



Investigation of Immunological Parameters IL-27 and IL-35 and Electrolyte Sodium, Potassium and Calcium in The Sera of Rheumatoid Arthritis females.



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Abstract

Rheumatoid arthritis is a chronic inflammatory illness that impacts the body joints. This causes in harmful joints, stiffness and swelling in the body joints. RA generally offence the joints of the body, commonly a lot of joints at once. RA usually impacts joints in the hand, wrist, and knee. In a joint infected with RA, the padding of the joint is going to be inflamed, makes a joint tissue harm and damage. This tissue harm can make a long-lasting or chronic pain, loss of balance, and misshapenness. The work designed to determinate the levels of anthropometric variables (age and BMI) immunological parameters (IL-27 and IL-35) and electrolyte (sodium, potassium and calcium) parameters in sera of rheumatoid arthritis female. The study contains 60 subjects who splitted in to two groups, the two groups is are healthy control group and rheumatoid arthritis patients group. There is non-significant ($p > 0.05$) difference among control and patients in age and BMI, A very high significant elevation ($P < 0.001$) has observed in the level of IL-27, IL-35 and sodium and a very high significant increase ($P < 0.001$) has observed in the level of calcium in RA females compared with control, from another way, there is no significant ($p > 0.05$) difference in the study of potassium and Uric acid between healthy control and RA patients. The net result shows that there is a related relationship between the inflammatory immunological parameters (IL-27 and IL-35) with the infection by RA, and shows a big role for immunity system of the body to fight this disease, and yet shows that this disease effect on the ratio of electrolyte (Ca and Na) in the body of patients

Keywords: RA, Rheumatoid arthritis, inflammatory disease , IL-27, IL35, electrolyte and chronic disease.

1. Introduction

Rheumatoid arthritis (RA) is an illness or disease characterized as a chronic inflammatory, mainly impacting the body joints and is correlated with significant scales of disability and decreased the quality of life(1), This makes lots of problems, like:

The capsules surrounding the body joints going to swollen, the body does very much synovial fluid (the special fluid which is assumed to cushion the body joints), rigid fibrous tissue builds up in the synovium zone (that is even assumed to help cushion the body joints)(2) .

actually, RA can break down a person's articular cartilage. In the normal situations , articular (have to handle with the body joints) cartilage coating the end of bones that they come altogether to make the body joints. This retains the bones from rubbing versus each other. If the articular cartilage has been demolished by RA, the bones will rub versus each

other, that is a very harmful thing(3), the real reason of RA is remain unknown , but some of the theories are which it have to do with environment, hormones, infection and genes. There is no steady medicine, but doctors have specified methods to help lowering and decrease the effect of the illness. Women getting RA two or three times more than men. utmost cases of RA happened with people between 25 and 55 years old(4) .

Interleukin 27 (IL-27) is a group of the IL-12 family of cytokines with proclaimed pro- and anti-inflammatory effect. It is a heterogeneous cytokine which is take shapes of two special genes. RA patients and examined the clinical significances of these variations. IL-27 is a key role of cellular agent which adjusts the differentiation of CD4+ T cells, that can execrate interleukin-10 and interleukin-17 *in vivo*(5).

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IL-35 is a comparatively new cytokine which protrudes as an substantial immunomodulatory. IL-35 belongs to IL-12 family of cytokine which contains IL-12, IL-23, IL-27, and IL-35. These cytokines are heterodimers that share subunits and their receptors even share subunits. Whereas IL-12 and IL-23 are obviously pro-inflammatory cytokines(6), the low of IL-35 is not really clear. All of studies which being done on mice indicate to the impact of IL-35 by support an anti-inflammatory job by promoting Tregs and Bregs, and inhibiting Th17. In RA and SLE(Systemic lupus erythematosus), more of the proof fingers in the way of a preservative immunosuppressive role for IL-35. A lot of future work is needed to scheme the role of IL-35 in lots of complex autoimmune rheumatic illnesses, like SSc (systemic sclerosis) and IIMs(inflammatory myopathies)(7).

Electrolytes are minerals and salts, like potassium, sodium, chloride and bicarbonate, that are being seen in the body blood. They can work as an electrical conductance impulses in the body. The electrolyte test is occasionally carried out through a routine physical exam, or it myth be utilized as a portion of a more comprehensive series of tests(8).

Sodium, that is an osmotically active cation, is the most remarkable electrolytes in the extra cellular fluid. It is accountable for preserving the extra cellular fluid dimension, and even for organization of the membrane potential of cells. Sodium is exchanged side by side with potassium across cell membranes as part of active transport(9).

Potassium is fundamentally an intracellular cation. The sodium-potassium adenosine triphosphates pump has the major accountability for adjusting the homeostasis between potassium and sodium, that pumps out sodium in exchange for potassium, that shifts into the cells. In the renal, the filtration of potassium happened at the glomerulus(10)

Calcium has a considerable physiological function in the body. It is implicated in skeletal mineralization, shrinkage of muscles, the transmission of blood clotting, nerve impulses, and excretion of hormones. The diet is the dominant root of calcium. It is commonly current in the extracellular fluid(11).

uric acid the final result of purine metabolism or oxidation in the human body. It is current in blood in a concentration of almost 5 mg/100 ml, This sedimentation of uric acid in the body joints is seen by the body's immune system as a strange existence. The immune system fights these sedimentations that cause inflammation in the body joints, causing the onset of arthritis(12).

2. Materials and Methods

2.1. Sample collection:

The current study involved 30 females patients with RA, whose ages ranged between (31-52) years. This study was carried out at the medical city Baghdad

Iraq, conducted during in the period from January 2022 to march 2022. After clinical examination by the consultant physicians and after approval from the patients. Blood samples were collected from the patients, the history of treatment and lifestyle has been taken into account. They were compared with 30 healthy controls of females with same ages of patients.

2.2. serum collection

the blood was drawn and left at room temperature for coagulation and for a time of 15 minutes, the serum was expelled at 5000 x g and the separated samples were frozen at -20 ° C for future biochemical analysis(13).

2.3. Biochemical parameters analyses:

Serum (calcium, potassium and uric acid) was determined according to colorimetric method, by using kits providing by (AGAPPE, India), and sodium was determined according to precipitation method by using kit providing by (spectrum, Egypt)(14) the IL-27 and IL-35 was determined by Enzyme Linked Immune-Sorbent Assay(ELISA) method, the ELISA kit providing by(Sun Long Biotech, China), bearing the number: SL0991Hu and SL1009Hu respectively(15)

2.4. Statistical analysis

Statistical analysis of the data has been accomplished by using SPSS statistics. The descriptive statistics for each parameter consisted of the mean and the standard deviation (SD). The T-test was utilized to match the chemical variables between patients and control groups at the level of probability ($P \leq 0.05$)(16).

3. Results

The results are studied in the way of mean \pm SD, and considered significant at $P \leq 0.05$. The age through the two sets and non-significant ($P > 0.05$), table 1: There is non-significant ($p > 0.05$) difference among control and patients with RA in age and BMI

Table 1. Age and BMI variables.

Parameters	Control (N=30) Mean \pm SD	Patients (N=30) Mean \pm SD	p-value
Age	42.30 \pm 11.00	44.36 \pm 9.08	0.43
BMI	29.19 \pm 4.62	29.90 \pm 4.27	0.53

* This sign means different significant at $P \geq 0.05$

** This sign means different significant at $P \leq 0.001$

Table 2: A very high significant rise ($P < 0.001$) has spotted in the level of IL-27, IL-35, sodium and calcium in RA females compared with control, from another way, there is no significant ($p > 0.05$) difference in the study of potassium and Uric acid between healthy control and RA patients.

Table 2: Parameters of the study.

Parameters	Control (N=30) Mean±SD	Patients (N=30) Mean±SD	p-value
IL-27	17.47±8.28	97.68±29.01	0.0001**
IL-35	30.16±15.63	273.72±154.53	0.0001**
K	5.06±0.56	4.91±0.70	0.3640
Na	148.48±13.80	167.37±8.14	0.0001**
Ca	9.04±0.49	10.18±0.55	0.0001**
UA	6.05±0.82	6.24±1.41	0.5306

* This sign means different significant at $P \geq 0.05$

** This sign means different significant at $P \leq 0.001$

4. Discussion

The result obtained from the previous study shows that there is a raise in the level of IL-27 and IL-35 and it is maybe clear that interleukins have a very important rule in the effective and regulation of RA. Because of the known anti-inflammatory effect of IL-35 and the double nature (pro-inflammatory and anti-inflammatory) effect of IL-27 it is believed that IL is works on helping the immune system to find and control the problems happened because the attack of the autoimmune disease RA on the joint of patients(17), farther more the hyper secretion of the two ILs is a necessary way to treat and lower the effect and symptoms of RA on the patients so that we found an elevated in the secretion of the two studied ILs in the patients as compared with healthy control. Study of serum electrolyte shows that Na is highly raised in the RA patients as matched with control Sodium levels associated with increasing an inflammation joints such as rheumatoid arthritis(18), salt

consumption can be harmful if excessive, due to high concentration of sodium correlated with early rheumatoid arthritis activity and it is an excellent performance of pro-inflammatory hormones(19). The interference by sodium with enzymes inside the cell caused largely increase of sodium in (RA) patients(20). Study of Ca shows that Ca is increased in the RA patients as compared with control, The results signalize that a fundamental part of RA patients is hyper calcaemic(21). Hypercalcemia is related with high activity of the disease and may participate to suppression of PTH excretion and vitamin D hormone synthesis(22). The study even showed that there is no effect of potassium and uric acid on the RA patients and this is clarify that the pain numbness and swelling

effects the joints is not correlated with other diseases like gout disease caused by Uric acid elevation.

5. Conclusion

the raise in the level of IL-27 and IL-35 declare the instinct role of interleukins and immune system in the regulation and severity of RA disease, the role of this parameter may be clear in the controlling and monitoring the progression of disease, increased of

serum Na is related with the activity between sodium and enzymes inside the cell caused largely increase of sodium, increased the Ca level is back to the less of activity to the bones in the absorption of Ca and the accumulation of Ca in blood to reproduce a hypercalcaemic in the RA patients.

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