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Evaluation of Serum Interleukin-17F Levels in Asthmatic Patients: a Case-Control Study in Baghdad, Iraq

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Abstract: This case-control study evaluates serum levels of IL-17f among Iraqi patients with asthma . The study involved 80 participants, including 45 asthmatic patients and 35 healthy controls, The mean age was 30±7.91 years for patients and 34.67±8.71 years for controls. Serum IL-17F levels were measured using ELISA (enzyme-linked immunosorbent assay) .Serum IL-17F levels were significantly higher in asthma patients compared to controls (41.45±8.64 vs. 21.63±0.66 ng/mL; P= 0.05). Among asthma patients, males exhibited significantly higher IL-17F levels than females (59.53±15.39 vs. 24.80±1.01 ng/mL; P= 0.02).

Introduction

Asthma is a chronic, heterogeneous respiratory disease characterized by airway inflammation, reversible airflow obstruction, and bronchial hyper responsiveness.(Global Initiative for Asthma [GINA], 2023). Cytokines, particularly those associated with the T-helper 17 (Th17) cell lineage, have emerged as key mediators in asthma inflammation. Among these, interleukin-17F (IL-17F), a member of the IL-17 cytokine family, is of particular interest. IL-17F is secreted by Th17 cells and is known to induce the expression of proinflammatory mediators including IL-6, CXCL8, and G-CSF, thereby promoting neutrophilic inflammation in the airways (Korn et al., 2009; Kolls&Lindén, 2004). Elevated IL-17F levels have been associated with severe and steroid-resistant asthma phenotypes, suggesting a distinct immunological mechanism underpinning disease severity (Al-Raml*iet al*., 2009).This study aims to evaluate serum IL-17F levels in in

asthmatic patients and explore their relationship with gender.

Materials and Methods

Study Participants

The current study is a case-control study.

A total of 80 participants were enrolled:

Hypertensive group (n = 45):18 males and 27 females, aged18-40 years

(Mean + SD = 30+7.91, median 38 years).

Control group (n = 35): 12 males and 23 females, aged 18–40 year (mean + SD = 30+7.91, median 38 years).

Participants were selected using a convenient sampling method. Asthma diagnoses followed global criteria. Inclusion criteria required patients to solely have asthma and be age-matched with controls. Participants with other or inflammatory diseases were excluded.

Blood Collection

From each individual included in this study, 5 ml was collected by vein puncture and placed in a tube without anticoagulant, the serum was carefully separated in a 2000 x g centrifuge for 10 minutes, and then the serum was isolated in a 2ml Eppendorf tube and kept in deep freeze until use in determination of serum IL-17F levels using Elisa.

Serum IL-17F concentrations were measured using a sandwich ELISA kit for human IL-17F (Bioassay Technology Laboratory), following the manufacturer's instructions. The assay involved antigen-antibody interaction and colorimetric detection, with absorbance measured at the appropriate wavelength.

Results

According to Table 1 , the mean ± SE of serum level of IL-17F in asthma patients and control groups were 41.45 ± 8.64 and 21.63 ± 0.66, respectively. A significant difference between the groups was seen (P = 0.05).

Table 1: The mean value of serum IL-17F levels in asthmatic patients compared with controls.

Parameters Groups	ng/mlMean+SE
Control	21.63±0.66
Patients	41.45±8.64
P-value	0.05
Significant	* Sig.

SE: Standard error

ng: nanogram

*Sig:Significant p< 0.05

Classification of serum Interleukin-17F levels by gender

Serum Interleukin-17F levels were classified according to gender in asthma patients and controls. IL-17F levels were significantly elevated in males compared to females in patients with asthma (59.53 ± 15.39 versus 24.80 ± 1.01), P = 0.02. Serum IL-17F levels of males females were significantly different in patients with asthma compared with controls (59.53 ± 15.39 vs. 23.38 ± 1.68, P = 0.02; while the levels of females with asthma wasnonsignificant compared with controls; 24.80 ± 1.01 vs. 21.54 ± 1.50, P = 0.004). Mean serum levels of IL-17F were not significantly

different whencomparing males with females in the control group (23.38 ± 1.68 vs. 21.54 ± 1.50, P = 0.42), Table 2.

Table 2: The mean value ofserum IL-17F levels by gender in asthmatic patients and controls.

Parameters / Groups	ng/mlMean+SE			
	Male	Female	P-value	Significant
Control	23.38±1.68	21.54±1.5	0.42	Ns.
Asthmatic patients	59.53±15.39	24.80±1.01	0.004	Sig.
P-value	0.02	0.07		
Significance level	Sig.	Ns.		

SE: Standard error

ng: nanogram

Sig:Significant p< 0.05

Ns:non-significant P>0.05

Discussion

A pivotal finding of this study was the significant elevation of IL-17F serum levels in asthmatic patients (41.45 ± 8.64 ng/mL) compared to controls (21.63 ± 0.66 ng/mL, P = 0.05). Elevated levels of IL-17F have been implicated in promoting neutrophilic inflammation and airway remodeling, hallmarks of severe and steroid-resistant asthma (Doe *et al*., 2010).

Numerous prior studies have investigated the role of Interleukin-17F (IL-17F) in asthma, often finding results that support an association between elevated levels and the disease or its severity, given its role as a pro-inflammatory cytokine in airway immunity.

Wu, 2014 found that serum levels of IL-17 and IL-17F were significantly higher in children with asthma compared to controls. It also showed a positive correlation between IL-17F levels and asthma severity, as well as markers of airway inflammation. This study directly aligns with my findings of a statistically significant increase in IL-17F levels in asthma patients. Both studies support the idea that IL-17F plays a role in the pathophysiology of asthma and could serve as a biomarker.

Najafi, 2017 demonstrated that serum IL-17F levels were significantly elevated in asthmatic patients compared to controls, suggesting its potential role in asthma pathogenesis. This result also closely aligns with my study's finding of elevated serum IL-17F in asthma patients. This consistency across different studies reinforces the evidence that IL-17F may play an important role in asthma.

Jiad and ahmed ,2022 indicated that cf-mt DNA down regulated significantly in Iraqi asthmatic patients(Jiad and ahmed ,2022) . A potential association between lower ORMDL3 levels and asthmaAbdulRedha and Ahmed ,2024 . Cytokines have been studied in many chronic diseases in Iraqi populations .Ahmed and Ghali,2019 analyzed the mutational changes of the IL-6-174 (G/C) in patients with type -2 diabetes mellitus.

Gender-based Serum Level Differences

- Male asthmatics had significantly higher IL-17F levels (59.53 ± 15.39 ng/mL) than female patients (24.80 ± 1.01 ng/mL, *P* = 0.004).
- This suggests sex-dependent cytokine expression, which may underlie gender disparities in asthma severity and responsiveness.

Wu *et al*.,2014 found that serum IL-17 and IL-17F levels were significantly higher in children with asthma compared to controls. Although it did not provide a detailed sex-specific analysis of cytokine levels, the authors noted that asthma is more prevalent in young boys, raising questions about potential roles of sex-specific factors .

The current study partially aligns with this study regarding the general elevation of IL-17F in asthma patients. However, the deeper analysis highlights that this elevation is largely driven by increased levels in male asthma patients, a detail not directly addressed by Wu 's study.

Xue*et al*., 2015 found that serum IL-17 levels were higher in asthmatic patients compared to controls. Although it focuses on IL-17 generally rather than IL-17F specifically, it noted differences in asthma prevalence by sex and age (.

This study supports the idea that Th17-associated cytokines (including IL-17F) play a role in asthma. The current study adds a critically important detail by demonstrating that higher IL-17F levels are particularly associated with male asthma patients, suggesting that inflammatory pathways might differ by sex.

Conclusions

Higher serum IL-17F levels in patients supports the involvement of IL-17F in asthma pathophysiology.There are sex-specific differences in IL-17F expression, with males showing higher cytokine levels, possibly reflecting differential immune responses or disease severity.

References

1. Ahmed, H. M., & Ghali, A. F. (2019). Transversion and transition mutations of interleukin-6 gene -174 (G/C) in patients with type-2 diabetes mellitus. GeneReports, 17, 100478.
2. Al-Ramli, W., Préfontaine, D., Chouiali, F., Martin, J. G., Olivenstein, R., Lemiere, C., & Hamid, Q. (2009). T(H)17-associated cytokines (IL-17A and IL-17F) in severe asthma. Journal of Allergy and Clinical Immunology, 123(5), 1185–1187.e3.
3. Doe, C., et al. (2010). Expression of the Th17-associated cytokines IL-17A and IL-17F in asthma and COPD. Chest, 138(5), 1140–1147.
4. Global Initiative for Asthma (GINA). (2023). Global Strategy for Asthma Management and Prevention.
5. Jiad, M. K., & Ahmed, M. S. (2022). Investigation Of The Molecular Role Of Cell-Free Nuclear DNA And Cell-Free Mitochondrial DNA In Asthmatic Patients. NVEO - NATURAL VOLATILES & ESSENTIAL OILS Journal, 9(1).
6. Kolls, J. K., & Lindén, A. (2004). Interleukin-17 family members and inflammation. Immunity, 21(4), 467–476.
7. Korn, T., Bettelli, E., Oukka, M., & Kuchroo, V. K. (2009). IL-17 and Th17 cells. Annual Review of Immunology, 27, 485–517.
8. Najafi, S., Keshavarz, S., Khazaei, M., Kiani, A., & Shahbazi, M. (2017). Serum IL-17A and IL-17F levels in asthmatic patients. Iran J Allergy Asthma Immunol, 16(1), 19-24.
9. Wu, X., Fan, X., Zhang, S., Zhang, H., Zhao, J., Tang, B., Yang, C., & Zhang, M. (2014). Serum IL-17 and IL-17F levels and airway inflammation in children with asthma. Cytokine, 69(2), 206-211.
10. Xue, J., Li, D., Chen, J., et al. (2015). Serum levels of IL-17A increase in asthma but not in accordance with serum level of IgE and asthma severity. International Journal of Medical Laboratory, 2(1), 25–33.