BLOOD LIPID PROFILE IN CHILDREN WITH BRONCHIAL ASTHMA

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ABSTRACT

Background: *Bronchial asthma is a common, chronic respiratory disease affecting 1–18% of the population in different countries. Dyslipidemia is known to impact potently the development of atopy by promoting proatopic Th2 immunity and allergic inflammation.*

Objectives: *This study was done to evaluate the lipid profile in asthmatic children and the correlations between the severity of bronchial asthma attacks in children as well as the level of control.*

Patients and methods: *This cross-sectional comparative study was conducted on 100 patients with Bronchial Asthma enrolled from the Allergy-Pulmonology outpatient clinic Al-Hussien, Al-Azhar University hospital, Cairo-Egypt in the period from 2017-2019. The enrolled patients were divided into two groups according to GINA assessment of asthma control in children; group I: 50 patients with well controlled asthma and group II: 50 patients with uncontrolled asthma who were further subdivided into 30 partly controlled asthmatic children and 20 uncontrolled asthmatic children. Group II also subdivided according to attacks severity (asthma score) into mild (21 children, 42 %), moderate (15 children, 30 %) and severe (14 children, 28 %). All children were subjected to history taking, complete clinical examination, local systemic examination, pulmonary function tests and fasting lipid profile in blood, included serum Total Cholesterol (TC), serum Triglycerides (TG), serum High-Density Lipoprotein (HDL) and LDL cholesterol level (LDL).*

Results: *TG and LDL were significantly higher in partly controlled and uncontrolled group compared with well controlled group ($p \leq 0.05$ and $p < 0.001$ respectively), while HDL level was higher in well controlled group compared with partly controlled and uncontrolled group ($p < 0.001$). There was negative correlation between LDL and (FEV1 & FVC); also there was negative correlation between HDL and FEV1/FVC ratio in the mild attacks subgroup. There was negative correlation between TG and*

PEFR; also there was negative correlation between LDL and FEV1/FVC ratio in the severe attacks subgroup.

Conclusion: *There was positive correlation between LDL in uncontrolled more than partly controlled asthmatic children while negative correlation between HDL in uncontrolled more than partly controlled asthmatic children.*

Keywords: *Bronchial Asthma, Lipid, Children.*

INTRODUCTION

Asthma is the most prevalent chronic respiratory disease in children worldwide **(Asher et al., 2006)**.

According to the guidelines of Global Initiative for Asthma (GINA), bronchial asthma is defined as a heterogeneous disease, usually characterized by chronic airway inflammation. It is defined by the history of respiratory symptoms such as wheeze, shortness of breath, chest tightness and cough that vary over time and in intensity, together with variable expiratory airflow limitation **(GINA updated 2020)**.

Dyslipidemia, defined as increased serum lipids including triglycerides (TGs), cholesterol, and/or fat phospholipids, is usually noticed with high prevalence in the developed countries due to bad dietary habits and lifestyle **(Chou et al., 2016)**. Dyslipidemia is known to impact potently the development of atopy by promoting proatopic Th2 immunity and allergic inflammation **(Ahmed et al., 2018)**.

Hypercholesterolemia initiates a systemic vascular proinflammatory response which can lead to development of atherosclerotic plaques and increased risk of cardiovascular diseases **(Baumruker; et al., 2003)**. Recently, hypercholesterolemia has also been associated with a skewing of the adaptive immune system toward a TH2-oriented response which could mediate other diseases, such as asthma and related disorders **(Sevelsted et al., 2015)**.

This study was conducted to evaluate the blood lipid profile in children with bronchial asthma and does the blood lipid level have any correlation with the degree of attacks severity and the control of bronchial asthma in children?

ETHICAL CONSIDERATION

1. Approval of ethical committee from pediatric department and Faculty of Medicine, Al-Azhar

University was obtained before the study.

2. Written patient consent was obtained before the study.
3. The patient has the right to withdraw from the study at any time.
4. The data of Study are confidential and the patient has the right to keep it.
5. The authors declared that there is no conflict of interest regarding the study on publication.
6. The authors declared that there is no financial support.

PATIENTS AND MATERIALS

This cross-sectional comparative study conducted upon 100 already diagnosed children with bronchial asthma; they were being divided into 2 groups:

Group I: 50 well controlled asthmatic children.

Group II: 50 uncontrolled and partly controlled asthmatic children whom were further subdivided according to attacks severity (asthma score) into mild, moderate and severe.

The chosen children collected from the attendance of the allergy pulmonology clinic, Al-Hussein, Al-Azhar University hospital, Cairo-Egypt in the period between 2017 and 2019.

Inclusion criteria:

- Age between 6-14 years.
- The diagnosis of bronchial asthma in children is based on the guidelines of the Global Initiative (2016).

Exclusion criteria:

- Chronic chest diseases other than bronchial asthma.
- Heart diseases, as coronary heart diseases and congenital heart diseases.
- Systemic Liver and Kidney diseases.
- Congenital abnormalities as, Familial hypercholesterolemia.
- Endocrinopathies as, Cushing's syndrome.
- Chronic drug use (e.g. prolonged systemic corticosteroid therapy).
- Abnormal increased body mass index.

All the enrolled children were subjected to the following:

- **Full history taking:** including Personal history, history of present illness, past and family history.
- **Full thorough clinical examination:**

- General examination including vital signs (BP, RR, HR and body temperature) and general appearance.
- Complete physical examination including height, weight and body mass index Local systemic examination including CNS examination, CVS examination, Respiratory examination, Abdomen examination, Skeletal examination.

Pulmonary function tests: to distinguish between the controlled and uncontrolled patients in addition to the history and clinical examination, included FEV1, FVC and FEV1/FVC ratio by MiniSpir PC-Based Spirometer.

Blood lipid profile: Fasting lipid profile in blood, included serum Total Cholesterol (TC), serum Triglycerides (TG), serum High-Density Lipoprotein (HDL) and LDL cholesterol level (LDL) by Beckman Coulter AU480 Chemistry Analyzer.

Statistical analysis:

Recorded data were analyzed using the statistical package for social sciences, version 20.0 (SPSS Inc., Chicago, Illinois, USA).

RESULTS

This study conducted upon 100 already diagnosed children with bronchial asthma; they were being divided into 2 groups:

Group I: 50 well controlled asthmatic children.

Group II: 50 uncontrolled and partly controlled asthmatic children whom were further subdivided according to attacks severity (asthma score) into mild, moderate and severe.

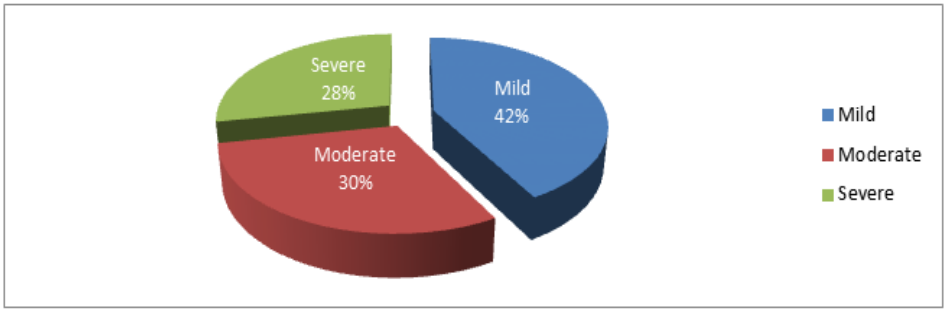

Figure (1): Apie shaped Classification of Group II according to severity of asthma attack exacerbation (asthma score) in to mild, moderate and severe

Table (1): Comparison between the studied groups regarding demographic data

Demographic data	Group I (n = 50)		Group II (n = 50)		p
	No.	%	No.	%	
Sex					
Male	31	62.0	23	46.0	0.112
Female	19	38.0	27	54.0	0.108
Age (years)					
Min. – Max.	7. 7 – 14.0		7.1 – 14.0		
Mean ± SD.	9.98 ± 1.83		10.51 ± 2.21		0.200
Median (IQR)	10.1(8.7 – 10.8)		10.7(8.31 –12.4)		
Order of siblings					
1st	11	22.0	13	26.0	0.132
2nd	14	28.0	20	40.0	0.143
3rd	16	32.0	11	22.0	0.129
4th	9	18.0	6	12.0	0.115
Level of education					
Primary school	33	66.0	39	78.0	0.142
Prep school	17	34.0	11	22.0	0.113
Child work					
Works	3	6.0	8	16.0	0.104
Doesn't work	47	94.0	42	84.0	0.154
P: p value for comparing between the studied groups					

This table showed that there was no statistically non-significant difference between the studied groups regarding demographic data.

Table (2): Comparison between the results of pulmonary function tests in both studied groups

The results of pulmonary function tests	Group I (n = 50)	Group II (n = 50)	p
PEFR L/MIN			
Min. – Max.	1.33 – 5.22	1.35 – 4.55	0.018*
Mean ± SD.	3.0 ± 1.06	2.53 ± 0.86	
Median (IQR)	3.14 (2.21 –3.66)	2.5 (1.99 – 3.16)	
FEV1 L			
Min. – Max.	0.47 – 2.37	0.47 – 1.91	0.008*
Mean ± SD.	1.34 ± 0.44	1.12 ± 0.29	
Median (IQR)	1.3 (1.01 – 1.64)	1.1 (0.98 – 1.14)	
FVC L			
Min. – Max.	0.47 – 2.45	0.82 – 4.40	0.068
Mean ± SD.	1.44 ± 0.49	1.84 ± 0.92	
Median (IQR)	1.41 (1.02 –1.81)	1.6 (1.30 – 1.96)	
FEV1/ FVC %			
Min. – Max.	69.90 – 100.0	22.50 – 96.90	< 0.001*
Mean ± SD.	92.78 ± 5.76	67.80 ± 19.37	
Median (IQR)	93.8(89– 96.98)	71.8(60– 81.55)	

P: p value for comparing between the studied groups.
*: Statistically significant at $p \leq 0.05$.

This table showed that group I showed significant lower values of PEFR, FEV1 and FEV1/FVC when compared to group II.

Table (3): Comparison between the results of lipid profile in the studied groups

Blood lipid profile	Group I (n = 50)	Group II (n = 50)	P
Total cholesterol			
Min. – Max.	3.50 – 5.20	3.50 – 5.30	0.630
Mean ± SD.	4.38 ± 0.52	4.33 ± 0.52	
Median (IQR)	4.5 (3.88 – 4.80)	4.25 (3.80 –4.83)	
LDL			
Min. – Max.	2.50 – 3.60	2.67 – 3.60	<0.001*
Mean ± SD.	2.75 ± 0.19	3.19 ± 0.23	
Median (IQR)	2.7 (2.67 – 2.75)	3.2 (2.99 – 3.40)	
HDL			
Min. – Max.	0.80 – 1.50	0.72 – 1.20	<0.001*
Mean ± SD.	1.08 ± 0.17	0.91 ± 0.10	
Median (IQR)	1.0 (0.98 –1.23)	0.89 (0.84 –0.98)	
Triglycerides			
Min. – Max.	1.45 – 1.80	1.43 – 1.82	0.039*
Mean ± SD.	1.66 ± 0.09	1.63 ± 0.09	
Median (IQR)	1.67 (1.60 – 1.74)	1.6 (1.57 – 1.69)	

This table showed that triglycerides (TG) and low-density lipoprotein (LDL) were significantly higher in group II compared with the group I, while high-density lipoprotein (HDL) level was higher in group I compared with the group II.

Table (4): Correlation between blood lipid profile and pulmonary function tests in group II according to severity

Pulmonary function tests	Blood lipid profile							
	Total cholesterol		LDL		HDL		Triglycerides	
	r_s	P	r_s	p	r_s	P	r_s	p
Mild (n = 21)								
PEFR	0.039	0.786	-0.084	0.564	-0.084	0.562	-0.007	0.962
FEV1	0.265	0.063	-0.345*	0.014*	0.071	0.623	0.097	0.503
FVC	0.274	0.054	-0.308*	0.030*	0.115	0.425	0.108	0.454
FEV1/FVC	-0.098	0.498	-0.007	0.962	-0.441*	0.001*	-0.028	0.849
Moderate (n=15)								
PEFR	-0.087	0.540	0.102	0.232	-0.111	0.345	-0.178	0.435
FEV1	0.109	0.322	-0.198	0.432	0.054	0.754	-0.058	0.643
FVC	0.010	0.643	0.043	0.089	0.103	0.652	0.109	0.452
FEV1/FVC	-0.090	0.511	-0.156	0.232	0.007	0.045	-0.032	0.801
Severe (n= 14)								
PEFR	-0.127	0.380	0.292*	0.039*	-0.181	0.208	-0.308*	0.030*
FEV1	-0.084	0.562	-0.066	0.647	0.036	0.802	-0.043	0.768
FVC	0.010	0.945	0.199	0.166	0.048	0.740	0.109	0.451
FEV1/FVC	-0.090	0.536	-0.391*	0.005*	0.236	0.099	-0.045	0.757

rs: Spearman coefficient

P: p value for comparing between the studied groups

*: Statistically significant at $p \leq 0.05$

This table showed that there was negative correlation between LDL and (FEV1 & FVC) in mild subgroup. Also there was negative correlation between HDL and FEV1/FVC ratio. There was no correlation between blood lipid profile and pulmonary function test in moderate subgroup. There was negative correlation between triglycerides and PFER in severe subgroup. Also there was negative correlation between LDL and FEV1/FVC ratio.

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Table (5): Correlation between blood lipid profile and group II

	Blood lipid profile							
	Total cholesterol		LDL		HDL		Triglycerides	
	r_s	p	r_s	p	r_s	P	r_s	P
Partly controlled (n = 30)	-0.125	0.423	0.234*	0.032*	-0.123*	0.050*	0.034	0.543
Uncontrolled (n = 20)	-0.245	0.056	0.010*	0.001*	-0.033*	0.001*	-0.167	0.234

rs: Spearman coefficient

This table showed there was statistically significant correlation between control of bronchial asthma and blood lipid profile in LDL and HDL. There was positive correlation between LDL in uncontrolled more than partly controlled asthmatic children while negative correlation between HDL in uncontrolled more than partly controlled asthmatic children.

Table (6): Correlation between blood lipid profile and pulmonary function tests in group II

Pulmonary function tests	Blood lipid profile							
	Total cholesterol		LDL		HDL		Triglycerides	
	r_s	p	r_s	P	r_s	P	r_s	p
Partly controlled (n = 30)								
PEFR	0.038	0.778	-0.086	0.564	-0.088	0.575	-0.023	0.962
FEV1	0.254	0.068	-0.342*	0.014*	0.076	0.643	0.089	0.503
FVC	0.213	0.065	-0.313*	0.030*	0.118	0.427	0.112	0.454
FEV1 / FVC	-0.094	0.487	-0.012	0.962	-0.447*	0.003*	-0.033	0.849
Uncontrolled (n= 20)								
PEFR	-0.124	0.397	0.286*	0.033*	-0.185	0.208	-0.323*	0.033*
FEV1	-0.086	0.554	-0.063	0.354	0.037	0.802	-0.054	0.775
FVC	0.017	0.953	0.186	0.327	0.043	0.740	0.102	0.421
FEV1 / FVC	-0.086	0.545	-0.345*	0.002*	0.239	0.099	-0.046	0.734

rs: Spearman coefficient
P: p value for comparing between the studied groups
*: Statistically significant at $p \leq 0.05$

This table showed that there was negative correlation between LDL and (FEV1 & FVC) also there was negative correlation between HDL and FEV1/FVC ratio in partly group. There was negative correlation between triglycerides and PEFR in uncontrolled group also there was negative correlation between LDL and FEV1/FVC ratio while there was positive correlation

between LDL and PEFR in same group.

DISCUSSION

Asthma is a chronic health problem that affects 20 % of children worldwide. Globally, asthma-related problems have increased by 30 % over the past 20 years **(Vos et al., 2012)**. Childhood asthma has a great negative impact on the social and economic perspectives of families **(Korn et al., 2013)**. Asthma is a heterogeneous disease that affects both children and adults, and is characterized by chronic inflammation in the respiratory tract due to continuous inflammatory stress signaling or chronic exposure to allergens **(Brand et al., 2008)**. Dyslipidemia, defined as increased serum lipids including triglycerides (TGs), cholesterol, and/or fat phospholipids, is usually noticed with high prevalence in the developed countries due to bad dietary habits and lifestyle **(Chou et al., 2016)**. Dyslipidemia is known to impact potently the development of atopy by promoting proatopic Th2 immunity and allergic inflammation **(Ahmed et al., 2018)**.

In this study, we aimed to assess the serum lipid profile in asthmatic children and to evaluate the correlations between the attacks severity of bronchial asthma in children and the level of control.

In the present study, the age of patients was between 6 - 14 years with mean of 10.25 ±2.04 years classified as Fifty four patients were males (54%) while forty six patients were females (46%) which agrees with Carey MA et al., who studied prevalence of childhood bronchial asthma and found maternal environment and genetics are important in development of asthma during childhood and boys have an increased prevalence of asthma compared to girls. A potential explanation is that boys have dysynaptic growth of their large airways, meaning the growth of their airway lags behind the growth of the lung parenchyma, leading to narrower airways in boys compared to girls **(Carey MA et al., 2007)**.

In our study, The mean of PEFR, FEV1, FVC and FEV1/ FVC ratio in group I were 3, 1.34, 1.44 and 92.78 respectively while in group II were 2.53, 1.12, 1.84 and 71.8 respectively. Group I showed significant lower values of PEFR, FEV1 and FEV1/FVC when compared to group II that agrees with K A Macleod et al who studied children with well

controlled asthma and FEV1 and found that FEV1 had significantly higher in uncontrolled asthmatic than well controlled asthmatic children, indicating abnormal gas mixing in patients with ongoing inhaled corticosteroid therapy and a high level of asthma control, salbutamol administration only minimally improved FEV1, which is to be expected in a population with well controlled disease, evidence of ventilation heterogeneity in children with well controlled asthma and normal FEV1 **(K A Macleod et al., 2008)**.

In the present study, the mean of TC, HDL-C, LDL-C and TG in group I were 4.38, 1.08, 2.75 and 1.66 respectively while in group II were 4.33, 0.91, 3.19 and 1.63 respectively. TG and LDL were significantly higher in group II compared with the group I ($p \leq 0.05$ and $p < 0.001$ respectively), while HDL level was higher in group I compared with the group II ($p < 0.001$) which agrees with Chen et al whom studied the association between dyslipidemia and asthma, also the interaction effect of asthma on hyperlipidemia; 10 – 15 years old children were recruited from 7 schools and 2 hospitals in Northern Taiwan. The population consisted of 237 asthmatic children and 225 non-asthmatic controls, and was further divided into four groups: non-obese control, obese control, non-obese asthmatic, and obese asthmatic. They found that TC and LDL-C levels were higher in obese asthmatic, non-obese asthmatic, obese control and non-obese control groups respectively. In boys, LDL-C levels were significantly higher in obese asthmatic group compared to obese non-asthmatic group, with a mean difference of 6.2 mmol/L in the general linear model. Asthma was associated with higher LDL-C levels and this association was amplified in overweight and obese subjects. A gender difference was observed in the joint effect of obesity and asthma on hyperlipidemia **(Chen et al., 2013)**.

In our study, there was negative correlation between LDL and (FEV1 & FVC) in mild subgroup. Also there was negative correlation between HDL and FEV1/FVC ratio This is in agreement with **Al-Shawwa et al.,** studied the effect of serum cholesterol level on asthma frequency in a retrospective study were on 188 patients between the 4 and 20 years of age who presented to a rural pediatric clinic and whose total serum cholesterol (TC) level was obtained. Diagnosis of asthma was

determined by the treating physician. They found that asthma was present in 50 patients. TC (mean +/- SD) for the asthma group was 176.7 +/- 39.8 compared to 162.9 +/- 12.8 in the non-asthma group (P = 0.028). A total of 21 of the 50 (42%) asthma patients were obese compared to 31 of the 138 (22%) non-asthma patients (p = 0.014). There was no difference between both groups regarding age and gender. Hypercholesterolemia and obesity were identified by logistic regression analysis to increase the probability of asthma independently. Hypercholesterolemia is a potential risk factor for asthma independent of obesity **(Al-Shawwa et al., 2006)**.

The results of our study were supported by **(Zhu et al., 2017)**, A case-control study in which 59 children (28 boys, 31 girls) in the asthma group compared with 57 (29 boys, 28 girls) children in the control group (not asthmatic). The mean age, gender distribution and mean BMI did not differ significantly between the two groups. TC, TG, LDL and VLDL levels were significantly increased in the asthma group (30.12, 24.17, 28.66, and 17.15 % higher than those of the controls, respectively and there was a corresponding decrease in HDL level in the asthma group, which was 15.08 % lower than that of the controls **(Zhu et al., 2017)**.

In the present study, there was negative correlation between TG and PFER in severe subgroup also there was negative correlation between LDL and FEV1/FVC ratio This is in agreement with **sovare et al.,** a prospective cohort study in which 100 children aged 5 to 18 years old diagnosed with allergic asthma were enrolled. Patients were divided into two groups according to their lipid profile group I with abnormal dyslipidemia (53%) and group II with normal lipid profile (47%). Among Group I, 44.7% of the patients included had controlled asthma, 10.6% had partially controlled asthma and 44.7% had uncontrolled percentage with higher values of serum cholesterol compared with those with controlled asthma; the children registered in the categories of moderate and severe asthma were in a higher percentage with total serum cholesterol increased compared to those with mild asthma while 3.8% of the patients in group II had controlled asthma, 43.4% of the patients with partially controlled asthma and 52.8% of those had uncontrolled asthma. This means that patients

in the categories of partially controlled and uncontrolled asthma were in a higher **(Sovare et al., 2019)**.

Ko et al. a large cross-sectional population-based study included 2841 subjects aged 11–18 years with fasting lipid blood sample data. 1511 of patients were male and 1330 were female and the mean age was 15.1 years. Among them, 123 were diagnosed with asthma (asthma group) and 2718 were not (non-asthma group). The TC/HDL-C ratio, LDL-C/ HDL-C ratio, and non-HDL-C levels were significantly higher in the asthma group than in the non-asthma group (P< 0.05). The high-risk groups displayed significantly higher asthma prevalence with higher TC, TG, LDL-C, and non-HDL-C levels and TG/HDL-C ratio than the low-risk groups (P < 0.05) **(Ko et al., 2018)**.

In our study, there was statistically significant correlation between control of bronchial asthma and blood lipid profile in LDL and HDL and there was positive correlation between LDL in uncontrolled more than partly controlled asthmatic children while negative correlation between HDL in uncontrolled more than partly controlled asthmatic children these results agrees with **Jiayu Peng and Ying Huang** who studied the association between asthma and the serum levels of HDL-C and LDL-C. Patients were divided into 2 subgroups according to age: children (<18 years old) and adults (18 years old and more) they found results In children, the asthma group had lower HDL-C levels (weighted mean difference, _3.44; 95% confidence interval [CI], _5.83 to _1.04; P ¼ .005) compared with the non-asthma group, whereas the serum levels of LDL-C in these 2 groups were not statistically different. In contrary, in adults, the asthma group had higher LDL-C levels (weighted mean difference, 8.95; 95% confidence interval, 3.55e14.35; P ¼ .001) compared with the non-asthma group, whereas the HDL-C levels were not statistically different. There is a significant association between asthma and the serum levels of HDL-C and LDL-C. Moreover, this association differs in children and adults **(Jiayu Peng, BS and Ying Huang, 2017)**.

In the present study, there was negative correlation between LDL and (FEV1 & FVC) in partly group. Also there was negative correlation between HDL and FEV1/FVC ratio. There was negative correlation between triglycerides and PEFR in uncontrolled group while there was positive correlation between

LDL and PEFR in same group. Also there was negative correlation between LDL and FEV1/FVC ratio. This is in agreement with **Yiallouros et al** who performed a series of studies examining the relationship between lipids and asthma in children and adolescents. In a cohort of 3,982 children from Cyprus, the authors found that low HDL cholesterol in childhood (11-12 years of age) was associated with the development of asthma in adolescence (age 15-17 years) **(Yiallouros et al., 2014)**. Utilizing a case-control design, these same authors found that adolescent asthma was associated with low serum HDL cholesterol levels independent of HDL levels in childhood **(Yiallouros et al., 2012)**.

CONCLUSION

Our study demonstrated Triglycerides (TG) and low-density lipoprotein (LDL) were significantly higher in partly controlled and uncontrolled group compared with well controlled group, while high-density lipoprotein (HDL) level was higher in well controlled group compared with partly controlled and uncontrolled group. There was positive correlation between LDL in uncontrolled more than partly controlled asthmatic children while negative correlation between HDL in uncontrolled more than partly controlled asthmatic children. In mild subgroup there was negative correlation between LDL and (FEV1 & FVC), also there was negative correlation between HDL and FEV1/FVC ratio. In severe subgroup there was negative correlation between triglycerides and PEFR, also there was negative correlation between LDL and FEV1/FVC ratio this means that dyslipidemia is associated with poor control of asthmatic children regardless the weight of the patients as well as the attacks severity.

RECOMMENDATION

- Regular follow up of lipid profile in children with uncontrolled asthma.
- Early intervention against hyperlipidemia for children through regular and appropriate life style may be useful for the prevention of the occurrence and/or aggravation of bronchial asthma.
- Further longitudinal studies are required to evaluate a potential modifiable link between an unhealthy blood lipid profile and asthma.

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مستوي الدهون بالدم في الأطفال المصابين بالربو الشعبي

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خلفية البحث: الربو هو أكثر أمراض الجهاز التنفسي المزمنة انتشارًا بين الأطفال في جميع أنحاء العالم. وفقًا لإرشادات المبادرة العالمية للربو (GINA)، يُعرَّف الربو الشعبي بأنه مرض غير متجانس، يتميز عادةً بالتهاب مجرى الهواء المزمن. يتم تعريفه من خلال تاريخ أعراض الجهاز التنفسي مثل الأزيز وضيق التنفس وضيق الصدر والسعال التي تختلف بمرور الوقت والشدة، إلى جانب الحد من تدفق الهواء الزفير المتغير. عادة ما يُلاحظ عسر شحميات الدم، الذي يُعرَّف بأنه زيادة الدهون في الدم بما في ذلك الدهون الثلاثية (TGs) والكوليسترول و/أو الدهون الفوسفورية الدهنية، مع انتشار مرتفع في البلدان المتقدمة بسبب العادات الغذائية السيئة وأسلوب الحياة. من المعروف أن عسر شحميات الدم يؤثر بشكل فعال على تطور التأتب عن طريق تعزيز مناعة بروتين Th2 والتهاب الحساسية يبدأ فرط كوليسترول الدم في استجابة مسببة للالتهابات في الأوعية الدموية والتي يمكن أن تؤدي إلى تطور لويحات تصلب الشرايين وزيادة خطر الإصابة بأمراض القلب والأوعية الدموية. في الآونة الأخيرة، ارتبط فرط كوليسترول الدم أيضًا بانحراف جهاز المناعة التكيفي نحو استجابة موجهة نحو TH2 والتي يمكن أن تتوسط في أمراض أخرى، مثل الربو والاضطرابات ذات الصلة.

الهدف من البحث: تم إجراء هذه الدراسة لتقييم مستوى الدهون في الدم لدى الأطفال المصابين بالربو الشعبي وهل لمستوى الدهون في الدم أي علاقة مع درجة شدة النوبات والتحكم في الربو القصبي عند الأطفال؟

المرضى وطرق البحث: أجريت هذه الدراسة المقطعية المقارنة على 100 مريض يعانون من الربو القصبي المسجلين من عيادة الحسين للحساسية والرئة، مستشفى جامعة الأزهر، القاهرة، مصر في الفترة من 2017-2019. تم تقسيم المرضى المسجلين إلى مجموعتين حسب تقييم GINA للسيطرة على الربو عند الأطفال. المجموعة الأولى: 50 مريضًا يعانون من الربو الخاضع للسيطرة جيدًا والمجموعة الثانية: 50 مريضًا يعانون من الربو غير المنضبط والذين تم تقسيمهم إلى 30 طفلًا مصابًا بالربو يتم التحكم فيه جزئيًا و 20 طفلًا مصابًا بالربو غير المنضبط. تم تقسيم المجموعة الثانية أيضًا وفقًا لشدة النوبات (درجة الربو) إلى خفيفة (21 طفل، 42٪)، معتدلة (15 طفل، 30٪) وشديدة (14 طفل، 28٪). خضع جميع الأطفال لأخذ التاريخ الطبي، والفحص السريري الكامل، والفحص الجهازي المحلي، والأشعة السينية للصدر، واختبارات وظائف الرئة، وصيام الدهون في الدم، بما في ذلك الكوليسترول الكلي في الدم (TC)، والدهون الثلاثية في الدم (TG)، والمصل عالي الكثافة البروتين الدهني (HDL) ومستوى الكوليسترول الضار (LDL).

النتائج: هناك فرق إحصائياً هاماً بين المجموعات المدروسة فيما يتعلق بمستوي الدهون في الدم حيث لوحظ ان الدهون الثلاثية (TG) والبروتين الدهني منخفض الكثافة (LDL) كانت أعلى بشكل ملحوظ في المجموعة التي يتم التحكم فيها جزئيًا وغير المنضبط مقارنةً بالمجموعة التي يتم التحكم فيها جيدًا، بينما كان مستوى البروتين الدهني عالي الكثافة (HDL) أعلى في المجموعة التي يتم التحكم فيها جيدًا مقارنةً بالمجموعة التي يتم التحكم فيها

جزئيًا و مجموعة غير خاضعة للرقابة. كان هناك ارتباط إيجابي بين LDL في أكثر من الأطفال الذين يعانون من الربو غير المتحكم فيهم جزئيا بينما هناك علاقة سلبية بين HDL في الأطفال غير المنضبطين أكثر من الأطفال المصابين بالربو الخاضع للسيطرة جزئياً. في المجموعة الفرعية الخفيفة كان هناك ارتباط سلبي بين LDL و (FEV1 & FVC)، كما كان هناك ارتباط سلبي بين HDL و FEV1/FVC.في المجموعة الفرعية الشديدة كان هناك ارتباط سلبي بين الدهون الثلاثية و PEFR، كما كان هناك ارتباط سلبي بين LDL و FEV1/FVC.

الاستنتاج: أن عسر شحميات الدم يرتبط بضعف السيطرة على الأطفال المصابين بالربو بغض النظر عن وزن المرضى وكذلك شدة النوبات

التوصيات: قد يكون التدخل المبكر ضد فرط شحميات الدم للأطفال من خلال النظام الغذائي وممارسة الرياضة مفيدًا للوقاية من حدوث و/أو تفاقم الربو الشعبي. هناك حاجة إلى مزيد من الدراسات الطولية لتقييم ارتباط محتمل قابل للتعديل بين ملف الدهون في الدم غير الصحي والربو.