to have *MRSA* (Methicillin Resistant *Staphylococcus aureus*). All the MRSA strains were shown to be susceptible to Vancomycin, Amikacin and Gentamycin.

Table 10: Sensitivity of the microorganisms to antibiotics.

Drugs	Sensitivity		Resistance	
	N	%	N	%
Amikacin	860	70.4	-	
Cefazolin	371	30.4	146	11.9
Cefepime	337	27.6	67	5.5
Cefotaxime	422	34.5	346	28.3
Ciprofloxacin	577	47.2	99	8.1
Gentamycin	803	65.7	125	10.2
Imipenam	895	73.2	186	15.2

Discussion

Vaginal contaminations have different ramifications for ladies' wellbeing, being the most well-known gynecological problem [15]. Commonness thinks about show that there is a conceivably substantial store of bacterial vaginosis contamination in the population [8] Microbes assume a basic job in deciding the biochemical and incendiary profile of the vaginal environment. [16] A comprehension of the organization of the vaginal microbial biological system is fundamental for far reaching comprehension of the etiology of vaginal disease and for the avoidance and treatment of the disease.17 Our investigation exhibits the predominance of different pathogenic microorganisms in the vagina in symptomatic ladies. Our investigation discovered disease increasingly normal in the age bunch 26-35 years with declining contamination with declining age and being least regular in the age bunch 18-25years. A comparative high recurrence of disease in the age bunch 20-30 years with a fall in recurrence of contamination as age progressed was found in an examination by Nagalaksmi Narayana Swami *et al*. [18] There is a solid relationship of the nearness of bacterial vaginosis with age over 25 years which is irregular for most explicitly transmitted contamination in females where the most astounding rates are dependably in ladies more youthful than 25 years old. Morris *et al* expresses that ladies matured under 25 years report higher number of sexual accomplices and higher rate of accomplice change yet report less instances of bacterial vaginosis contradicting the proposed courses of sexual transmission.8 In our examination the commonness of E. coli was the most noteworthy at 18.2% pursued by Klebsiella pneumonia (9%), Klebsiella oxytoca (7.3%) and staphylococcus (6%). The consequences of our investigation was similar to the examination by K. Lakshmi, *et al*. who found that Escherichia coli, Staphylococcus aureus and Klebsiella pneumonia were the most well-known pathogenic microorganisms isolated.10 A prior examination by Rahman, *et al* observed Escherichia coli to be the most widely recognized pathogenic microscopic organisms (15%) detached from culture.19 Burton and Reid revealed nearness of E. coli in 21% Nagalaksmi, *et al*. discovered pervasiveness of E. coli of 11.5 % and a commonness of 17 % was found by Gopal Kumar, *et al*. [18, 20, 21] Our examination discovered staphylococci in 6% of symptomatic ladies while Lakshmi, *et al* discovered staphylococci aureus in 9.3 % not at all like Gopal Kumar, *et al* who discovered Staphylococcus aureus in just 1 %. [10, 21] In our investigation we observed Candida species to be disconnected in 28 ladies (1.4%) and was increasingly basic in age bunch 26-35 years. Lakshmi, *et al* discovered Candida species in 16% of ladies and progressively regular in premenopausal women.10 Gopal Kumar, *et al* discovered Candida species in 2% of patients. [21] It is realized that vaginal diseases because of a disturbance of ordinary vaginal vegetation increment the danger of explicitly transmitted contaminations particularly HIV. [22] An ongoing report in Chicago gathering cervicovaginal lavage examples discovered gram stains demonstrative of Bacterial vaginosis to be altogether connected with a recently recognized HIV-Inducing factor that initiates HIV-1 Gene expression [23]. Newer anti-infection agents like Imipenam are successful however very expensive. [24] Amikacin Gentamycin still keep on being medications to which the vast majority of the life forms are touchy. Lakshmi, *et al* discovered a large portion of their gram negative detaches to be exceedingly delicate to Amikacin, gentamycin and Ceftazidine. They additionally discovered that MRSA strains were altogether observed to be helpless to Vancomycin [10] In our examination too we found that all the MRSA strains were touchy to Vancomycin notwithstanding Amikacin and Gentamycin. High opposition rates have jumped out at generally utilized anti-infection agents because of inappropriate and wide unpredictable use. This investigation was done to decide the affectability and opposition examples to the regularly utilized anti-infection agents therefore empowering us to settle on the right anti-infection agents to be utilized.

Conclusion

One of the most common complaints by women attending Gynecology OPD is vaginal infection and it still remains one of the least understood. Our present study provides information about the different microorganisms present in the symptomatic women complaining of vaginal discharge. Pathogenic bacteria like *E. coli*, *Klebsiella*, and *Staphylococci* etc. were more common than Candida species. Hence the principle of empirically treating women with leucorrhoea with an antifungal agent without taking an HVS has to be changed and appropriate treatment is to be given after properly diagnosing the vaginal infection. Appropriate antibacterial agents based on the culture sensitivity results have to be given along with the antifungal agents.

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