

Bacterial Vaginosis and Urinary Tract Infection

Authors:

Maryam Afrakhteh, MD*

Assistant Professor of Shahid Beheshti University of Medical Sciences

Atossa Mahdavi, MD

Resident of Obstetrics & Gynecology of Shahid Beheshti University of Medical Sciences

تاریخ ارائه: ۸۴/۴/۱۱ تاریخ پذیرش: ۸۴/۱۱/۱

واژینوز باکتریال و عفونت ادراری

خلاصه

هدف: نظر به شیوع بالای عفونتهای اورژنیتال و کمبود اطلاعات در مورد ارتباط بین واژینوز باکتریال و عفونت ادراری در کشور، این مطالعه در بیماران مراجعه کننده به بیمارستان شهدای تجریش در سالهای ۱۳۸۱-۱۳۸۰ انجام گرفت.

روش کار: این مطالعه مورد-شاهدی روی ۱۳۴ فرد صورت گرفت. بیماران با عفونت ادراری وقتی محسوب می شدند، که علائم و کشت مثبت ادراری داشتند. افراد شاهد خانمهایی بودند که کشت ادراری منفی داشتند و با گروه بیماران از نظر سن، تعداد دفعات مقاربت، سالهای ازدواج و نوع پیش گیری از بارداری با یکدیگر مشابه بودند. تشخیص واژینوز باکتریال بر مبنای معیار (کرایتریای) Amsel در هر دو گروه گذاشته می شد. نتایج مطالعه با استفاده از روشهای آماری t-test و chi-square مقایسه شدند و خطر نسبی و ضریب اطمینان در دو گروه محاسبه گردید.

نتایج: ۶۷ بیمار با عفونت ادراری با ۶۷ خانم شاهد بدون عفونت ادراری مقایسه شدند. واژینوز باکتریال در ۴۰/۳٪ در خانمهای گروه شاهد و ۶۲/۷٪ در خانمهای بیمار وجود داشت ($p < 0.01$) و ترشحات با مشخصه واژینوز باکتریال و pH بیش از ۴/۵ در ۹۱٪ و آزمون ویف مثبت در ۷۴٪ و سلول کلیدی (clue cell) در ۷۲٪ بیماران با واژینوز باکتریال وجود داشت.

نتیجه گیری: افراد با عفونت ادراری بیش از افراد شاهد، دچار واژینوز باکتریال بودند. برای پیش گیری از عفونت ادراری، تشخیص و درمان واژینوز باکتریال پیشنهاد می گردد. مطالعات تجربی بیشتری در این زمینه و به خصوص در مورد خانمهای حامله توصیه می شود.

کلمات کلیدی: واژینوز باکتریال، عفونت ادراری، سلول کلیدی.

Address corresponding authors:

M. Afrakhteh, M.D. Shohada Hospital – Tehran – Iran

Tel: 021- 22718001-9 Fax: 021-22712141

E-mail: maryam_afrahkhteh@yahoo.com

Introduction:

Urinary tract infection is a very common disease which causes more than 7 million outpatient visits each year ⁽¹⁾ and two-thirds of the patients are women.

⁽²⁾ Generally 10-20 percent of women get symptomatic urinary tract infections in their lives and about 20 percent of these patients will have recurrence during the next six months ⁽²⁾.

The cost of these 7 million episodes of UTI in women in the United States of America is estimated at more than one billion dollars each year. ⁽³⁾ Most important complications of the urinary tract infection are pyelonephritis, sepsis, and premature delivery. Treatment of women with UTI is accomplished apart from the genital tract infection. The recent observations show that after beginning of sexual activities, the incidence of UTI increases considerably in women ⁽¹⁾. And before appearance of remarkable bacteriuria, the colonization around urethra is found with the same germs that causes UTI. ^{(4),(5)} Urinary tract infections (UTI) are the second most frequent type of infectious pathology treated in primary care clinics. ⁽¹²⁾

Obviously the best way to reduce this problem is the recognition of effective factors in pathogenesis which in this case, is the lack of lactobacillus producing peroxide hydrogen as a dominant flora of vagina, which facilitate colonization of coliforms in the lower vagina, the skin around urethra and distal urethra. ⁽¹⁾

In 1989 the relationship between bacterial vaginosis and UTI in women using diaphragm was reported ^{(6),(15)}. In year 2000 for the first time, there was a report that women suffering from bacterial vaginosis are in risk of UTI more than others. ⁽⁷⁾

After registering the present research, two other reports were published to confirm this hypothesis in 2002 ^{(8),(9)}.

Considering little research and lack of information about the incidence of this relationship in Iran and also having the available diagnostic tests which are cheap and fast, we performed this study in women with UTI and their controls in Shohada Tajrish Hospital in 2001- 2002.

Materials & Methods:

The method of our research was case-control. All the patients in our clinic with clinical signs or symptoms of infection in the genitourinary system were examined. Clinical signs and symptoms were dysuria, frequency, urgency, feeling of pressure, itching, irritation, vaginal discharge, bad odor, redness, tenderness, and erosion of the cervix. We performed a urinary culture for them. The culture medium was blood agar and eosin methylene blue (EMB) medium, and when there were more than 100,000 pathogenic microorganisms (of one kind) in each milliliter of midstream and clean catch urine. We considered it a positive culture. We considered women with positive culture as case group. Pregnant, immunocompromised women and recent users of drugs affecting immune system, diabetes, vaginal bleeding, recent using of antibiotics or vaginal creams and women with hospital urinary tract infections were excluded from our study.

A questionnaire was completed for each case including: age, marital status, reproductive status, job, education, husband's education, contraception method, frequency of intercourse per week, years of marriage, previous gynecologic surgery, smoking, systemic illness, and presence of candidal or trichomoniasis infection.

At the same time we performed another questionnaire with the same information for our control group. These persons were women without urinary tract infection (negative urinary culture) and without excluding standards of our research. Also, these women were matched for age, frequency of intercourse, years of marriage, and kind of family planning.

It is obvious that if we couldnot find a suitable match from control group for our case, we excluded that case from our research. Detection of the bacterial vaginosis was based on Amsel ⁽¹⁰⁾ criteria. Four criteria which were considered in this research consisted of distinctive discharges of bacterial vaginosis, positive whiff test, vaginal PH above 4.5, and clue cell. It means that if a patient had three of these

four standards she was considered to be affected by bacterial vaginosis.

Data from the questionnaires were analyzed using spss-version 9, and people of the two groups were judged statistically considering t-test and chi-square. Odds Ratio (OR) and confidence interval (CI) with 95% probability was determined in this population .

Results:

Overall 134 patients were studied. Mean age was 41.6 ± 9.8 (range 16 to 64).

Mean number of pregnancies were 4.6 ± 2.5 , number of deliveries were 3.9 ± 2.1 , and number of abortions were 1.8 ± 1.4 .

There was no significant difference between two groups in age, times of intercourse per week, years of marriage, number of pregnancies and deliveries and abortions, and years of menopause.

The majority of women were married (91%), non smokers (83%), without background disease (79.8%) and housewives (90%). There was no significant difference between the two groups in their education and their husband's education, marital status, smoking, background disease, job, gynecologic surgery, and the kind of family planning.

Clinical signs and symptoms of patients with UTI and their control group are shown in Table /1/. The most common symptom in two groups was vaginal discharge, then dysurea, itching, and frequency. The case group, in comparison with the control group, had a significant difference in dysurea and vaginal burning ($P < 0.05$). The most common symptom was vaginal discharge. As is shown in Table /2/, there is no significant difference between two groups.

The state of bacterial vaginosis in case group and their control group is shown in Table /3/, and it shows that in control group 27 persons (40.3%), and in case group 42 persons (62.7%) were encountered with bacterial vaginosis. Statistics show that the difference is significant ($P < 0.01$) and case group was encountered with bacterial vaginosis, 2.5 times more than control group (OR= 2.49). The real degree of OR with 95% probability are estimated between 1.3 -5 (CI= 1.3 - 5) .

As is shown in Table /4/, there was specific vaginal discharge and PH more than 4.5 in 91 percent of the case group. Whereas in 73 percent of cases, positive whiff test and in 72 percent of cases clue cell was noticed. The difference between cases and controls was statistically significant ($P < 0.01$).

It is better to mention that 29 person (42%) of patients with BV had Candidal infection, and 37 person (53%) had Trichomonas infection. In control group 15 person (23%) had Candidal infection and 12 persons (18%) had Trichomonas infection which was significantly different ($P < 0.05$). In women with UTI, 19 people (28%) had candidiasis and 22 people (32%) had trichomonas infection. The difference was not significant. In 63 people (94%) with UTI, the microbe in their urine culture was E. coli, and in 3 people (4.5%) was klebsiella, and one was proteous.

Discussion:

The research revealed that women with UTI encountered bacterial vaginosis more than their control group.

As mentioned in the introduction since 1970 until now there have been only a few researches with the same title, before registration of this project. In 1989, Hooton et al reported in their research that BV or alteration in vaginal microflora which is seen in specific gas - liquid chromatographic pattern of BV is consistent with colonization of E.coli in entrance of vagina and symptoms of acute UTI in women using the diaphragm. ^{(6), (15)} Antibiotics and other compounds that interfere with normal genital flora may increase the risk of UTI. ⁽¹⁶⁾ In the year 2000 Harmanli et al, conducted a study considering BV and UTI in 129 women during their routine visits, and they found that 15 of 67 women (22.4%) had BV and UTI whereas only 6 women without BV had UTI (9.7%).

These researchers mentioned obvious difference between organisms causing BV and UTI, and reported remarkable relation between frequency of intercourse with BV and UTI. This study had some advantages such as: new subject, providing endocervical culture from the viewpoint of gonorrhea and chlamydia and using Amsel

criteria for diagnosis of vaginosis infection and urine culture for diagnosis of UTI, and selection bias was one of its limitations. ⁽⁷⁾ Microorganisms associated with sexually transmitted disease were found in a large percentage of cultures, indicating the need for studies to clarify their role in the etiology of UTI. ⁽¹²⁾

In 2002, Hillebrand et al in a cross sectional research examined 503 pregnant women from the viewpoint of UTI and BV, and it was reported that 13.6 percent of 140 women suffering from BV also had UTI, whereas only 6.6 percent of 363 women without vaginosis had UTI and researchers concluded that BV in pregnancy increases the risk of UTI (OR =2.21) ⁽⁹⁾.

Reid and Burton (2002) concluded that lactobacillus with these probable mechanisms reduces the infection of vagina and urinary tract : Antiadherent factors, lateral products such as hydrogen peroxide, Bacteriocine (which is fatal for pathogenic microbes) and perhaps regulating immunity system or signaling effect . ⁽⁸⁾

GR-1, B-54, RC -14 strains reduce the risk of UTI and maintain normal flora, and their entrance to the intestine makes vaginal flora healthier. These germs prevent the growth of intestinal and urogenital pathogens. Even GG lactobacillus prevents and treats bacterial viral gastroenteritis. Therefore researchers indicate that these Bacilli are natural treatment without complications of pharmacological drugs and recommend that patients with resistant UTI and also pregnant women use this bacillus. ⁽⁸⁾

Factors causing colonization of gram negative Bacillus around urethra are unknown, but it seems that urethral massage during sexual activity has a facilitating role. Furthermore it seems that proximity of urethra to the anus, shortness of urethra, its location under labias, warm and moist environment of perineum has an important role in this field. Changing normal vaginal flora by using antibiotics, other genital infections, type of contraception (diaphragm or spermicide agents) also increase the risk of colonization of coliforms. It must be mentioned that the pathogenicity of microbial germ, inoculum's size, the host's general and local defensive mechanisms and perhaps genetics are noticeable subjects in

this field. Considering the above statements, urination after intercourse is essential for reducing the risk of UTI. Regarding statistics about patients with B.V which also have candidal or trichomonal infection, this synchronism is very important. ⁽⁵⁾

Franklin and colleagues, in considering wet mount of pregnant women in their pregnancy period, found that in 35 to 38 percent of women with trichomonas infection there is a sexually transmitted disease, or undiagnosed urinary infection, and it is common that pregnant women with trichomoniasis, also have BV. ⁽¹¹⁾

This study, which seems to be a new subject in Persian research, has capabilities and also limitations. Matching control and case group from the viewpoint of confounding factors, using reliable criteria for diagnosis of UTI and BV, facility of performance and inexpensiveness of the study are its capabilities.

Considering prevalence of urogenital infections and its preventable and curable course proving probable synchronism between these infections is valuable.

So recommending to evaluate patients with UTI from the viewpoint of BV and vice versa is logical such as other case-control researches, there is possibility of bias.

There is possibility of selection bias, because of selection from hospital patients and also there is possibility of recall bias, because of trusting patients responses. On the other hand because we didnot screen patients from the viewpoint of gonorrhea and chlamydia or interference of other microbes except gardnella vaginalis the effects of these factors may be ignored.

Finally, it is recommended to schedule future studies for the diagnosis and treatment of BV in prevention of UTI. Special attention to pregnancy is also mandatory. Preventing UTI in women suffering from bacterial vaginosis and vice versa seems cost – effective, and it can reduce the risk of later complications; therefore we recommend screening the patients for bacterial vaginosis. Reducing health problems of women is an effective step toward security, protection and promotion of the health of society.

Table 1. Distribution of samples on the basis of clinical symptoms in the state of urinary tract infection

1- UTI ¹ Clinical symptoms	No N =67(%)	Yes N = 67(%)	Result
Dysurea	(29.8) 20	(47.7) 32	P < 0.05
Frequency	(32.8) 22	(35.8) 24	N.S
Urgency	(17.9) 12	(22.3) 15	N.S
Pressure feeling	(23.8) 16	(14.9) 10	N.S
Itching	(32.8) 22	(37.3) 25	N.S
Burning	(14.9) 10	(29.8) 20	P < 0.05
Vaginal discharge	(65.6) 44	(59.7) 40	N.S
Bad odor Of discharge	(22.3) 15	(28) 19	N.S

Urinary Tracy Infection

Table 2. Distribution of samples on the basis of clinical signs in the state of urinary tract infection

1- UTI ¹ Clinical signs	No N = 67(%)	YES N=67(%)
Cervical redness	(34.3)23	(22.3)15
Vaginal discharge	(74.6) 50	(83.5)56
Bad odor	(49.2) 33	(44.7)30
Cervical erosion	(19.4) 13	(13.4) 9
Cervical tenderness	(7.4) 5	(4.4)3

Urinary Tract Infection

Table 3. Distribution of abundance of B.V in the case group and control group

UTI ¹ Bacterial Vaginosis	No(%)	Yes(%)
No	(59.7) 40	(37 .3) 25
Yes	(40.3) 27	(62.7) 42
Total	67	67

1- Urinary Tract Infection

Table 4. Abundance of criterion of bacterial vaginosis

Criterion B .V ¹	Specific Discharge Of B.V(%)	P H more Than 4.5 (%)	Positive Whiff (%)	Clue Cell(%)
NO N= 65	(41.5) 27	(46 .1) 30	(27 . 6) 18	(18.4) 12

YES (91.3) 63 * (91.3) 63 * (73.9) 51 * (72.4) 50
N = 69

1- Bacterial Vaginosis

* p<

Abstract

Background: Due to prevalence of urogenital infection and lack of knowledge about the relationship between bacterial vaginosis¹ and urinary tract infection¹ in this country, this study was conducted in patients referred to Shohada Hospital during the years 2001-2002.

Materials & Methods: This case - control study was carried out on 134 candidates. Patients were labeled as having urinary tract infection when urinary culture was positive. Normal individuals with either negative culture, matched with our cases, have compromised the control group. Matching was designed for age, frequency of coitus, marriage years, and contraception. Bacterial vaginosis based on standard Amsel criteria was determined in both groups. The results were analyzed using t-test and x-test. The odds ratio and confidence intervals were calculated.

Results: 67 patients with urinary tract infection were compared with 67 normal individuals. Bacterial vaginosis was reported 40.3% and 62.7 % in the control and case group (p< 0.01, OR = 2.49). Characteristic discharge, PH over 4.5 was reported in 91%, positive whiff in 74%, clue cell in 72% of patients with bacterial vaginosis.

Conclusion: Individuals with urinary tract infection encountered bacterial vaginosis more than control group. Experimental studies seem to be useful to evaluate effectiveness of vaginitis treatment in prophylaxis of urinary tract infection and also Further attention to pregnant woman.

Key Words: Bacterial vaginosis, Urinary tract infection, Clue cell.

Maryam Afrakhteh , MD and et al

References:

1. Harrison TR, Braunwald E , Fanci AS, Kasper DL ,et al. Harrison's principles of internal medicine. 15th ed, New York: McGraw-Hill;2001:1620.
2. Mandell GL, Bennettes JE, Dolin R. Practice of infectious diseases.5th ed, Philadelphia: Churchill Livingstone;2000:780.
3. Johnson JR , Stamm WE . Diagnosis and treatment of acute urinary tract infections . Infect Dis Clin North Am . 1987 Dec;1(4):773-91. Review.
4. Stamey TA . The role of introital enterobacteria in recurrent urinary infections.
5. J Urol . 1973 Mar; 109(3):467-27.
6. Kunin CM, Polyak F, Postel E.Periurethral bacterial flora in women. Prolonged intermittent colonization with Escherichia coli. JAMA 1980 Jun 11;243(2):134-39.
7. Hooton Tm , Fihn SD, Johnson C, Roberts PL, Stamm WE.
8. Association between bacterial vaginosis and acute cystitis in women using diaphragms.Arch Intern Med 1989 Sep;149(9):1932-6.
9. Harmanli OH, Cheng GY, Nyirjesy P, Chatwani A, Gaughan JP.Urinary tract infections in women with bacterial vaginosis.Obstet Gynecol. 2002 May;95(5):710-12.
10. Reid G, Burton J.Use of Lactobacillus to prevent infection by pathogenic bacteria.Microbes Infect 2002 Mar;4(3):319-24.
11. Hillebrand L, Harmanli OH, Whiteman V, Khandelwal M.Urinary tract infections in pregnant women with bacterial vaginosis.Am J Obstet Gynecol 2002 May;186 (5):916-7.
12. Amsel R, Totten PA, Spiegel CA, Chen KC, Eschenbach D, Holmes KK.Nonspecific vaginitis , Diagnostic criteria and microbial and epidemiologic associations.Am J Med. 1983 Jan;74(1):14-22.
13. Franklin TL , Monif GR.Trichomonas Vaginalis and bacterial vaginosis. Coexistence in vaginal wet mount preparations from pregnant women. J Reprod Med 2000 Feb;45(2):131-4.

14. Gonzalez-Pedraza A, Ortiz C, Mota R, Davila R, Dickinson E.[Role of bacteria associated with sexually transmitted infections in the etiology of lower urinary tract infection in primary care].*Enferm Infecc Microbiol Clin*. 2003 Feb;21(2):89-92. Spanish..
15. Donders GG. Lower Genital Tract Infections in Diabetic Women.*Curr Infect Dis Rep*. 2002 Dec;4(6):536-39.
16. Saling E, Schreiber M.[The lactobacilli-protection system of pregnant women--efficient prevention of premature births by early detection of disturbances].*Z Geburtshilfe Neonatol*. 2005 Aug;209(4):128-34. German
17. Alnaif B, Drutz HP. Bacterial vaginosis increases in pessary users. *Int Urogynecol J Pelvic Floor Dysfunct*. 2000;11(4):219-22.
18. Winberg J, Herthelius-Elman M, Mollby R, Nord CE. Pathogenesis of urinary tract infection--experimental studies of vaginal resistance to colonization. *Pediatr Nephrol*. 1993 Oct;7(5):509-14.



