FREQUENCY OF HUMAN METAPNEUMOVIRUS IN INFANTS AND CHILDREN WITH WHEEZY CHEST

Thesis

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بسم الله الرحمن الرحيم

{وَأَنْزَلَ اللهُ عَلَيْكَ الْكِتَابَ وَالْحِكْمَةَ وَعَلَّمَكَ مَا لَمْ تَكُنْ تَعْلَمُ وَكَانَ فَضْلُ اللهِ عَلَيْكَ عَظِيمًا}

صدق الله العظيم

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Dedication To

I'd like to dedicate this work,

to my Parents,

my Wife and Kids,

my Brothers and Sister,

who always spirited me to complete my work.

(Abstract)

This work was a cross sectional study including (50) infants and children all presenting with wheezy chest recruited from the Pediatrics Pulmonology Outpatient Clinic, Specialized New Children Hospital (Abou El- Reesh), Cairo University. The patients' mean age was 31.3 ± 20.9 (in months) , 70% were males and 30% were females. The aim is to study the frequency of hMPV in infants and children with wheezy chest and to demonstrate its correlation with the severity of the disease. All patients were classified into new onset wheezers and recurrent wheezers .Patients were re-classified our wheezy infants and children according to their atopic status into atopic 42% and non- atopic 58% groups. The hMPV was found in 6% (no=3) of the patients using direct immunoflorecense assay.

Key words

Human Metapneumovirus + wheezy chest + infants and children

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List of Abbreviations

aMPV	Avian metapneumovirus
ARI	Acute Respiratory Illness
ARTI	Acute respiratory tract infection
BAL	Bronchoalveolar lavage
CBC	Complete Blood Picture
COPD	Chronic obstructive pulmonary disease
DFA	Direct immunofluorescence
ED	Emergency department
EDTA	Ethylene-diamine-tetra-acetic acid
EPR-3	Expert Panel Report 3
FEV1	Forced Expiratory Volume in 1 Second
FITC	Fluorescein isothiocyanate
GERD	Gastroesophageal reflux disease
GOR	Gastro-oesophageal reflux
HIV	Human immunodeficiency virus
hMPV	Human metapneumovirus
ICS	Inhaled corticosteroids
IgE	Immunoglobulin E
IgG	Immunoglobulin G
IgG	Immunoglobulin G
ILI	Influenza like illness
ISAAC	International Study of Asthma and Allergies in Childhood
LABAs	Long-acting β2AR-agonists
LRTI	Lower respiratory tract infection
mAPI	Modified Asthma Predictive Index

List of Abbreviations

MCC ..... Mucociliary clearance

MDI ..... Metered dose inhalers

NRC ..... National research center

OCS ..... Oral corticosteroid

OM ..... otitis media

ORFs ..... Open reading frames

PBS ..... Phosphate buffered saline

PCR ..... Polymerase chain reaction

RAST ..... Radioallergosorbent test

RBM ..... Reticular basement membrane

RNA ..... Ribonucleic acid

RSV ..... Respiratory syncytial virus

SABAs ..... Short-acting β2AR-agonists

SARS ..... Severe acute respiratory syndrome

SDB ..... Sleep-disordered breathing

SMART ..... Salmeterol Multicenter Asthma Research Trial

URTI ..... Upper respiratory tract infection

WHO/IMCI ..... World Health Organization / Integrated Management of childhood Illness

wLRIs ..... Wheezy lower respiratory tract illnesses

β2AR ..... Beta -2- adrenergic receptor

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INTRODUCTION

During the first years of life, pulmonary and non-pulmonary diseases can clinically manifest as recurrent episodes of wheezing, which can be called the "wheezy baby syndrome" ***(Dela et al., 2009).***

Generally, the first episode of wheezing occurs during the first year of life and is associated with upper airway respiratory infection, and this is especially true of recurrent forms ***(Bouzas et al., 2012).***

Wheezing in children is a common problem encountered by family physicians. Approximately 25 to 30 percent of infants will have at least one wheezing episode, and nearly one half of children have a history of wheezing by six years of age. The most common causes of wheezing in children include asthma, allergies, infections, gastroesophageal reflux disease, and obstructive sleep apnea. Less common causes include congenital abnormalities, foreign body aspiration, and cystic fibrosis. Historical data that help in the diagnosis include family history, age at onset, pattern of wheezing, seasonality, onset of attack, and association with feeding, cough, respiratory illnesses, and positional changes ***(Weiss, 2008***). Recurrent early life wheeze is not always asthma, and up to 50 per cent of children are reported to remit ***(Hovland et al., 2012).***

Many common respiratory viral infections can trigger recurrent wheezing, which in turn can have an impact later in childhood. The most often identified viruses in the first episode of wheezing in infants are respiratory syncytial virus (RSV), rhinovirus, parainfluenza, Human metapneumovirus (hMPV), coronavirus, influenza, bocavirus and adenovirus ***(Jackson and Lemanske Jr, 2010).***

The hMPV has been identified in many countries as a common respiratory tract virus, now one of the leading causes of lower respiratory tract infections in young children ***(Ong et al., 2007),*** as It has been suggested that it is responsible for 5–10% of acute respiratory tract infections in neonates and children ***(Agrawa et al., 2011).***

The hMPV infection is clinically similar to RSV, with signs and symptoms ranging from severe cough, fever, rhinorrhea and influenza like symptoms to bronchiolitis, pneumonia and attacks of wheezing ***(Moattari et al., 2010).***

Studies concluded that the more common diagnoses for cases with hMPV infection were bronchiolitis (49.5%) and recurrent wheezing (45.5%) ***(García-García et al., 2006).***

The hMPV was identified recently in the Netherlands in respiratory samples from children with acute respiratory symptoms. The seropositivity of the anti-hMPV IgG antibody in China was 74.5% in children aged 0 to 5 months, 64.0% in 6

to 11 months, 72.7% in 12 to 23 months, 87.1% in 24 to 35 months and 90.3% in 3 to 6 years ***(Zhang et al., 2008).***

The hMPV is an enveloped non-segmented RNA virus belonging to genus Metapneumovirus, family Paramyxoviridae ***(Mackay et al., 2004).*** It is classified by phylogenetic analysis into two major genetic lineages termed subtypes A and B and are further subdivided into four subgroups (A1, A2, B1, and B2). Subtype A is the most dominant one. Some authors reported recently the existence of novel sub-lineages within the hMPV subgroup A2, named A2a and A2b, and various subtypes in the B2 group ***(Regev et al., 2012).***

Studies showed that direct immunofluorescence (DFA) staining of clinical specimens, with results available within 2 to 4 h, is commonly used in clinical virology laboratories for the rapid diagnosis of respiratory viruses ***(Landry et al., 2008).***

AIM OF THE STUDY

The aim of this work is to study the frequency of hMPV in infants and children with wheezy chest and to demonstrate its correlation with the severity of the disease.