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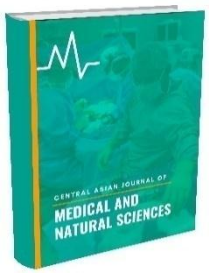

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Estimation of IL-17 and TNF-α serum concentrations in patient with *proteus spp* infection in Al-Najaf province, Iraq

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Abstract: *Proteus spp* infections are common in last period among people in Iraq. It may cause serious complications if left untreated. Proinflammatory cytokine Interleukin-17 (IL-17) is required for immunity against extracellular pathogens. Tumor necrosis factor-a (TNF- α) is a pleiotropic cytokine that plays an essential role in mediating inflammatory processes. This study aimed to investigate the role of IL- 17 and TNF-α in immunity against *Proteus spp* infection. A total of 90 serum sample toke from patient clinically confirmed with *Proteus spp* infection, the 90 sample is divided to three groups, case grope 30 sample (patient has *Proteus spp infection),*30 samples control positive group (patient with different type of bacterial infection) 30 samples control negative group (healthy indivisibles) were enrolled in this study. blood samples were collected in Alnajaf Alashrf hospitals in Najaf province, Iraq, during the period from November 2022 to Jun 2023. Cytokine profile was assessed using ELISA technique. Serum IL17 results showed a significant difference (P-value 0.001) between patients and controls grubs and serum TNF-α results also showed a significant difference (P-value 0.001) between patients and controls groups. It was concluded from the present study that *Proteus spp* infections caused strong influence on immune response and caused significant elevated in IL-17 and TNF-α.

Key words: *Proteus spp*, IL17, TNF-α.

INTRODUCTION

bacterial infection is a collective term that describes any infection involving any type of the bacteria colonize any part of human body , [1]. IL-17A is a Proinflammatory cytokine that can be produced by a broad spectrum of cell populations, including Th17 cells, γδT cells, NKT cells, group 3 innate lymphoid cells (ILC3s), CD8+ (Tc17) cells, neutrophils, microglia, and mast cells [2]. In general, IL-17A-mediated downstream pathways induce the production of inflammatory molecules, chemokines, antimicrobial peptides (AMPs), and remodeling proteins. IL-17A elicits crucial impacts on host defense, cell trafficking, immune modulation, and tissue repair, with a key role in the induction of

innate immune defenses [3]. IL-17A also promotes the secretion of anti- microbial peptides (e.g., b-defensins, calgranulin, S100A8, and lipocalin-2) from macrophages and neutrophils in response to acute pathogen invasion [4].

Tumor necrosis factor alpha (TNF-α) is a pro-inflammatory cytokine that plays an important role in the pathogenesis and clinical outcomes of UTI [5]. It is a 157 amino acid peptide with a molecular weight of 17 kD. It is produced mainly by monocytes and macrophages and by T and B lymphocytes and glomerular mesangial cells [6]. TNF-α is an inflammatory mediator.

that is focal to the inflammatory action of the innate immunity induction: production of cytokine, activation of adhesion molecules, and growth energizing [7]. TNF-α exerts inflammation, apoptosis, and proliferation [8]. TNF-α can stimulate fever, either directly through stimulation of PGE2 synthesis by the vascular endothelium of the hypothalamus, or indirectly by prompting release of IL-1. TNF-α also shares a substantial inflammatory property with IL-6 and IL-11[8].

In this study, we determined and compared between the serum levels of IL-17A and TNF-α in patients with *Proteus spp* infections , patient with other type of bacterial infection and healthy control group.

Materials and Methods

A case-control study included 90 clinically confirmed *Proteus spp*, their ages ranged is open, blood samples were collected in Alnajaf Alashrf hospitals in Najaf province, Iraq during the period from November 2022 to Jun 2023. 90 sample are divided to three groups, case grope 30 sample (patient has *Proteus spp infection),*30 samples control positive group (patient with different type of bacterial infection) 30 samples control negative group (healthy indivisibles) were enrolled in this study.

Five milliliters of venous blood were collected from all participants; and then undergone centrifugation where the serum was obtained and preserved at -20ºC until be used. IL-17A and TNF-α serum concentration was assessed using ELISA technique according to instructions of the manufacturer (Elabscience / USA).

Statistical analysis

The Statistical Package for the Social sciences (SPSS, version 19) was used for statistical analysis. Numeric variables were presented as mean and standard deviation while nominal variables were expressed as number and percentage. ANOVA test was used to estimate the significant level of the cytokine concentrations between patient and control groups. P-value was considered significant when it was less than or equal to 0.05.

Ethical Approval

The ethical approval was carried out through: Ethical committee in College of Health and Medical Techniques/ Kufa, Al-Furat Al-Awsat Technical University in Najaf province health directorate and written consents from all subjects involved in this work have been taken before enrollment with the right to withdraw the consent at any time.

Results

Serum IL-17 concentration

This study found that there is a significant difference (P-value 0.001) in serum IL-17 concentration between *Proteus spp* infections patients and tow control groups where the difference in value of serum IL-17 concentration between the study groups .

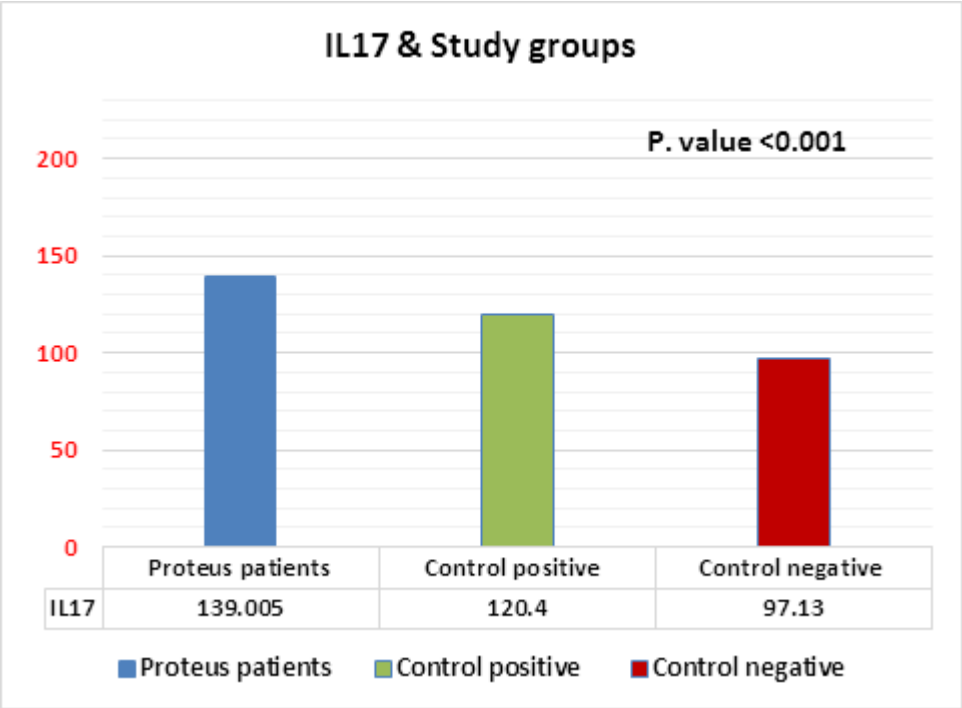

Figure 1: IL-17 serum concentration in *Proteus spp* infections patients and control groups

Serum TNF-α concentration

This study found that there is a significant difference (P-value 0.001) in serum TNF-α concentration between *Proteus spp* infections patients and tow control groups where the difference in value of serum TNF-α concentration between the studded groups.

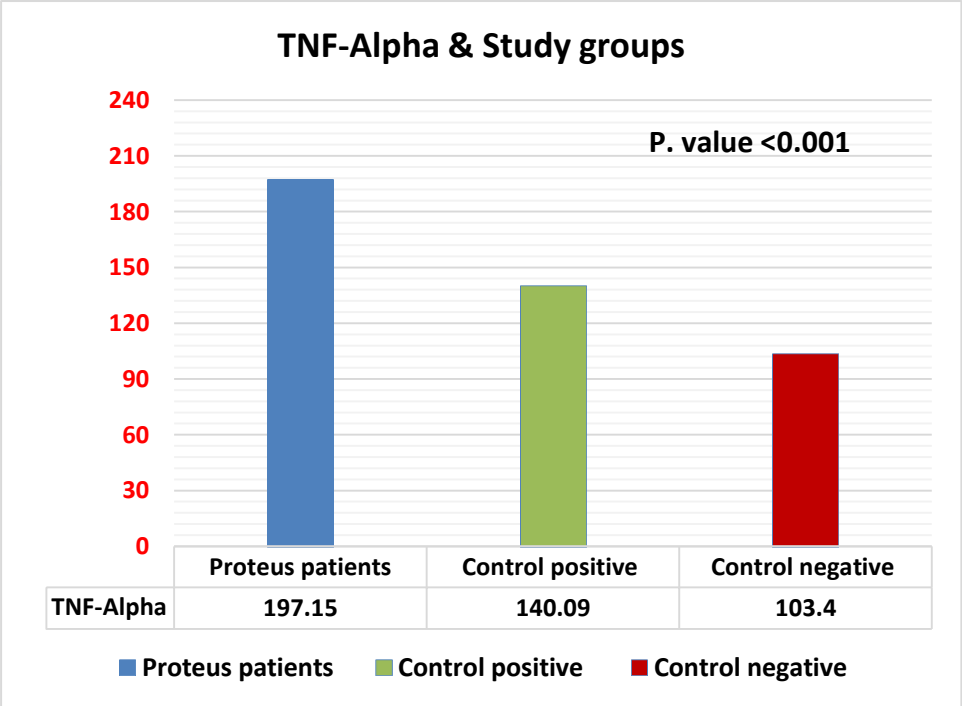

Figure 2: TNF-α serum concentration in *Proteus spp* infections patients and control groups

Discussion

In this work it was found that serum IL-17 levels in patients was significantly higher than control groups (P-value: 0.001). And this finding was comparable to [9], who reported that urine levels of IL-17 in patients with *Proteus spp* infections patients were markedly higher compared to controls groups . This study was also along with another study conducted by Pelicari and co-workers from Brazil who showed that the serum concentration of IL-17 in patients with nephritis in childhood-onset systemic lupus erythematosus was significantly (p=0.009) higher than in healthy controls [10]. High levels of IL-17 cytokine in *Proteus spp* infections patients in this study could be to attribute to the fact that IL-17-expressing T cells contributing to inflammatory processes [11]. It's worthy to mention that IL-17A which is an immune-modulatory cytokines, considers as an innate immune response important factor in the UTI associated with UPEC and other Gram-negative bacteria [12]. IL-17A contributed to innate clearance of UPEC and Gram-negative pathogens through a mechanism involving secretion of cytokines and chemokine and cells influx such as neutrophils and macrophages to the blood stream [13].

In this study, the serum TNF-α concentration in patients' group was significantly higher than tow control groups. This finding was agreed with [14] who confirmed a significant increase of TNF-α cytokine in IgA nephropathy patients compared to the healthy control group. Wu et al. reported that people with IgA vasculitis-nephritis have a higher serum level of TNF-α and other cytokines when compared with age matched able bodied healthy controls [15]. Cytokines and cytokine receptors are involved in the systemic and local inflammatory response in patients with urinary tract infections [25]. TNF-α is rapidly recruited to the saite of infection and contributes directly to the innate defense against various viral and bacterial infections [17]. Increased serum TNF-α cytokine levels in patients group suggesting that *Proteus spp* infections patients have more active inflammatory response and TNF-α can be considered as a biomarker of disease severity [17].

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