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“Effect of urinary tract infections with *Klebsiella pneumoniae* on some immunological variables for patients admitted to Ramadi General Hospital”

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Abstract:

Background Urinary tract infections in women are more common, as the urethra or urethra is short, which makes the distance for bacteria to reach the bladder shorter, and urinary tract infections are transmitted to women when they have sex with a man who has a urinary tract infection, and not often vice versa. It is also worth noting that With age, UTIs in men become more common. Methodology Five mL of blood was withdrawn from the brachial vein by medical syringes and then divided into two parts. Then, 1 ml was placed in single-use test tubes containing 2-EDTA and kept in the refrigerator until the total and differential count of white blood cells were tested. The second section was for chemical and immunological tests. In sterile plain plastic tubes free of EDTA, the samples were transferred to the laboratory, the tubes were left for blood clotting, and the blood-containing tubes were placed in a centrifuge for 10 minutes at a speed of 3,000 rpm. The blood was separated by a series of blood serums using a sterile Pasteur pipette. Then distribute the serum into small test tubes of equal volumes (120 l). Several immunological tests were carried out, including Interlukin 1 and 2. Result effect of infection with urinary tract infections by Klebsiella bacteria on the concentration of IgM and IgG antibodies, where an increase in the concentration of IgM antibodies was observed in men more than its concentration in women where it reached a concentration of 13.1 compared to its concentration in infected women Urinary tract infections reached 12.9 compared to 1.5 in control, and we did not notice an increase in IgG antibody concentrations in either infected or control women or men. The decrease in the level of globulin IgG and IgM in patients with renal failure.

Keywords: Urinary tract infections, klebsiella pneumonia.

Introductions

The causes of chronic renal failure are multiple, including acute glomerulonephritis, obstruction (urinary tract, hypertension), excessive use of some medications, and diabetes. The occurrence of pathological infections associated with disorders in the immune system, such as the total and differential number of white blood cells ^(1,2) Bacterial and viral infections account for 7%, polycystic nephropathy 3%, urinary tract obstruction 2%, and other unknown intervening causes (14%). ^(3,4) Clinical symptoms of kidney failure begin to appear in all organs of the body because the kidney disorder has a general and comprehensive effect on the rest of the body's organs⁽⁵⁾ Symptoms include fatigue, mental and physical exhaustion, lack of appetite, itching, and weakness⁽⁶⁾ Sexual urination, especially at night, peripheral neuritis, pallor of the skin, vomiting, nausea, heart failure, convulsions, and coma, osteomalacia, decreased urine output, swelling of the legs and ankles, and fluid retention caused by kidney failure, all of which indicate uremia, the clinical syndrome associated with kidney function deterioration due to renal failure and defined as a toxic condition represented by the presence of urine components in the blood ^(8,9) in addition to other symptoms such as vitamin D deficiency, anemia, and hypertension) in the blood ^(10,11) One of the most important complications of chronic renal failure is anemia. Its severity is proportional to the duration of the disease and the duration of dialysis treatment, and it varies according to age and gender⁽¹³⁾ Others include a deficiency in the hormone erythropoietin, which is responsible for stimulating the bone marrow to produce red blood cells (RBCs), malnutrition, blood urea

poisoning, and the occurrence of hematuria due to the high level of urea and creatinine in the blood resulting from the failure of the kidneys to secrete them. ^(14,15)

Methodology:

Urine collection

Urine samples were collected in sterile glass bottles and based on mid-stream urine. These samples were cultured on MacConkey agar media, Mannitol-salt agar and blood agar, and the occlusion was incubated at 37°C for 24 hours for the purpose of diagnosis. Bacteria growing on the media.

Identification of microorganism

Cultural characteristics

Blood agar, MaconKey agar, and manitol salt agar were used to examine colony morphologies, culture properties, and growth or lack thereof on the various medium.

Morphological characteristics

The phenotypic characteristics are studied through the work of Gram stain from different culture media, and the shape and size of colonies, color .

Collecting of blood

Five mL of blood was withdrawn from the brachial vein by medical syringes and then divided into two parts. Then, 1 ml was placed in single-use test tubes containing 2-EDTA and kept in the refrigerator until the total and differential count of white blood cells were tested. The second section was for chemical and immunological tests. In sterile plain plastic tubes free of EDTA, the samples were transferred to the laboratory, the tubes were left for blood clotting, and the blood-containing tubes were placed in a centrifuge for 10 minutes at a speed of 3,000 rpm. The blood was separated by a series of blood serums using a sterile Pasteur pipette. Then distribute the serum into small test tubes of equal volumes (120 l). Several immunological tests were carried out, including Interlukin 1 and 2.

Result and discussion

Table 1 Effect of urinary tract infections by *klebsiella pneumonia* on the concentration of antibodies in both men and women

	gender	case of patient	Mean	Std. Deviation
IgM concentration	male	patient	13.1000	1.52388
		control	1.5900	1.18645
		Total	7.3450	6.05227
	female	patient	12.9000	1.19722
		control	1.1510	.82206
		Total	7.0255	6.10943
	Total	patient	13.0000	1.33771
		control	1.3705	1.01863
		Total	7.1853	6.00463
IgG concentration	male	patient	8.0900	2.10631
		control	2.3900	2.52870

	Total	5.2400	3.69871
female	patient	8.9000	1.79196
	control	5.3000	9.19227
	Total	7.1000	6.70499

Table 1 shows the effect of infection with urinary tract infections by *Klebsiella* bacteria on the concentration of IgM and IgG antibodies, where an increase in the concentration of IgM antibodies was observed in men more than its concentration in women where it reached a concentration of 13.1 compared to its concentration in infected women Urinary tract infections reached 12.9 compared to 1.5 in control, and we did not notice an increase in IgG antibody concentrations in either infected or control women or men. The decrease in the level of globulin IgG and IgM in patients with renal failure. The decrease in the level of immune globulin concentration in patients with chronic renal failure may be attributed to several reasons, including the accumulated uremic toxin, which inhibits the synthesis of immune globulins in patients with chronic renal failure, as well as a decrease in the numbers of B-cells, which are the basis for the synthesis of globulins. As an immune response against different antigens, and that taking some types of antibiotics and some types of steroids contributes to a decrease in globulin concentrations in the serum of patients with chronic renal failure by inhibiting its re-synthesis The concentration of IgM globulin was slightly lower in the presence of bacteria due to the fact that IgM is the first immunoglobulin produced in response to infection and that the severe bacterial infections suffered by kidney patients led to a decrease, so the decrease of IgM confirms its importance in the defense of the host because IgM contains 10 sites for antigen incorporation

Table 2 ANOVA table of urinary tract infections by *klebsiella pneumonia* on the concentration of antibodies in both men and women

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	IgM concentration	1353.616 ^a	3	451.205	309.097	.000
	IgG concentration	261.846 ^b	3	87.282	3.543	.024
Intercept	IgM concentration	2065.113	1	2065.113	1414.701	.000
	IgG concentration	1522.756	1	1522.756	61.813	.000
gender	IgM concentration	1.021	1	1.021	.699	.409
	IgG concentration	34.596	1	34.596	1.404	.244
case	IgM concentration	1352.453	1	1352.453	926.495	.000
	IgG concentration	216.225	1	216.225	8.777	.005
gender * case	IgM concentration	.143	1	.143	.098	.756
	IgG concentration	11.025	1	11.025	.448	.508
		1148.704	39			

a. R Squared = .963 (Adjusted R Squared = .960)

b. R Squared = .228 (Adjusted R Squared = .164)

Table 2 Analysis of variance of the effect of infection with *Klebsiella* bacteria that causes urinary tract infections on the concentrations of antibodies in men and women compared to the control, where it was noted that there were no significant differences between the concentrations of IgM and IgG antibodies depending on gender, meaning that there were no significant differences between Infected women and men with urinary tract infections, and it was also noted that there is a significant difference between the infected and the control, and there is no significant difference for the interaction of sex with the pathological condition As shown in Figure 1 and 2 . The presence

of "inactive" natural IgM antibodies in the blood of normal individuals provides a primary defense against infection and promotes healing of infected cells. Thus, a decrease in IgM in glomeruli indicates cellular damage and may warn that this damage exceeds the ability to repair.

Through IgG antibodies, it is possible to know if the infection was previous, so the antibody of the type IgG increases, and as for the IgM antibodies, it indicates the recent infection, so the antibody of the type IgM increases.

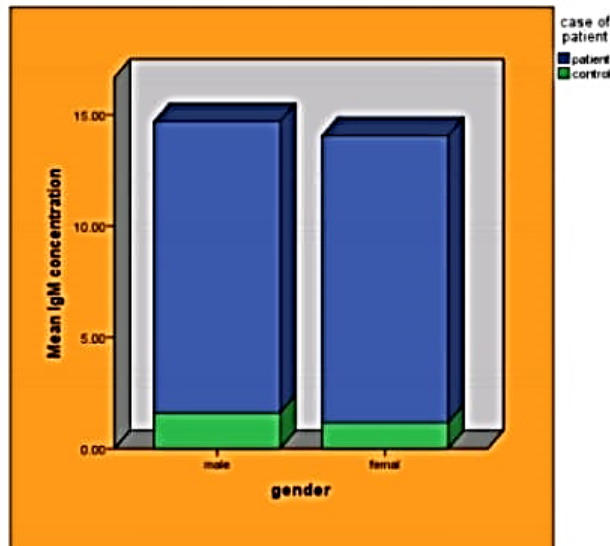


Figure 1effect of urinary tract infections by *klebsiella pneumonia* on the concentration of IgM antibodies in both men and women

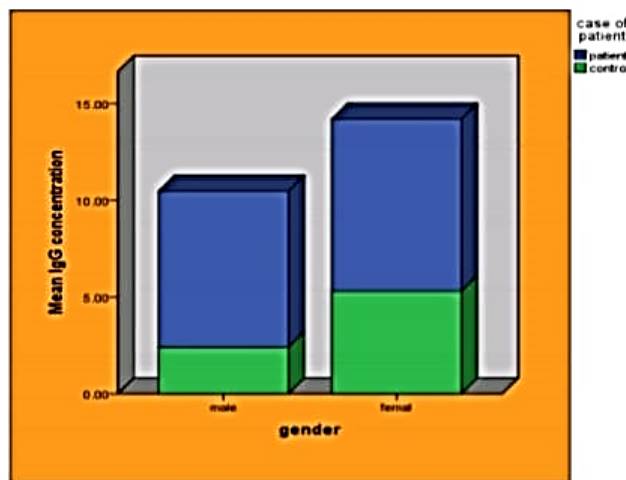


Figure 2effect of urinary tract infections by *klebsiella pneumonia* on the concentration of IgG antibodies in both men and women

Table 3 effect of urinary tract infections by *klebsiella pneumonia* on the concentration interleukin 1 and 2 in both men and women

	gender	case of patient	Mean	Std. Deviation
interleukin 1 concentration pg/ml	male	patient	10.40	1.897
		control	3.20	.789
		Total	6.80	3.955
	female	patient	12.40	1.265
		control	5.60	1.506
		Total	9.00	3.742
	Total	patient	11.40	1.875
		control	4.40	1.698
		Total	7.90	3.960
interleukin 2 concentration pg/ml	male	patient	62.70	10.436
		control	17.60	5.190
		Total	40.15	24.487
	female	patient	62.70	14.712
		control	62.80	5.391
		Total	62.75	10.784

Table 3 shows the effect of infection with *Klebsiella* bacteria that causes urinary tract infections on the concentration of interleukin 1 and 2 in both sexes, where there was an increase in the concentration of interleukin 1 and 2 in women with urinary tract infections, where the concentration reached 12 and 62 respectively compared to its concentration in infected men also, where its concentration reached 10 and 60, respectively, compared to the control, which was 3 and 17, respectively Immunodeficiency in patients with renal failure is accompanied by changes in immunity that depends on antibodies, and as a result of these changes, the proportion of immune stimuli such as interleukin and NB increases in patients with renal failure, due to increased secretion and less excretion from the kidneys, thus giving a reflection of the deficiency in the immune functions of T lymphocytes, which leads Decreased production of antibodies. The reason for the high concentration of this interleukin is that it belongs to the IL-1 group, as the pre-inflammatory kinetics (Pro-inflammatory cytokine) increase rates during immunopathies and infections of different types of bacteria, as bacterial infections stimulate macrophage cells to release inflammatory mediators such as IL- 1, IL-12, TNF- and L33, These inflammatory

mediators are essential stimuli for the inflammatory response and for various local infections in the body, which leads to their increase in the blood, the numbers of white blood cells increase, and neutrophils are attracted to the affected area to kill germs

Table 4 ANOVA table of effect of urinary tract infections by *klebsiella pneumonia* on the concentration interleukin 1 and 2 in both men and women

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	interleukin 1 concentration pg/ml	538.800 ^a	3	179.600	88.813	.000
	interleukin 2 con.	15277.700 ^b	3	5092.567	53.415	.000
Intercept	interleukin 1 con. pg/ml	2496.400	1	2496.400	1234.484	.000
	interleukin 2 con.	105884.100	1	105884.100	1110.608	.000
gender	interleukin 1 concentration pg/ml	48.400	1	48.400	23.934	.000
	interleukin 2 con.	5107.600	1	5107.600	53.573	.000
case	interleukin 1 concentration pg/ml	490.000	1	490.000	242.308	.000
	interleukin 2 con.	5062.500	1	5062.500	53.100	.000
gender * case	interleukin 1 concentration pg/ml	.400	1	.400	.198	.659
	interleukin 2 con.	5107.600	1	5107.600	53.573	.000

a. R Squared = .881 (Adjusted R Squared = .871)

b. R Squared = .817 (Adjusted R Squared = .801)

Table 4 Analysis of variance for the effect of infection with urinary tract infections with *Klebsiella* bacteria on the concentrations of interleukin 1 and 2 in both sexes, where there were significant differences in terms of the concentration of interleukin between infected women and men with urinary tract infections, which means that there is a significant significant difference between women and men in terms of the concentration of interleukin 1 and 2, and there is also There is a significant difference between healthy and injured for both sexes, and there is no significant difference for the treatment of the interaction between sex and disease state As shown in Figure 3 and 4. Presence of Gram-negative bacteria possessing LPS protein that greatly stimulates the release of inflammatory cytokines that promote kidney disease. Inhibition of these

inflammatory cytokines can alleviate kidney tissue injury and thus inhibition of these cytokines helps early anti-inflammatory treatment to improve kidney function. Nitric Oxide compound It has the ability to get rid of staphylococcus bacteria, many cellular kinetics such as IL-1, INF-y have the ability to activate nitric oxide, which in turn acts as phagocytes that work to kill bacteria, and interleukin is produced mainly by T and B lymphocytes and immune cells Such as dendritic cells, macrophage cells, mononuclear cells, natural killer cells, and epithelial cells

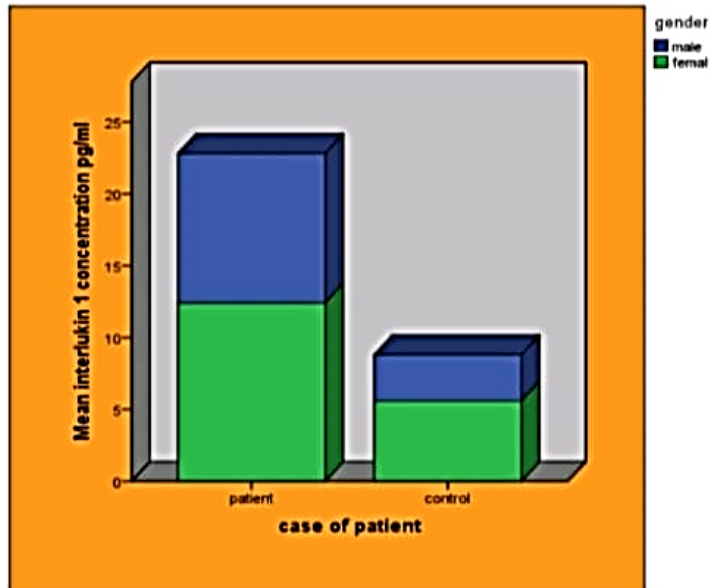


Figure 3 effect of urinary tract infections by *klebsiella pneumonia* on the concentration interleukin 1 in both men and women

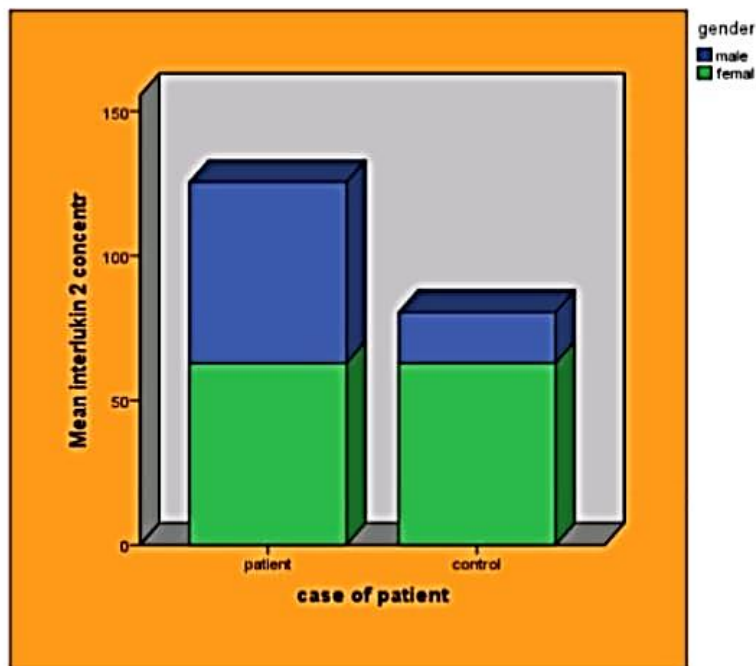


Figure 4 effect of urinary tract infections by *klebsiella pneumonia* on the concentration interleukin 2 in both men and women

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