International Journal of Pharmaceutical Science Invention
ISSN (Online): 2319 – 6718, ISSN (Print): 2319 – 670X
www.ijpsi.org Volume 6 Issue 5 ǁ May 2017 ǁ PP. 15-18

Difficult To Treat Asthma with Cardiac Arrhythmia

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I. Introduction

Bronchial asthma is the most common chronic respiratory disease in childhood. In the last 20 years the prevalence of asthma is increasing worldwide and according to a different data is between 5-15% for childhood age. An essential therapeutic problem is the severe asthmatic attack, which is the main cause for hospital admission of asthmatics.
The severe asthmatic attack is determined by a group of clinical, laboratory and instrumental criteria.

Clinical criteria for a severe asthmatic attack:
- Shortness of breath
- Tachypnea, orthopnea
- Communication with separate words
- Irritation, nervousness, sleeplessness
- Dyspnea, use of accessory muscles
- "Wheezing" from the chest, diminished breathing sounds or "silent" lungs
- Tachycardia, cyanosis , reduced physical capacity

Laboratory and instrumental criteria:
- Lung functional test (LFT) : severe bronchial obstruction
- Peak expiratory flow (PEF)< 60% of the predictable value
- Blood gas analysis : hypoxemia with/without hypercapnea
- TcSaO2 <90%
- Chest radiogram : hyperinflation

II. History of the disease

We present a 15-year old girl, born a normal pregnancy and delivery. Family history for allergic diseases from both parents. Personal allergic dermatitis. Since the age of 3 years the child start with attacks of bronchial obstruction, provoked by respiratory infections. From the 7-th year of age attacks appear more frequent, once or twice a month, induced by physical efforts. For a short period a prophylactic therapy with Ketotifen – sirup
(Zaditen) is performed, in case of breathlessness - bronchodilator Salbutamol (Ventolin) – spray, and not regular – Beclomethasone dipropionate (Becotide) – spray. The reason for the recent hospital admission is coughing and shortness of breath for several days.
Physical examination:
Deteriorated general appearance, pale skin, sweating, no fever, upright sitting. Dry skin with erythematic patches and hyperkeratosis around elbows and knees. Clinical signs for a marked respiratory distress : expiratory tachydyspnoea with total retraction of the breathing muscles, hypersonic tone in percussion, very diminished breathing sounds with a prolonged expiration and wheezing crackles in both lung bases , BR 32 / b.p.m.Cardio-vascular system : tachycardia, HR 110 /b.p.m., no murmurs, BP 110/70 mmHg. No deviations from the other organs and systems.
Laboratory and instrumental findings:
- Complete blood count (CBC) : ESR 4mm, Hb 11.7g/l, Ery 4.56x $10^{12,}$Leu 8.8h10^{9}, PLT 166 000
- Urinalysis – with transitory ketonuria and glucosuria
- Chest X –ray : hyperinflation with peribronchial interstitial infiltrates, low position of the diaphragm, flat cupola
- Tc SaO2 : 89-90%
- Lung functional test (LFT) : FVC 82.4% ; FEV1 63.6%,MMEF 26.8% - severe obstruction
- Blood gas analysis : hypoxemia

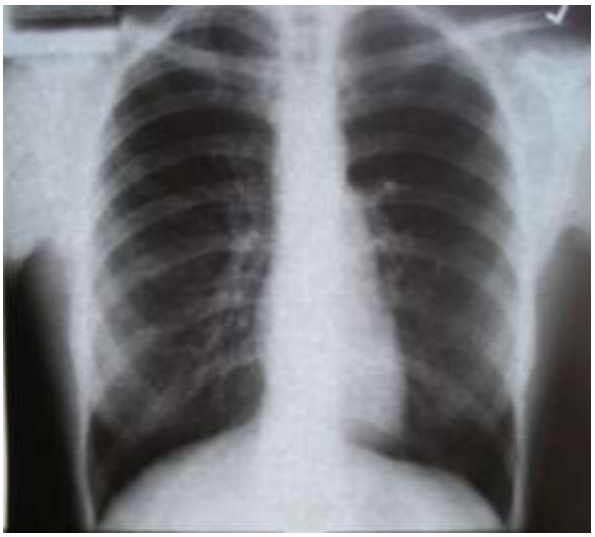

Fig. 1 – Chest X- ray: hyperinflation with peribronchial interstitial infiltrates, low position of the diaphragm, flat cupola

III. Treatment

According to GINA initial treatment started with 3 inhalations with short acting beta 2 – agonist (SABA) Salbutamol (Ventolin) in 20 min. interval, followed by 4 hour – interval, steroid Methylprednisolon 2mg/kg/d i.v., nasal oxygen supply 2l/min with nasal cannula.

On the second day of the hospital treatment still the bronchial obstruction was observed, on the physical examination cardiac arrhythmia with extra systoles was detected. From the electrocardiogram(ECG) : frequent monomorph ventricular extrasystoles - ventricular ectopic beats (VEBs).Blood tests (glucose, urea, creatinin, electrolytes) were in the normal rates.

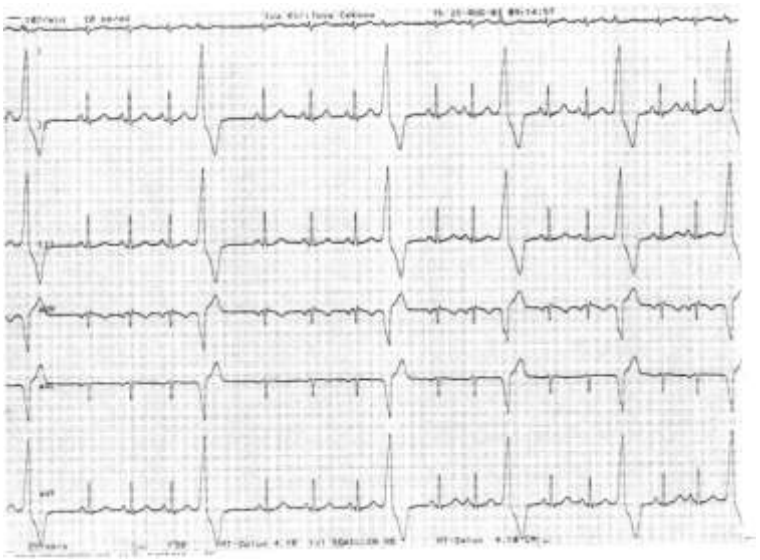

Fig.2 – Initial ECG: monomorph ventricular extrasystoles

Extrasystoles were connected with: β2-agonist therapy and cardiac tissue hypoxemia. The treatment continue only with the steroid, no SABA , but the pulmonary status got worse, extrasystoles decrease in rate but still appear in the ECG. After a consultation with a pediatric cardiologist the SABA therapy was started again in lower doses in combination with antiarrhythmic medication: Ca –channel blocker - Verapamil 3mg/kg/d.

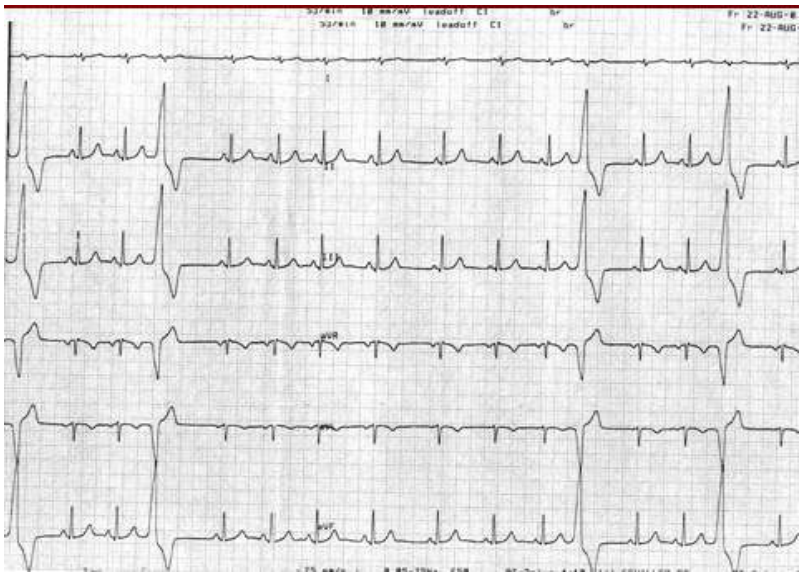

Fig. 3 – ECG with SABA and antiarrhythmic medication

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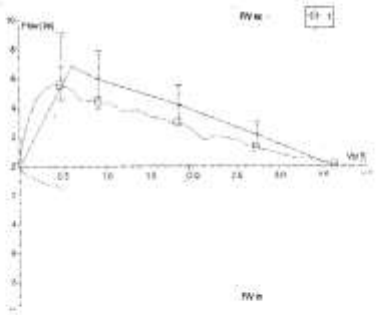
BRONCHODILATION TEST

Last Name:	Tsekova	Identification:	6810126812
First Name:	Iva	Age:	14 Years
Date of Birth:	12/10/1988	Weight:	43 kg
Sex:	female	Height:	167 cm

Diagnosis: Asthma Br.



	Pred	Act1	Act1%(Act1/Pred)
VC MAX.....[l]	3.65	3.64	99.8
IC.....[l]	2.44		
ERV.....[l]	1.19		
FVC.....[l]	3.63	3.64	100.4
FEV 1.....[l]	3.07	2.86	93.2
FIV1 % FVC .....[%]		93.79	
PEF.....[l/s]	6.82	5.46	80.1
FEF 25.....[l/s]	5.91	4.30	72.7
FEF 50.....[l/s]	4.19	2.87	68.4
FEF 75.....[l/s]	2.16	1.14	52.8
MMEF 75/25.....[l/s]	3.78	2.37	62.6
MVV.....[l/min]	68.64		
Date		11/08/2003	
Time		12:05:27	

REPORT: dose of albuterol used 200 mcg
CONCLUSION: The test is: POSITIVE ~~NEGATIVE~~

The child showed significant clinical improvement, also controlled ECG – normal sinus rhythm. Controlled LFT : improvement in parameters , but still obstructive defect.Positive (+) bronchodilator test (BDT) : improvement in FEV1 with 14%.

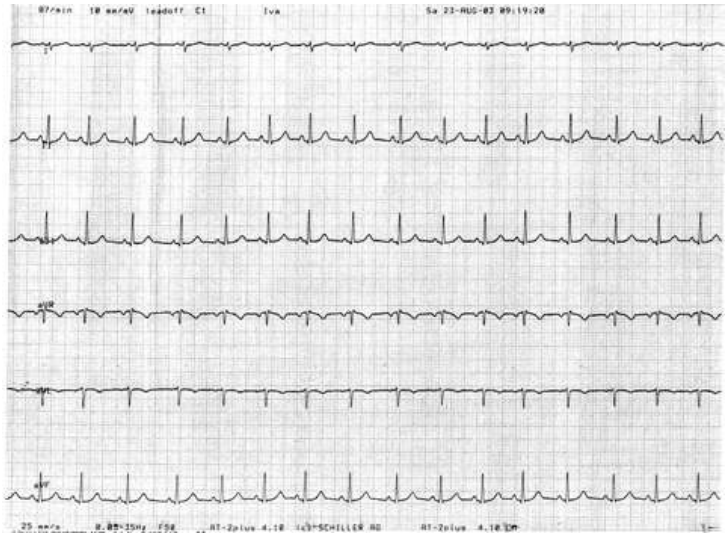


Fig. 4- Last ECG before the hospital discharge and LFT

The girl was discharged from the hospital with normalized pulmonary status, LFT before discharge: VC 100.4%, FEV1 93.2%, MMEF 62.6%. The asthma - control therapy was started with Fluticasone propionate - spray (Flixotide) 250 mcg 2x1 puff with volume camera and SABA (Ventolin) spray 3 x 2 puffs in case of need .

The clinical case is presented as a difficult to treat severe asthma attack, combined with cardiac complications. In order to perform the best treatment a thorough observation and collaboration is needed.

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