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Rhinovirus and Bacterial Causes Upper respiratory tract and relationship with Asthma infection

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ABSTRACT

Rhinovirus ubiquitous seasonal pathogen and has been linked to emergence, the first is for wheezing in children and exacerbation of asthma in patients of all ages, Bacterial species have a role in upper respiratory infections and exacerbation of asthma in adults. The research aims to clarify the relationship between Rhinovirus and bacteria that cause infections, The upper respiratory tract and its relationship to asthma. In 200 patients with acute upper respiratory tract infection and asthma Swabs were obtained from the throat to detected pathogenic and commensal bacteria in the throat, and species and sera from these individual for identification RV antibodies IgM, IgG, determination of RV Antigen. Culture results showed that 37.5% were commensal bacteria and The percentage of pathogenic bacteria was rate of 70%, BacterialSpecies isolated (Staph. aureus, Strep. pyogens, H.influenzae ,K.pneumonia ,Strep. Pneumonia P.aeroginosa,E.coli ,S. marcescens), Serological testing using ELISA showed that Rhinovirus infection exacerbation asthma and URTI. type of antigen and Antibody showed a change depending on the sex group.

1. INTRODUCTION

The respiratory system is one of the most important vital organs in the human body, as it provides the body with the necessary oxygen For life, the respiratory. Acute respiratory infections are the most common diseases [1], according to recent estimates by the World Health Organization (WHO) states that acute lower respiratory tract infections are responsible for 22% of child deaths under the age of five annually [2], [3]. Infectious diseases result from the colonization of microbes, including bacteria and viruses that infect an area nose, throat, and pharynx, there is an interaction between these microbes, especially bacteria and viruses, cause which It leads to a range of disorders including tonsillitis [4].

rhinitis and bronchitis, Viruses are predisposing factors for bacterial infection

Viruses that infect the respiratory system Human Rhinovirus The virus is more common and closely related Respiratory infections, which is the main cause of cold in children in the winter, which is the cause and is The direct cause of frequent wheezing in children with asthma and has a role in exacerbating asthma in adults, bacterial species (Strep. pyogens, K. pneumonia, H influenzea, Staph aureus), The most common types of respiratory infections and may be found in the upper part of the system Without causing

disturbances in the mechanism of the work of the system, but it becomes a pathogen of the normal respiratory flora in a way Without causing disturbances in the mechanism of the work of the system, but it becomes a pathogen of the normal respiratory flora in a way When the immune system is weakened as a result of its colonization of more than one pathogen [5], [6], Studies have shown that some respiratory viruses increase the risk of disease Secondary bacterial The immune response to respiratory viruses may depend on the spread of specific bacteria antibodies possess a large part of the protective immunity and this immunity Cellularity is important for clearing infection [7].

2. Materials and method

The group in this study consisted of 200 sample throat swab and serum sample and 30 people were collected as patients from acute tonsillitis and asthma a control group at the who came to the unit Consultant at Azadi Hospital and Children's Hospital / Kirkuk city period December 2020 to April 2021. Ethical Approval for this study was obtained from Kirkuk Directorate General of Health, Department of planning, Scientific Research Division (. approval reference number (211922021- 11). The sample were taken with a swab from the tonsils Were cultured on Macconkey agar ,Blood agar and chocolate agar and incubation at 37 C for 24 hours ,the growth diagnosis using biochemical test and the Vatik compact system 5ml venous blood was collected from all patients' blood was placed in a test tube and Centrifuge and immediately stored in an Eppendroph tube and frozen at -20 until assayed for serological diagnosis of Human Rhinovirus was assayed by ELISA kits which performed according to the instruction of the manufacturing company Sung company spin.

3. Results

Table (1) Seroprevalence of HRVs antibodies, bacteria pathogen and (bacterial &viral) co-infection among patients upper respiratory tract infection &asthma

Study group	Results													
	Bacterial isolation				Seroprevalence of HRVs						(bacterial &viral)co-infection			
	G+		G-		RV-Ag		RV-IgM		RV-IgG		+ve		-ve	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%
URTI	71	62	52	45	30	47	12	54	8	44	43	21	57	28
Asthma	40	44	56	62	22	34	6	27	8	44	33	16	54	27
Control group	25	83	10	30	12	18	4	18	2	11	18	9	12	6
P-value Chi-seq	**Chi- = 141.855 P = 0.00003**				**Chi-Square = 1.592 P-Value = 0.810**						**Chi- = 0.312 P-Value = 0.856**			

(P≥ 0.05) NS is not significant

Among the bacterial isolated of URTI ,62%belonged to Gram positive and only 45%belonged to Gram negative and bacterial isolated of asthma 44% belonged to Gram positive and 62% belonged to Gram negative. The rate of RhV-Ag highest than RhV-IgM and RhV-IgM highest than RhV-IgG. Bacterial with HRVs co-infection 28%.

Table (2) Distribution of seropositive HRV in relationship to gender RTI panties using ELISA technique

Gender	Total	Seropositive of HRV					
		RhV-Ag		RhV-IgM		RhV-IgG	
		N	%	N	%	N	%
Male	58	30	52	10	17.2	9	16
Female	46	22	47	8	17.3	7	15.2
P-value Chi-seq		**Chi-Square =4.488 P-Value = 0.611**					

(P≥ 0.05) NS is not significant

The results of serological diagnosis of HRVs infection indicate that highest rate of RhV-Ag 52% was found in male patients, while 47% found in female. the Rate 17.2 found in male of RhV-IgM while 17.3% found in female and the rate rate 16%found in male of RhV-IgM while 15% found in female.

Table (3) the percentage of pathogenic and commensals bacteria isolated patients

Bacterial isolation					
Pathogenic bacteria	N	%	Commensals Bacteria	N	%
Staphylococcus aureus	58	30	*Streptococcus viridans*	43	45
Streptococcus pyogens	40	20	*Staphylococcus Epidermidis*	27	28.1
Pseudomonas Aeruginosa	20	10	*Staphylococcus saprophyticus*	12	12.5
Klebsiella pneumonia	29	15	*Diphtheroid*	4	4.1
Heamophilus influenzea	18	9	*Enterococcus Faecalis*	7	7.5
Escherichia coli	10	5.2			
Streptococcus	3	2	*Micrococcus*	3	3.1

Pneumonia					
Moraxella catarrhalis	12	6.2			
Serratia marcescens	2	1.5			
Total	192	100	Total	96	100
P-value Chi-seq	**Chi- = 141.855** **P-Value = 0.00003**		**Chi-Square = 94.500** **P-Value = 0.00001**		

(P≤ 0.05) HS is High significant

The study showed that out of a total of 200 samples, 75 were normal flora bacteria, with a percentage of and 140 samples were pathogenic bacteria The number of samples that showed mixed bacterial %, and 70% were 37 growth between the pathogen and the commensal was 35, at a rate of 17%.

They were isolated types of pathogenic bacteria that cause respiratory infection, as it was found that there are major causes 9 Including Staphylococcus aureus With 30%, followed by Streptococcus pyogens 20%, Klebsiella pneumonia isolated by 15% and Heamophilus influenza bacteria were isolated 9.3%,

Pseudomonas aeruginosa by 10% and the rest of the bacterial species At a lower rate, were found with similar study New work, in the study also indicated that 3 of the samples taken had no bacteria l growth despite the diagnosis of the specialist doctor in the presence of an inflammatory injury in the respiratory system, and this is due to the fact that the infection Caused by a viral infection or a fungal infection.

4. Discussion

Asthma is a disease of the lower airways, based on our conclusions are to sample obtained from the upper airway given the age of the subjects and secretions difficulty taking samples from the lower airway [9]. however previous studies have shown the presence of correlations between upper and lower airway microbiology and virology. it is reasonable to we hypothesize that the inflammatory responses of epithelial cells induced by an allergen or virus are similar in the upper and lower airways. thus, analysis of virus-induced effects on upper airway cells and secretions can provide clues about lower airway pathological findings [10].

The respiratory mucosa provides a major microbial interface where epithelial and dendritic cells interact with a group of functionally distinct lymphocytes. The lymphocytes then control a set of pathways, both innate and specific, that Regulate the host's mucosal immune response [11], [12]. Central to innate immune responses to microbes are interactions between pathogen-associated molecular patterns and pattern recognition receptors, which are associated with production of type I interferon, pro inflammatory cytokines, and the T-helper-2 cell pathway in predisposed subjects. These dynamic, coordinated immune responses underlie the different phenotypes of asthma [8]. ELISA technology is sensitive, fast does not require much experience and can be adapted to epidemiological studies wide range. However, we believe that more research is needed to investigate the method Optimized for collection and specific treatment, Rhinovirus has been the causative agent of colds in more than Half of the studied cases are common during the months of the epidemic in Iraq [13], [14]. In this study, it was detected Rhinovirus Only during the

spring and winter the presence of a virus associated with gonorrhoea and cold, is People with asthma are more likely to be infected the HRV virus, show a positive rate (HRV) with More adults have asthma than children, and this can be explained by some deficiency in the immune system They have or these patients may have some Chronic lung and heart disease, especially in patients Elderly or smoking patients, as for children, the most positive percentage of infection was caused by the behaviour of the virus through induced wheezing attacks, in addition to weak lung physiology or antiviral response [15].

5. Conclusion

Rhinovirus infection enhances detection of specific bacterial pathogens in children with and without asthma. Furthermore, these findings suggest that Moraxella catarrhalis and Streptococcus pneumoniae contribute to the severity of respiratory tract illnesses, including asthma exacerbations.

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