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A CLINICAL CASE OF SPONTANEOUS PNEUMOTHORAX ASSOCIATED WITH BRONCHIAL ASTHMA IN A 17-YEAR OLD MALE ADOLESCENT

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Spontaneous pneumothorax most commonly occurs among able-bodied male population at the age of 20-40; thus revealing not only medical but also social significance of the problem. We have described the case of spontaneous pneumothorax of a 17-year old male adolescent, admitted to the department of pulmonology of the Pediatric center, Republic Hospital №1 – National Center of Medicine.

The significance of the case results from clinical manifestation of the spontaneous pneumothorax associated with a severe and acute attack of the bronchial asthma.

Keywords: pneumothorax, pneumonia, bronchial asthma, emphysema, pollinosis.

Introduction. A term 'spontaneous pneumothorax' (SP) was introduced by Laennec in 1803. The fact of revealing of the collapsed lung was a diagnostic victory at that time. Before the era of the X-ray any pneumothorax without any sign of the trauma was considered to be spontaneous and causeless. Spontaneous pneumothorax is a collection of air in the lung tissue not associated with trauma or iatrogenic clinical interventions. Statistically it prevails in able-bodied male population at the age of 20-40 and reveals not only medical but also social significance of the problem. There are two types of spontaneous pneumothorax as primary and secondary. Primary spontaneous pneumothorax is diagnosed among those who previously did not have clinically diagnosed lung pathology. Secondary spontaneous pneumothorax is associated with previous lung disorders. Most commonly secondary spontaneous

pneumothorax complicates chronic obstructive lung disorders, bronchial asthma. Clinically pneumothorax is associated with sharp chest pain; acute shortness of breath, dry non-productive cough. That is why the choice of adequate diagnosis and therapy tactics is of great importance for pulmonologists, thoracic surgeons and phthisiatricians [1, 2, 3].

Materials and methods: We have analyzed a case history of the patient, admitted to the department of pulmonology of the Pediatric center, Republic Hospital №1 – National Center of Medicine. The patient underwent complete and profound examination according to all standards and clinical recommendations at the department of pulmonology. We have carried out clinical (complete blood count, urine test, rinocitogram), immunological (immunoglobulin level detection, antibodies to certain infections), functional methods as spirometry, X-ray examination, computed tomography of the lungs. Skin allergy testing was for standard pollen allergens (early blooming plants as birch, alder, avellane; late blooming plant as poplar; weeds as timothy, meadow, cheat, wormwood, ryegrass, dandelion and couch grass; gramineous (rye, oat, fescue grass) and food allergens. Skin sensitivity is evaluated by the indicators (+, ++, --).

Results and discussion. The patient experienced suffocation for the first time in 9.08.2019 during the haymaking. He applied for medical assistance to his local polyclinic. He was administered intravenous aminophylline 3.0 injected very slowly, ceftriaxone 1.0 intramuscularly. Anteroposterior radiography of the chest revealed the signs of pneumothorax of the right lung and subcutaneous two-sided emphysema in 10.08.2019. The patient was referred to the department of surgery of the Pediatric center of Republic Hospi-

tal №1 – National Center of Medicine.

Past history of the patient: The fourth pregnancy child was without any gravity abnormalities, the 4th delivery, at 36th week of gestation. The weight at birth was 2800 gr, 49 cm length. He was breastfed till 2 years. He is not regularly consulted by phthisiatrician. No contact with infected people. All preventive inoculations were taken on time according to the schedule.

Past medical history: Acute respiratory diseases, respiratory infectious diseases, maxillary sinusitis, chicken pox. No traumas and surgeries were registered. The patient says he is a non-smoker.

Allergic history: The father is diagnosed with bronchial asthma, the mother has pathology of the cardiovascular system. The patient is allergic to pollen, he reacts to the smell of haymade grass associated with swollen eyelids and suffocation.

On examination the admitting physician estimated a medium severity of the condition. The height was 178 cm, weight was 65 kg, BMI was 20.515. He was in contact, active. The skin was of typical colour. The visible mucous membranes were pink. Lymphatic nodes (neck, mandibular, occipital and axillary) were not enlarged. The pharynx was not inflamed. The breathing was present in all lobes/parts, a bit weakened in the right side. The lung percussion revealed tympanic sound in the lower parts of the right lung. Bronchophony of the right lung revealed weakened sound transmission. The respiratory rate was 20 per 1 minute. Intercostal spaces of the right lung were smoothed. Cardiac tones were clear and rhythmic. Heart rate was 89 per 1 minute. The stomach was soft and painless. Urination was free. Stool, diuresis was within the norm.

Paraclinical notes: Urine analysis (12.08.2019): pale yellow colour, trans-

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parent, relative density 1013, protein was negative, leukocytes were solitary, erythrocytes were not found. Total blood count for 12.08.2019 revealed; erythrocytes 3.6×10^{12} /l, hemoglobin 120 gr/l, leukocytes 4.7×10^9 /l, segmented granulocytes 55, stab granulocytes 11, eosinocytes 6, monocytes 4, erythrocytes sedimentation rate 57 mm/hr.

In 12.08.2019 the patient was urgently hospitalized into the surgical department of the Republic Hospital №1 – National Center of Medicine. On admission the primary diagnosis was: J18.0 Unconfirmed pneumonia? Bronchial asthma? Right side pneumothorax. Two-sided subcutaneous emphysema.

In 12.08.2019 a second X-ray revealed subcutaneous right emphysema. X-ray showed the signs of bronchitis.

In 12.08.2019 the patient was referred to the department of pulmonology. A doctor of the department of pulmonology administered:

1. Immunoglobulins A, M, G, E circulating immune complexes
2. Immunofluorescence test for infections (mycoplasma pneumoniae, chlamydia pneumonia and herpes simplex virus)
3. Rinocitogram
4. Spirometry with testing for salbutamol
5. Alpha 1 antitrypsin test
6. Sweat test
7. C-reactive protein test in blood
8. Stool test for lamblia
9. Allergy test

The patient is recommended a special diet #4. Nebulizer therapy: 20 drops of berodual and 2 ml of saline solution to be inhaled for 10 min 2 times a day for 10 days long; pulmicort 500 mkg and 2 ml of saline solution to be inhaled for 10 min 2 times a day for 10 days long. Azythromycin 500 mkg should be taken once a day for 5 days long. Therapeutic physical training is a special complex of exercises, #5. The massage of the chest was also recommended, #5. Ultrahigh-frequency therapy (UHF-therapy) #5 of the chest was also recommended. Short-wave ultraviolet therapy of the nose and pharynx #5 was carried out.

In 15.08.2019 the computed tomography (CT-scan) revealed a focal shadow in the right lung, pneumomediastinum, subcutaneous emphysema of the right lung, and pneumothorax.

In 20.08.2019 spirometry was carried out, it did not reveal low potency of bronchial tubes. Vital capacity of the lungs was within the norm. Salbutamol test was positive.

The results of immune analyses were:

IgA 2.0 gr/l, IgM 2.0 gr/l, IgG 9.6 gr/l, IgE 180 IU/ml. According to the results of the analyses IgE level was increased indicating allergic reaction.

In 12.08.2019 rinocitogram revealed high level of neutrophils 2-3 within the field of microscopy, eosinophils 5-6 within the field of microscopy.

In 12.08.2019 alpha 1 antitrypsin indicator was within the norm, 0.9 g/l.

In 12.08.2019 the level of sodium chloride after the sweat test was within the norm, 10 mmol/l.

The lamblia stool analysis did not reveal any cysts of protozoa. The blood analysis for antibodies did not reveal antibodies to *Mycoplasma pneumonia* IgG and *Mycoplasma pneumonia* IgM, *Chlamydia pneumonia* IgG and *Mycoplasma pneumonia* IgM, virus of herpes simplex 1 and 2 IgG was found out.

The allergy test revealed high reaction to timothy grass +++, cheat +++, couch grass +++, rye grass+.

According to the results of the analysis the patient was diagnosed with bronchial asthma, atopic form of medium severity; attack period (J45.0) and allergic rhinitis, pollinosis (J30.4). Complication: secondary pneumothorax. The condition was after experienced pneumothorax. Subcutaneous emphysema of the both sides was registered. Concomitant diagnosis was unconfirmed pneumonia (J18.9). Community-acquired lower lobar pneumonia of moderate severity with broncho-obstructive syndrome was diagnosed.

In 10 days the patient was discharged from the hospital in a satisfactory condition with following recommendations:

1. Regular medical check-up and examination by the local pediatrician. A daily recording of peak flow chart (in the morning and in the evening) was recommended.
2. The consultation of the pulmonologist in three months and a consultation of the allergologist in 1 year were also recommended.
3. Maintain a hypoallergenic home environment.
4. Base therapy with seredite 25/250 mkg twice a day at 8.00 a.m. and 8.00 p.m. for three weeks, flixonase (nasonex, avamys) therapy once a day for 3 months.
5. No inoculations for 1 month.

Conclusion. The treatment of spontaneous pneumothorax should be aimed at solving two problems as releasing air from the pleural cavity and preventing secondary pneumothorax. Not all patients with a first episode of the spontaneous pneumothorax should undergo evacuation of the air from the pleural cavity, it

is necessary only in cases of extended pneumothorax and the condition experiencing the symptoms of pneumothorax. The medical literature represents different methods of treating pneumothorax as conservative treatment; pleural puncture (singular or repeated); transthoracic microdrainage; Bulau drain; drainage with active aspiration; drainage with pleurodesis; video-assisted thoracic surgery; thoracotomy. The choice of tactics is of great importance in pediatric patients. We have described the case of spontaneous pneumothorax associated with severe attack of acute bronchial asthma as a result of contact with graminoids during the hay-making. A list of authors constitute that there can be a pulmonary laceration due to high pressure in the lungs during the attack of asthma; which results in accumulation of air in the pleural cavity [2, 3]. Modern tactics of spontaneous pneumothorax treatment are conservative methods, thoracocentesis, drainage of pleural cavity and surgical intervention [2]. An outcome of the primary spontaneous pneumothorax is favourable. It is usually possible to smooth the lung with minimum of invasion. In 20-50% the symptoms of spontaneous pneumothorax recur. The patients after spontaneous pneumothorax should regularly visit a thoracic surgeon or a pulmonologist [1, 2, 3].

Thus, timely diagnosis of spontaneous pneumothorax, adequate treatment of the developing spontaneous pneumothorax, planned base and preventive treatment of the underlying disease in a case of secondary spontaneous pneumothorax found the basis for successful treatment. In that case adequate treatment of the bronchial asthma could arrest the spontaneous pneumothorax by conservative methods and obtain stable improvement of the patient's condition.

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