

Research Article

The Role of IL-17 in Patients with *Respiratory Syncytial Virus (RSV)* Causing Upper and Lower Respiratory Tract Infections

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A B S T R A C T

Search of IgG from 100 patients with URTI and LRTI were diagnosed as RSV in ELISA test. The lower proportions of severe/critical cases were noted at the lowest within-age group range (≥ 5 years), which show a significant difference between age groups. The notable sex-difference was where distilled water infected more females than males. There was little change in upper versus lower respiratory tract infection rates and urban versus rural infection rates. In the same way, there was no significant difference between IL17 levels in infected and uninfected people.

Keywords: RSV, IgG, ELISA, IL-17

Introduction

Respiratory syncytial virus (RSV), a seasonal RNA virus, is the most frequently recognized pathogen causing lower respiratory tract illness in infants and young children, older adults and individuals with elevated comorbidities that place them at excessive threat of extreme sickness associated to RSV(1). All winter long, RSV infections are seen in temperate climates compared to RSV infection occurs throughout the year with different epidemics during humid summer season of the warm rainy season in tropical environments (2). Specifically, 336 000 RSV acute respiratory infection (ARI) hospitalizations and 14 000 RSV-ARI in-hospital deaths accrued worldwide in adults ≥ 65 years of age in 2015 (3). Among adults ≥ 60 years of age, those with COPD or congestive heart failure (CHF) are twofold more likely to die as a result of RSV infection than those without these conditions.⁴ Introduction At present, there are two licensed prefusion F-based vaccines against respiratory syncytial virus (RSV) targeting adults ≥ 60 years of age for prevention of

disease in the US and EU respectively(5). The majority of primary studies of RSV burden in adults are country-, region- or age group-specific estimates (3). Future observational studies of the incidence of RSV and vaccine strategies (e.g. region-and sub-group prioritisation) will require reviews summarising data across multiple countries, regions and age-groups. To help inform the burden of RSV in adults (aged 18 years and older), including both community-based and medically attended populations, we carried out a literature search as well as search specific to defined population groups with underlying conditions that have an increased risk for severe RSV illness.⁶

Materials and methods

Patients

Methods A total of 100 subjects from 5 to -40 years old were recruited from the Babylon Maternity and Children's Hospital and Hillah Teaching Hospital in Iraq with clinical symptoms of sneezing, headache, cough (bronchitis, pneumonia).

Sample Collection

Five to ten minutes, three milliliters of whole blood was pipetted in a gel duct at 25 °C. Immunological and virological analysis was performed on serum that was obtained by centrifuging whole blood for 10 minutes at 3000 RPM with subsequent transfer of the serum to eppendorf tubes before storage at -20°C.

A. Immunity test

However, RSV specific IgG and IL-17 levels between patient and control populations were analysed by ELISA test (Elabscience—China) from serum that was rummage-sale.

Statistical analysis

Statistical analyses were performed in SPSS version 28. P values ≤ 0.05 were considered statistically significant.

Results and Discussion

A respiratory syncytial virus (RSV) is present if it is detected. If it is detected, it is a respiratory syncytial virus (RSV). To make a diagnosis, 100 cases of RSV infection were diagnosed by using ELISA for IgG. This showed that the age group ≥ 5 years is impacted significantly more, (Table(1)).

Respiratory syncytial virus (RSV), an important cause of viral lower respiratory tract infection (LRTI) in children.⁶ worldwide and so-called young infant is most susceptible group;(8). There is currently no approved vaccine for such groups of age. However, alternative control strategies (9) are based on the modes of transmission that ultimately correlates also with the shedding of virus. Factors associated with virus shedding include age, severity of this infection and probably co-infections (others identified before but during the presence of RSV in some cases and simultaneously in the household). Younger people 1–4 years, 5–15 years and ≥ 15 years recovered from COVID-19 faster in comparison to infants by factors of 1•98, 1•82 and 1•97 respectively. In the Rochester family study, we obtained a similar report with children aged < 2 years shedding longer than those aged 2–16 years (9 vs 4 days respectively). The Okiro et al. No association with age was seen in this study, but children < 3 years of age (an age group most likely to revert to a past RSV infection) were designated as having had previous infection: faster recovery of infected children versus controls was noted by 1•37 times (10).

While the incidence of RSV infections is higher in females than males in older adults and adults, the hospitalization rates are the same (11). This argues against sex bias at least in the pathology of elderly RS disease, and instead may indicate differences in exposure due to other factors such as different levels of direct contact of female caregivers with young children who have been shown to be common RSV carriers (12). Sexually dimorphic expression and activity

of sex steroid hormones are likely to be involved as well; however, there is a lower difference in concentrations of sex steroid hormones in male and female adults compared to early life stages (when striking sex differences in the expression of RSV infection are reported) (13). Also, there are sex differences in the natural aging immune system of older adults with greater innate and proinflammatory activity but lower humoral responses in males (14).

Lower respiratory tract infections (LRTIs) impose a substantial disease burden in the form of morbidity and mortality on the world due to viruses and bacterial pathogens. Other major pathogens of acute lower respiratory tract infections (LRTIs) include *Streptococcus pneumoniae* (pneumococcus, Spn) and respiratory syncytial virus (RSV), which are known to be the leading pathogens of LRTIs in children and elderly population respectively.¹⁵ It is known that RSV and pneumococcus can interact to synergistically support viral and/or bacterial penetration to the respiratory system by modulating the host immune response, leading to more severe respiratory disease and its complications (16).

Lower respiratory tract infections (LRIs) are primarily caused by viral pathogens such as the Respiratory syncytial virus (RSV) and influenza virus among under-5 children especially infants, young children (17). Children < 2 years of age, with the most severe manifestations in infants < 6 months, also preterm infants and children with comorbidities (17) are one important cause of acute respiratory tract infections due RSV infection. Approximately 60–70% of children are infected with RSV during the first year of life and nearly all children will experience a single episode by the age of two years (18)

Measurement of IL-17 concentration

Results The serum concentrations of IL-17 in the infected and no infected groups were 115.75 ± 21.35 pg/ml and 275.91 ± 28.18 pg/ml, respectively which is illustrated according to Figure (1) There was no statistically significant difference between the two study groups regarding concentration of IL-17; ($p > 0.05$).

IL-17, a T-helper type 17 (Th-17) produced proinflammatory cytokine. It is crucial for regulating immune response to a large number of pathogens, primarily viruses (19). Increased production of IL-17, however, can lead to chronic inflammation and autoimmunity, cirrhosis, fibrosis and hepatocellular carcinoma (HCC) (20). Multiple studies have shown that IL-17 is not only participating in the antiviral immune response but also in the virus-mediated pathology as well (21). Contribution of IL-17 and IL-35 in HCV Infection: Not much is known. At baseline, IL-17 production is significantly increased in chronic HCV patients than in healthy controls. The IR result substantiates the

hypothesis that IL-17 participates in the pathogenesis and/or progression of liver fibrosis in humans, subsequently triggering an increase in serum levels of IL-17 after liver injury induced by chronic hepatitis and subsequent cirrhosis (22).

Table 1. Distribution of cases based on Age Group

Age Group	Cases	Percentage	P-Value
≥5	32	32%	0.044
6-10	28	28%	
11-20	20	20%	
21-30	10	10%	
31-40	10	10%	
Total	100	100%	

Table 2. Distribution of Cases by Sex

Sex	Cases	Percentage	P-Value
Male	25	25%	0.03
Female	75	75%	
Total	100	100%	

Table 3. Distribution of Cases by infection

Infection	Cases	Percentage	P-Value
Upper respiratory tract	40	40%	0.23
Lower respiratory tract	60	60%	
Total	100	100%	

Table 4. Distribution of Cases by region

Region	Cases	Percentage	P-Value
Urban	30	30%	0.34
Rural	70	70%	
Total	100	100%	

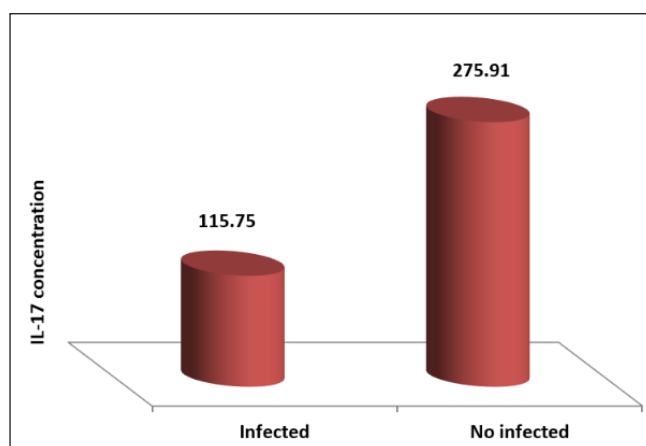


Figure 1. IL-17 concentration between patients and control groups

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