

## GRASS INFLORESCENCE ASPIRATION - EVOLUTIONARY FEATURES IN CHILDREN

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### Abstract

The authors present the case of a child, aged 1 year and 5 months, admitted to the 2<sup>nd</sup> Pediatric Clinic of the Emergency County Hospital in Craiova, with a suspicion of aspiration or ingestion of a foreign body (grass inflorescence), which occurred during a respiratory intercurrence.

The paper describes the evolution from the first admission when the child presented poor general condition, fever, antalgic position of right lateral decubitus, abdominal meteorism, cough, respiratory failure, staccato lung, right axillary decreased vesicular murmur, subcrepitan rales in the right lung area. The pediatric surgery examination, the abdominal x-ray on empty stomach, and the abdominal ultrasound examination excluded the possibility of ingestion while the bronchoscopy examination revealed no foreign body. Later on, the patient presented right pneumothorax. After a calm six-month-period, the child removes, in a fit of coughing, the grass inflorescence, followed by hemoptysis. Later, bronchiectasis is highlighted, at the level of the terminal bronchus on the right side, following a bronchoscopic examination performed one month after the elimination of the grass inflorescence.

**Key words:** grass inflorescence, aspiration, child

### Introduction

Foreign body aspiration is a medical emergency and needs special attention due to the serious effects that can lead to: acute respiratory failure, asphyxiation, heart failure, laryngeal edema, pneumothorax, hemoptysis, bronchial stenosis, recurrent pneumonia, and sometimes death (1,2).

### Case presentation

Female child from urban area, aged 1 year and 5 months, is hospitalized in the 2<sup>nd</sup> Pediatric Clinic, Emergency County Hospital in Craiova, on 05/15/2012, showing fever, cough, and moaning.

*Heredocollateral history:* young, healthy parents; a healthy three-year-old sister; without any chronic illnesses in the family.

*Physiological personal history:* the second child, born after a normally developed pregnancy, born at term, in the hospital's Maternity Unit, by caesarean section, birth weight 3200g, with no birth sufferance. Breast fed for five months, fed properly with varied food from 5 months onwards, weaned at 1 year 5 months old. On admission she was eating adult food. Vaccinations were performed according to the scheme of the National Health Ministry. The prevention of rickets was performed correctly.

*Pathological personal history:* Frequent acute upper respiratory tract infections treated ambulatory.

*Living conditions:* urban housing, appropriate conditions.

*Disease history:* onset 5 days before admission with fever, cough, runny nose. She was investigated by the family physician who recommended treatment with Cephalixin, Nurofen, Ambroxol, Betabioptal, and Losec. The mother reported that the patient had swallowed grass inflorescence, while she had been in the yard, 2 days before admission, when she started coughing and vomiting. Later, the general condition got worse, the patient presenting again fever, spastic coughing fits, moaning; the parents presented the child for admission in the hospital.

At admission she had 38°C fever, weighed 9 kg, bad general condition, pale skin, ringed face, cyanotic color around ears and nose, dry lips, antalgic position of right lateral decubitus, spastic coughing fits, mucoserous rhinorrhea, nasal flaring, moaning, expiratory dyspnea, polypnea (35 breaths/min), intercostal and subcostal indrawing, lung staccato, right axillary decreased vesicular murmur, subcrepitan rales in the right lung area, rhythmic heart sounds AV= 140 beats/ min., meteorism in the abdomen, enteric transit present, normal feces.

The chest x-ray done at admission showed the emphasis of the right basal pulmonary interstitial image (Image 1).

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Image 1. The chest x-ray done at admission showed the emphasis of the right basal pulmonary interstitial image.

Taking into account the possibility of foreign body ingestion, we performed an urgent x-ray on empty stomach which revealed no hydro-aeric levels, a pediatric surgery examination which denied the surgical acute abdomen, while the abdominal ultrasound examination was normal. Suspecting the aspiration of a foreign body diagnosis, when admitted, the patient is sent for an Otorhinolaryngology examination, where she is recommended exploratory bronchoscopy.

Biochemical investigations: hemogram Hb= 9.6 g%, T= 452,000/mm<sup>3</sup>, L= 40,700/mm<sup>3</sup>, NS= 72%, NN= 6%, E= 2%, M= 5%, Ly= 15%. ESR= 110/122 mm at 1/2 hours, GPT= 9 IU/l, GOT= 17 IU/l, urea= 12 mg%, creatinine= 0.44 mg%, blood ions: Na= 127 mEq/l, Cl= 98 mEq/l, K= 3.6 mEq/l, sideremy= 15µg%, calcium blood test= 2.10 mmol/L.

Emergency treatment was established: glucose and electrolytes EVP, antibiotics (Zyvoxide + Meronem), HHC, Debridat, Espumisan, rectal probe, DNF and secretion aspiration, oxygen therapy.

An emergency bronchoscopy is performed to find large mucus with pus secretion at the right primitive bronchus which is aspirated; the tracheo-bronchial mucous membrane is slightly congested. Left primitive bronchus aspect is normal and does not show any pus and mucus secretions. Repeated CXR on the second day of hospitalization shows a slight ascension of the right hemidiaphragm and the reduction of the posterobasal transparency highlighting the air bronchogram, on the side incidence.

Under treatment, the general condition of the patient improved, fever disappeared, and in the second day from admission she presented productive cough, moderate expiratory dyspnea, polypnea, subcrepitant rales on the right lung area.

On the 6th day, her general condition suddenly got worse, presenting perioronasal cyanosis, groan, expiration dyspnea, lung staccatic vesicular murmur abolished on the right lung area. Emergency chest x-ray shows total right pneumothorax (Image 2).

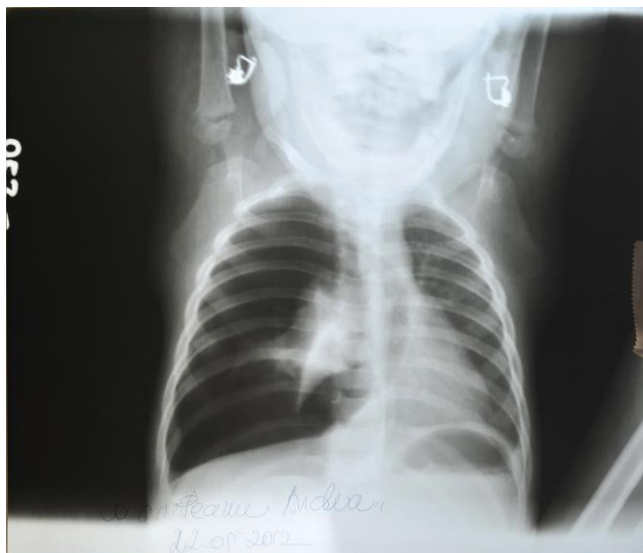


Image 2. Emergency chest x-ray shows total right pneumothorax.

The patient was transferred to the Pediatric Surgery Clinic where pleural drainage was performed and she continued the symptomatic and antibiotics treatment; the further evolution was favorable. She was discharged after 12 days of hospitalization from the Pediatric Surgery Clinic in good general condition, afebrile, rare cough, and lung staccastic vesicular murmur present without added rales. Diagnosis at discharge: Aspiration Pneumonia. Total Right Pneumothorax. Acute Respiratory Failure. Iron Deficiency Anemia. Deficiency Rickets.

6 months after the discharge (November 2012), she showed fever, productive cough for which she received

ambulatory treatment with Zinnat for 10 days. 48 hours after the treatment, fever reappeared and the parents came again with the child in our clinic and re-hospitalized her.

On admission, she was afebrile, with a fair general condition, weighed 10 kg, pale skin, the face of a suffering person, spastic cough, intercostal indrawing, staccastic pulmonary vesicular murmur axillary decreased and in the upper right semi thorax, slender abdomen, and liver 1 cm below the costal margin. Pulmonary x-ray (on admission, 11/29/12): intense opacity occupying the right median base region, homogeneous, medium intensity, having a condensation character (Image 3).



Image 3. Pulmonary x-ray (on admission, 11/29/12): intense opacity occupying the right median base region, homogeneous, medium intensity, having a condensation character.

Hemogram (BCT): Hb=10.3 g%, T= 667,000/mm<sup>3</sup>, L= 26,600/mm<sup>3</sup>, NN= 39%, Ly= 46%, M= 8%, ESR= 84/114 mm at 1/2 hours, fibrinogen= 260 mg%, CRP <6 mg%, urea= 27 mg%, creatinine= 0.43 mg%, glucose= 112 mg%, GPT= 12 UI/l, GOT=21 UI/l, INR= 0.92, Quick= 116%, PPTa= 24, calcium= 1.95 mmol/l, sideremy= 41 mg%, blood electrophoretogram: Na= 136 mEq/l, Cl= 104 mEq/L, K= 3.9 mEq/l, normal urine analysis test, negative urine

culture, tracheobronchial secretion culture in aerobic environments at 37°C developed no pathogens.

The patient was given a treatment with Sulperazone + Zyvoxide, Dexamethasone, Salbutamol in nebulization and, Liv 52. On the second day of hospitalization she eliminated, in a fit of coughing, a vegetable residuum – grass inflorescence 2.5 cm long (Image 4); she still presented some prolonged coughing fits with fresh blood and blood clots expectoration with a hemoptysis look.



Image 4. Grass inflorescence 2.5 cm long.

Further evolution under the treatment was favorable, the patient was afebrile, she had good appetite, and coughing fits were rare. Repeated CXR highlighted positive development with marked restriction in intensity and extent of opacity mentioned above (Image 5). Repeated biochemical investigations: blood count test: Hb=10.7 g%, T= 807,000/mm<sup>3</sup>, L= 8,400/mm<sup>3</sup>, NS= 20%, Ly= 70%, M= 10%, ESR=23/40 mm to 1/2 hours, urea= 16 mg%, GPT= 28 UI/l, GOT= 28 UI/l, CRP <6 mg% fibrinogen= 230 mg%. She was discharged after 12 days of hospitalization with good general condition, afebrile, good appetite, no



cough, lung staccato normal. Discharge diagnosis: Right pneumonia abscess due to foreign body aspiration (grass inflorescence). Acute respiratory failure. Hemoptysis. Iron deficiency anemia. Deficiency rickets. 1st degree dystrophy.

In January 2013 she underwent a specialized control at Marius Nasta Hospital in Bucharest where the bronchoscopy showed bronchiectasis at the level of the terminal bronchus in the right lung area.

Further evolution was favorable. The patient appears in our clinic's records.

Image 5. Repeated CXR highlighted positive development with marked restriction in intensity and extent of opacity mentioned above.

### Discussions

Factors which favor the aspiration of foreign bodies are (3,4):

- age: most cases are found in children between 6 months and 4 years, with a higher frequency between 11 months and two years of age,
- increased curiosity of children regarding the surrounding environment developed by a maximum exploratory activity between hand and mouth (5),
- the tendency of children to run or play during feeding,
- the absence of molars decreases the ability to chew food sufficiently, leaving large chunks of non-chewed food,
- young children have a decreased ability to chew and an increased respiratory rate, so any object placed in the mouth has a higher possibility of being aspirated than in older children (6),
- children do not have a complete coordination of the mouth and tongue,
- small children lack the coordination between swallowing and glottis closure.

Foreign bodies are classified by origin: exogenous and endogenous; by structure: organic and inorganic (2,7). Organic foreign bodies: peanuts, bread, vegetables, and irritants: beans, corn, walnut, popcorn, seeds, pumpkin skin, sunflower, watermelon and other fruits, bones, meat. There are authors who claim that organic substances are most commonly aspirated (7,8). We did not find in the medical

literature a case like this in which the patient aspirated grass inflorescence, as it happened in our case (8).

Organic foreign bodies are usually radiologically invisible and cause early infectious accidents, being difficult to extract because they crumble at the extraction (9). The organic foreign bodies tend to swell due to local moisture, to cause stenosis, destructions and cause large reactions (10).

In this case, bronchoscopy failed to reveal the grass inflorescence and the repeated radiological examination revealed no special parts, but the general condition of the patient, the antalgic position, respiratory failure, pulmonary staccato, biological samples (leukocytosis= 407,000/mm<sup>3</sup>, neutrophilia, ESR increased over 100 mm), anamnestic context drew attention. In this case, the aspiration of the grass inflorescence occurred in the context of a respiratory infectious episode.

The right pneumothorax installed on the 6th day of hospitalization was produced by the perforation of the pleura. Most foreign bodies stop in the right bronchus because the diameter of the main bronchus is bigger than the left one, the divergence point from the tracheal axis is smaller in the right (the bronchus is more vertical), the air flow through the right lung is bigger than the left lung one (11,12). In our case the location of the foreign body was on the right side, too.

For the treatment of this case, a multidisciplinary medical team was involved, consisting of specialists in

pediatrics, pediatric surgery, pediatric otolaryngology, radiology.

As a feature of this case, we consider its evolution: from the moment of aspiration – noticed by the parents – to the first admission when she presented poor general condition, fever, right antalgic position, respiratory failure, subcrepitan rales in the right lung area; radiological tests and the bronchoscopy did not reveal the foreign body when the right sided pneumothorax appeared. It followed a six months slack, after which she removed the grass

inflorescence in a coughing fit, followed by hemoptysis, when the x-ray examination showed the condensation aspect on the right lung area and later the emphasis of bronchiectasis at the level of a right side terminal bronchus.

A pulmonary CT would have helped to highlight the foreign body. The grass inflorescence produced lesions in the lung parenchyma and, when eliminated, lesions at the bronchi level with hemorrhagic manifestations. The removal of the grass inflorescence by the child revealed the foreign body and led to healing.

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