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Estimation the relationship between IL-17 and some biochemical parameters in patients with rheumatoid arthritis

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Abstract---Little information is available on the relationship between IL-17 with VD, ESR, MDA and GSH levels for patients with Rheumatoid Arthritis. This study aimed to determine the levels of IL-17, VD, ESR, MDA and GSH, also to determine the relationship between IL -17 with VD, ESR, MDA and GSH. The sample of this study consists of 30 patients and 30 apparently healthy individuals. The results showed that the levels of IL-17, MDA and ESR marked increase in patients group in compare with controls group ($P \leq 0.05$). While levels of VD and GSH shows marked decrease in patients group in comparison with the controls group ($P \leq 0.05$). It was found positive relationship between IL-17 and levels of MDA and ESR. Also it was found negative correlation between IL-17 and levels of the VD and GSH.

Keywords---Rheumatoid arthritis, IL-17, Vitamin D, MDA, GSH.

Introduction

Rheumatoid arthritis (RA) is a chronic, systemic autoimmune disease characterized by arthrosynovitis as the main pathology (kim et al 2013) Persistent recurrence of arthrosynovitis may damage the intra-articular cartilage and bones, causing articular dysfunction and eventually resulting in joint deformities or even disabilities (Scott, 2013). The etiology and pathogenesis of RA remain unknown, it is generally considered an autoimmune pathology in which autoreactive T cells of pathogenic potential, such as Th1 and Th17 cells, are thought to play an important role Park (Park et al 2005; Afzali et al 2007). Th17 cells selectively produce the signature cytokines such as interleukin 17 (IL-17), IL-21 and IL-22, and have been demonstrated to play a critical role for the chronic inflammatory response and subsequent tissue damage in RA affected joints (Hemdan, et al 2010). Vitamin D is known to induce immunologic tolerance (Weiss, 2011). Thus, vitamin D deficiency may perturb immune tolerance and induce the development of autoimmune diseases, such as RA. Vitamin D has immunomodulatory properties, acting on the immune system both in an endocrine and in a paracrine manner (Hewison, 2012; Mora et al. 2008) Free radicals, causing tissue toxic oxidative stress, have been implicated in several human diseases such as inflammation and RA. Evidence exists for elevated synovial lipid peroxidation (MDA content) in rheumatic patients, Rheumatoid arthritis has been linked also to decreased levels of reduced glutathione— an intracellular antioxidant—in the synovial fluid T cells of patients with RA (M. Q et al 2001)

Materials and methods

At AL-Shattra Hospital in Thi- Qar governorate .This study has been conducted. At the duration between (17/5/2021) to (25/12/2021). The study including (60 subjects), (30 control) and (30 patients). About 5 mL-blood sample was pulled from each (controls and patients). Samples were allowed to coagulate at room temperature in empty disposable tubes, then centrifuged at 3000 xg for 10 minutes. Serum samples were separated and stored at (-20 ° C) for subsequent measurement of biochemical parameters, unless used immediately. IL-17 was determine by ELISA (Enzyme Linked Immunosorbent according to the method of (Lequin, 2005). Also VD was determine by ELISA. MDA it was measured according to the method of Muslih (Muslih et al., 2002).GSH was determine according to the method of (Ellman,1959).

Statistical Analysis

Statistical analysis was done using statistical package for the social sciences version 23, results were expressed the (mean ± standard deviation). T test was applied to compare between parameters in all studied groups. P-values (P≤0.05) were considered. Pearson's correlation was applied to make the relationship among the present study parameter.

Results

Table (1-1) show marked increase in the levels of serum IL-17 in patients group in compare with controls group. The same table show marked decrease in the levels of serum VD in patients group in compare with control group. Also show

marked decrease in the levels of serum GSH in patients group in compare with control group. Table 1-1 also show marked increase in the levels of serum MDA in patients group in compare with control group and marked increase in the levels of ESR in patients group in compare with control group.

Table (1-1)
Laboratory characteristics of (patients and control) with RA

Parameters	Patients (mean±SD) N=30	Controls (mean±SD) N=30	p-value
IL-17 (Pg/Ml)	467.25±34.84	263.30±16.72	0.001
VD (mg/dL)	16.87±3.89	31.90±4.53	0.016
GSH (μ mol/mL)	329.95±54.47	550.70±45.51	0.031
MDA(μ mol/L)	3.88±0.60	2.07±0.54	0.003
ESR (mm/1 st /h)	35.45±3.49	11.40±1.48	0.000

The result in this study show a negative correlation between IL-17 and (VD and GSH) as shown in the two figures (1-1) and (1-2). Also it was found a positive correlation between IL-17 and (MDA and ESR) as shown in the two figures (1-3) and (1-4).

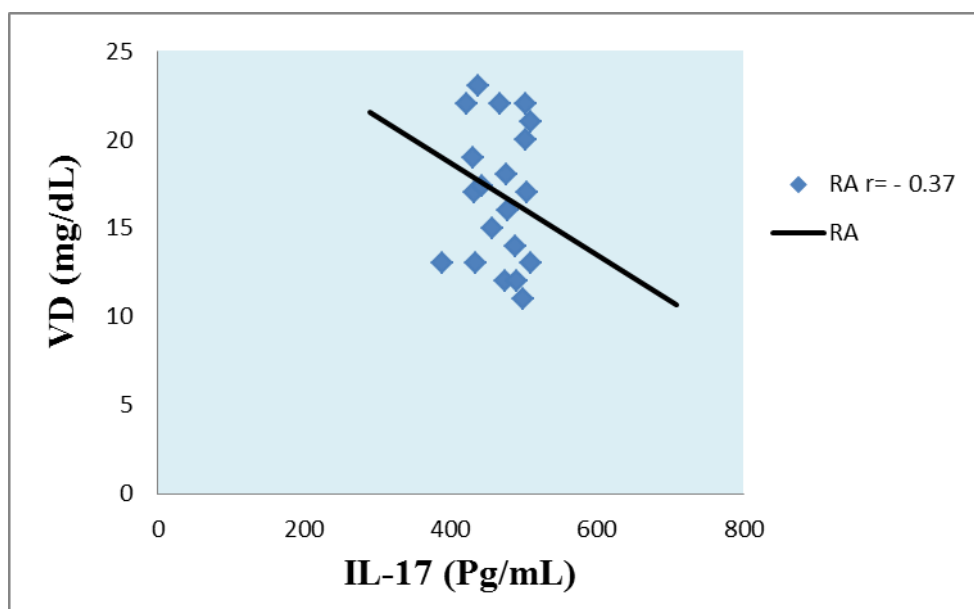


Figure (1- 1). Shows the negative correlation between VD and IL17

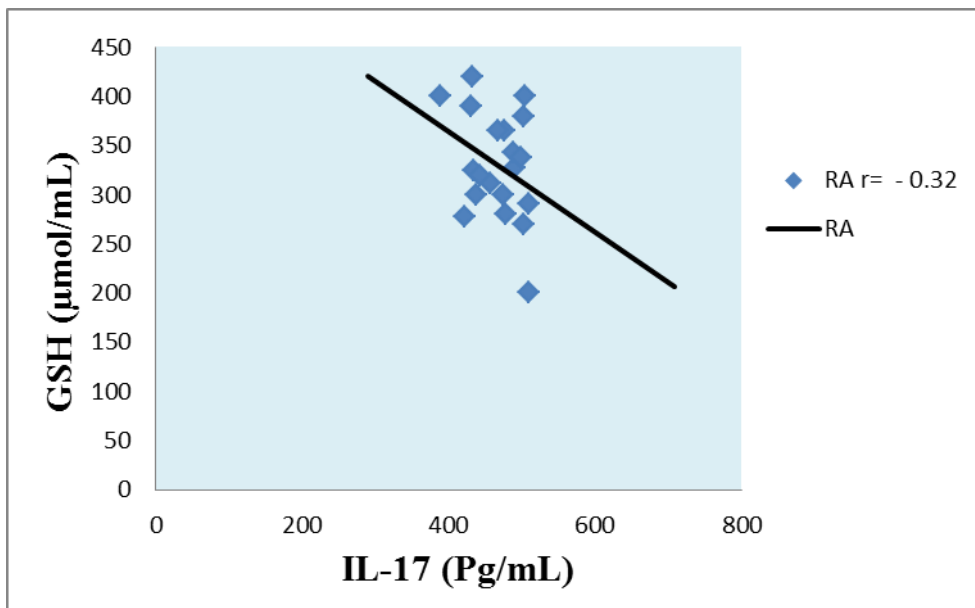


Figure (1- 2). Shows the negative correlation between GSH and IL-17

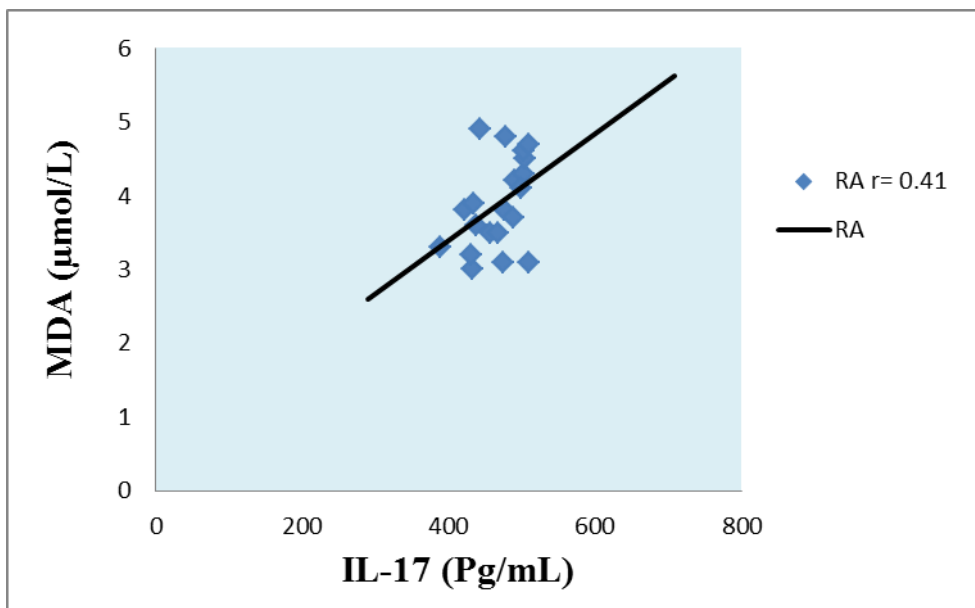


Figure (1- 3). Shows the positive correlation between MDA and IL-17

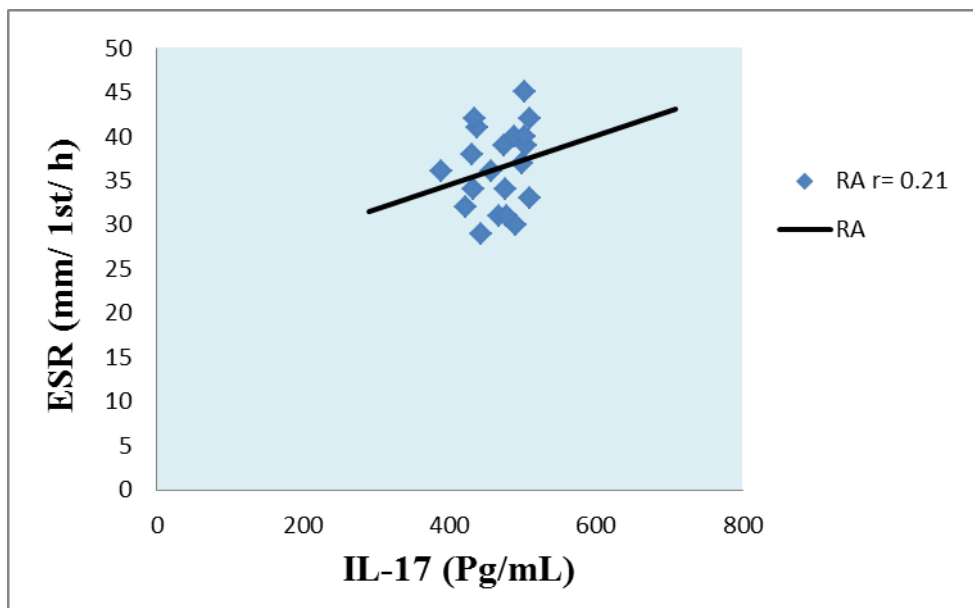


Figure (1- 4). Shows the positive correlation between ESR and IL-17

Discussion

Dysregulation of cytokine production or action is thought to have a central role in the development of RA. Previously, RA had been considered a Th1-cell-mediated disorder, and therefore was thought to be driven by a population of T cells producing inflammatory cytokines such as IL-2, TNF and interferons (Schulze and Kalden, 2001). Cartilage damage is partially induced by synovial cytokines such as IL-17. Experiments on RA synovial samples show that IL-17 triggers the production of IL-6, leukemia inhibitory factor (LIF) and macrophage inflammatory protein (MIP)-3 α /chemokine (C-C motif) ligand-20 by RA synovium (Chabaud et al 1999; Chabaud et al 1998; Chabaud et al 2001). Moreover, the addition of an anti-IL-17 antibody to RA synovium cultures significantly decreases matrix metalloproteinase (MMP)-1 production, collagenase activity but not tissue inhibitor of MMP (TIMP)-1 production suggesting the direct contribution of IL-17 to joint destruction (Chabaud et al 2000). It has been suggested that overproduction of IL-17 and up-regulation of Th17 cells are common features of RA (Zhang et al 2009). Hanan et al explain the important role of Th-17 cells and IL-17 in the pathogenesis of inflammatory and destructive pattern characteristic of RA (Hanan et al 2015). RA is an inflammatory disease characterized by flares and remissions, flares being characterized by pain. Vitamin D deficiency is also known to be associated with diffuse musculoskeletal pain (Hirani, 2012). Vitamin D deficiency may increase the risk for the development of RA. Recently, the role of vitamin D deficiency in the pathogenesis of RA, as well as the relationship between vitamin D deficiency and the activity of RA is discussed (Song et al. 2012; Kim et al. 2012). Vitamin D deficiency may be linked to disease severity in RA. As vitamin D deficiency has been linked to diffuse musculoskeletal pain, these results have therapeutic implications. Vitamin D supplementation may be needed for the prevention of osteoporosis and for pain relief in patients with RA (Ifigenia et al 2012) Previous studies hypothesize that anti-MDA B cells may be selected

within the joint due to interactions with the high local increased burden of ROS and MDA (Caroline et al 2017) GSH is a good supplement for RA which can regulate immune cells preventing them from attacking the normal body cells. GSH can neutralize free radicals which can destroy tissues and muscles of the joints. It increases body energy and owns anti-inflammatory effect (Lu et al 2013; Robinson et al 2018). Liposomal GSH is capable to bypass de novo glutathione synthesis contributing to elevating glutathione level, improving redox homeostasis and decreasing the effect of TGF- β (Robinson et al 2018; Ballatori 2009).

Conclusion

It was discuss the roles of IL-17 in RA , then explain the correlation with other parameters includes (VD , MDA, GSH and ESR).

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