

ORIGINAL ARTICLE

Megrrment the Level of SDF1-A in the Serum of Patients with Urinary Tract Infection and Patients with Vaginal InfectionAHMED ABBAS ALI¹, HAYDER HAMZAH IBRAHIM²¹*Al Furat Al-Awsat Technical University, College of Health and Medical Techniques, Iraq*²*Technical Institute Babil, Al Furat AL-Awsat Technical University, Iraq*

Correspondence to: Ahmed Abbas Ali

ABSTRACT

Urinary tract infection, Bacterial vaginosis as one of the global threats affecting millions of women and causing some time deaths around the world.

Objective: This study aims to assess levels of SDF1 and IgA in patients with Urinary tract infection, Bacterial vaginosis, and people enjoying good health as a control group.

Methods: Collecting medical information from (180) participants in the Imam Al-Sadiq General Teaching Hospital in Iraq- Babylon, the Gynecology Consultant, according to specific criteria, the subjects were divided into three groups: the control group, the patients (UTI, BV), while the demographic study included age, education, Jobs, and living Laboratory results, signs and symptoms, SDF1- α and IgA levels were assessed by the enzyme-linked immunosorbent assay (ELISA) technique.

Results: The results revealed that there were significant variations in SDF1 and IgA between the UTI group, BV group, and control groups. SDF1 level with the UTI group was (1.206522 \pm 0.0927277 pg/ml) and for patients with BV was (1.213735 \pm 0.0661389 pg/ml) whereas the control group appear was (1.130013 \pm 0.0496400 pg/ml), IgA level in the UTI patients was (64.252983 \pm 7.5946759 pg/ml) and patients with BV was (60.441928 \pm 6.1457661 pg/ml) whereas the control group appears was (48.011745 \pm 4.7938613 pg/ml)

Conclusion: They can be considered good indicators to give knowledge about the diagnosis of urinary tract infection and bacterial vaginosis, and help doctors to give appropriate medications.

Keywords: Urinary tract infection, bacterial vaginosis, stromal cell-derived factor 1-alpha, Immunoglobulin A.

INTRODUCTION

Urinary tract infections (UTIs) are bacterial infections of the urinary tract and can involve both the lower (cystitis) and upper (pyelonephritis). UTI occurs in females of any age, with the highest prevalence in pregnant and postmenopausal patients. (1), (2).

Women experience lower UTIs (Urethral, Bladder infection) much more frequently than men do. The main reason for this is anatomical variations. In most cases, UTIs begin with per urethral contamination by a uropathogenic living in the gut, followed by urethral colonization and, lastly, pathogen migration to the bladder or kidney. When effective host defense mechanisms are defeated by bacterial virulence mechanisms, infections develop. When uropathogenic organisms climb to the kidneys via the ureters, upper UTIs (Kidney infections) result. (3), (4), (5).

Gram -ve and Gram +ve bacteria, as well as some fungi, are responsible for UTIs. Uropathogenic E. coli is the most frequent cause of UTIs. (6).

UTIs are classified based on (Level of Complicated, Site and Type of Infection, Symptoms of UTI) and the nature of the occurrence. (7), (8), (9).

The most common trigger of unusual vaginal fluid in women of sexually active age is (BV) and the most common cause of vaginal infection in pregnant and non-pregnant women. It is differentiated by a shortage in the number of lactobacilli which generate hydrogen peroxide and an increase in the pH level of the vagina. (10), (11), (12), (13), (14), (15).

SDF-1 is a chemokine protein that would be present in a range of organs and cell types. It's also encoded by the CXCL12 gene, which is found on human chromosome 10q11.1. TNF-induced pro-inflammatory stimuli further influence immune cell activation, migration, and regulation. (16), (17).

UTI and vaginal infection trigger an exciting protective immunity that is in charge of bacterial clearance that is quick and efficient. epithelial cells secretion of the chemokine stromal cell-derived factor 1, triggering the migration and accumulation of immune cells at the site of infection (18), (19), (20), (21), (22).

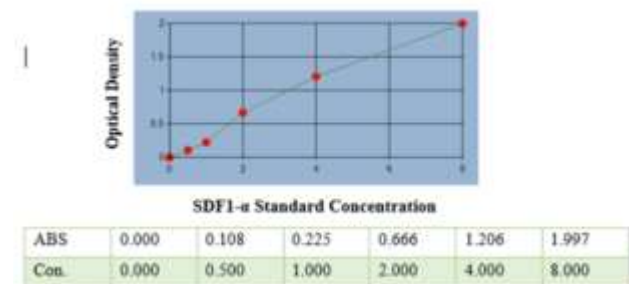
Immunoglobulin A (IgA) is an antibody which is generated by your immune system and is generated in greater quantities in conjunction with mucosal membranes than all other types of antibodies put together (70%). The most prevalent immunoglobulin in the blood and mucous secretions of the genitourinary tract is

IgA. Performs important functions in immune defense against bodily secretion-based microbial invasion., (23).

MATERIAL AND METHODS

Study Design: A group comparison study design was used, started in September 2022 with 180 participants divided into 3 groups (60 women with UTI and 60 women with BV) and 60 women healthy participants from the Imam Al-Sadiq General Teaching Hospital/ Gynecology Consultant/Babylon /Iraq, the three groups' demographic research criteria were taken (age (15-50 years), education, job, living, and laboratory tests).

Control and Patients: Patients with urinary tract infection and bacterial vaginosis were identified by a specialist in gynecology, according to the patient's signs and symptoms according to the laboratory tests evaluated. The Control group of women who participated in this study matched with patients in age, education, job, living, and laboratory tests, all women in the control groups were checked for signs and symptoms and laboratory tests and were within the normal range and apparently healthy. The medical information was gathered in Imam Al-Sadiq General Teaching Hospital/ Gynecology Consultant/Babylon /Iraq.

Figure1: Standard Curve for SDF1- α

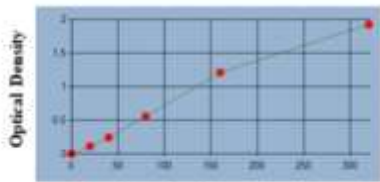
Samples Collection and ELISA Assay: Blood collection from the vein of approximately (5ml) was obtained from patients and control, let clotting for 15 minutes and centrifugation at (3000xg) for 10 minutes to obtain serum stored at -20^o C. Determination of Human Stromal Cell Derived Factor 1 α and Immunoglobulin A (IgA) Levels by ELISA kit supplied from Melsin Medical Co. applied to

the in vitro quantitative determination of Human Stromal Cell Derived Factor 1 α , IgA concentrations in serum. This ELISA kit used the Sandwich - ELISA principle at 450 nm.

The standard curve for human stromal cell-derived factor 1 α and Immunoglobulin A were obtained using the ELISA technique (Figures 1, 2).

$$Y=A[i]*x+B[i], \text{ correlation coefficient}(R^2) =0.999$$

$$Y=A[i]*x+B[i], \text{ correlation coefficient}(R2) =0.998$$



	0.000	0.115	0.243	0.557	1.211	1.923
ABS	0.000	0.115	0.243	0.557	1.211	1.923
Con.	0.000	20.000	40.000	80.000	160.000	320.000

Figure 2: Standard Curve for IgA

Statistical Analysis: All statistical analyses were performed using software package version 28 (SPSS) data were presented as (mean + standard deviation) with 95% confidence intervals.

RESULTS AND DISCUSSIONS:

The medical information (Table 3-1) was collected for the patients and control including:

N=60 each group		UTI		Vaginal		Control		Sig.
Mean± Std.		30.433±9.59		30.283±9.26		34.100±10.50		*P.value
		Freq.	Per%	Freq.	Per%	Freq.	Per%	
Age groups	15-25 Y	21	35.0	20	33.3	19	31.7	0.08
	26-36 Y	21	35.0	23	38.3	15	25.0	
	37-47Y	14	23.3	16	26.7	16	26.7	
	48-58 Y	4	6.7	1	1.7	10	16.7	
Education levels	Elementary	8	13.3	11	18.3	9	15.0	*0.001
	Intermediate	14	23.3	14	23.3	19	31.7	
	Academic	11	18.3	13	21.7	13	21.7	
	Institute	9	15.0	6	10.0	7	11.7	
	College	18	30.0	8	13.3	10	16.7	
	Master/PhD	0	0	8	13.3	2	3.3	
Job	Employee	20	33.3	15	25.0	25	41.7	*0.042
	Student	22	36.7	20	33.3	14	23.3	
	Housewife	18	30.0	25	41.7	21	35.0	
Living	Urban	29	48.3	30	50.0	37	61.7	*0.001
	Rural	31	51.7	30	50.0	23	38.3	

*P.value ≤ 0.05) was significant

The distribution of patients according to 10 years' intervals was shown in table (3-1). It was obvious that the majority of UTI patients were in the age groups (15-25-26-36) years accounting for (35.0% for 15-25 years and,35.0% for 26-36 years). The majority of BV patients were in the age group (26-36) years accounting for (38.3%) in control subjects the highest rate with (15-25) years, this may be attributable to the fact that the age of onset of UTI, BV usually in young women, caused by frequent or recent sexual intercourse (increased sexual activity) is a major risk factor,(24) For UTI and (25),(26),(27) For BV.

According to the educational levels, for the UTI group, most of them had a college level (30%), for the BV group, most of them had an intermediate level (23.3%), and for the control group, most of them had intermediate level (31.7%),(28).

For the jobs, for the UTI group, most of them were students (36.7%), BV group most of them were housewives 41.7%, and 56.7% respectively. Finally, 41% of the control were employees (29).

For the living area, 51.7% of the UTI group was living in a rural area, 50% of the BV group was living in an urban area and the other half was in a rural area. 58.3% and control were living in urban areas respectively.

Table (3-2) SDF1 Alfa comparison among study groups

Groups	No.	Mean	Std. Deviation	Std. Error	Lower Bound	Upper Bound	*P.value
UTI	60	1.206522	.0927277	.0119711	1.182568	1.230476	0.001
BV	60	1.213735	.0661389	.0085385	1.196650	1.230820	
Control	60	1.130013	.0496400	.0064085	1.1117190	1.142837	

*P.value ≤ 0.05) was significant

results showed that the concentrations of SDF-1 α in healthy controls as well as in patients with UTI (1.206522 ±.0927277 pg/ml) and patients with BV (1.213735 ±.0661389 pg/ml) were significantly greater (P.value = 0.001) than that of normal controls (1.130013±.0496400 pg/ml).

SDF-1 α is one of the chemokines responsible for attracting and accumulating T lymphocytes (30),(31), monocytes as well as responsible for the activation, adhesion, and migration of neutrophil leukocytes to inflammatory sites (21) , (22). Elevated production of SDF-1 has been shown to be associated with some of infectious and inflammatory diseases (32),(33) ,(34). (16) that says SDF-1 is secreted shortly after infection of UTI and most significantly elevated during infection of UTI also elevated in the Reproductive system .

Table (3-3) IgA comparison among study groups

Groups	No.	Mean	Std. Deviation	Std. Error	Lower Bound	Upper Bound	*P.value
UTI	60	64.252983	7.5946759	9804884	62.291071	66.214896	0.001
BV	60	60.441928	6.1457661	7934150	58.864309	62.029548	
Control	60	48.011745	4.7938613	6188848	46.773369	49.250131	

*P.value ≤ 0.05) was significant

The study's findings of women with UTI have the elevation of IgA (64.252983 ± 7.5946759pg/ml) and patients with BV (60.441928±6.1457661pg/ml) compared with those in normal controls (48.011745 ±4.7938613 pg/ml), according to the statistical test, the comparison among means reveals that there is highly statistically significant difference between them (0.001).

Immunoglobulin A (IgA) is the most abundant type of antibody 70% in the body compared with other types of immunoglobulin, it serves to protect the mucosal tissues from microbial invasion by preventing bacterial adherence to per urethral epithelia and uroepithelia linings of the genitourinary tracts (23) .

Conclusion

SDF1-Alpha and IgA were used as diagnostic tools to reveal the Urinary tract infection and Bacterial vaginosis. Elevated levels of SDF1 and IgA act to protect the mucosal tissues from microbial invasion by preventing bacterial adherence to per urethral epithelia and uroepithelia linings of the genitourinary tracts and attracting and accumulating, activation, adhesion, and migration of immune cells to infection/inflammatory sites.

Recommendation: Compare between the gene of stromal cell-derived factor 1 alpha in women with UTI and women with BV by polymerase chain reaction.

Ethical Approval: The study was carried out after obtaining the approvals of the patient and the Iraqi Ministry of Health.

Study Conflict: there are no studies conflicts.

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