



## LOWER AIRWAY FOREIGN BODIES TREATMENT IN CHILDREN: A FORTY YEARS EXPERIENCE

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### Abstract

There are many publications concerning the treatment of foreign bodies of lower airways in children, but the problem remains urgent in many countries and Armenia as well. Only 16% of all patients are referred to the hospital on the first day after the aspiration of the foreign body and a still higher percent of patients is admitted after having multiple unsuccessful medical treatments (17-20%). Bronchoscopy is the only right way to treat these children.

In Armenia “Sourb Astvatsamayr” Medical Centre is the only place, where children with this problem can be treated. Since the day of foundation in 1982 till present, 2768 children (aged from 7 months to 16 years) with a diagnosis of a foreign body aspiration were treated in Pediatric Thoracic Surgery Department of our Medical Centre: 3380 bronchoscopies were done, 328 patients underwent this procedure twice and 145 of them three or more times.

Bronchoscopy is done under general anesthesia with artificial lung ventilation with a special pediatric “Fridel’s” and “Karl Storz” bronchoscopes. The manipulation is done by a thoracic surgeon to skip and manage complications as rupture of the bronchus, bleeding, etc.

During the last years flexible bronchoscopy is widely used in our clinic, which allows to evaluate the condition of the bronchus more properly and atraumatically. For correct diagnosis and medical treatment of foreign body aspiration in children, parents and general pediatricians must be comprehensively informed about this pathology and the children must be admitted to the specialized department in case of any doubt on foreign body aspiration. Bronchoscopy with the foreign body removal must be done as soon as possible to prevent the late complications.

**Keywords:** foreign bodies of lower airways, bronchoscopy, bronchoscope, flexible bronchoscopy, obstructive emphysema

### INTRODUCTION

There are many publications concerning treatment of foreign bodies of lower airways in children, but the problem remains urgent in many countries and Armenia as well. Only 16% of all patients are referred to the hospital on the first day after the aspiration of the foreign body and a high percent of patients is still admitted after having multiple unsuccessful medical treatments (17-20%). Bronchoscopy is the only right way to treat these children.

### MATERIAL AND METHODS

In Armenia “Sourb Astvatsamayr” Medical Centre is the only place, where children with this problem can be treated.

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Table 1.

Patients' distribution by age

Age	Under 1year	1-3 years old (y.o.)	3-7 y.o.	Over 7 y.o.
Patients	147 (5.3%)	2015 (72.8%)	401 (14.5%)	205 (7.4%)

Since the day of foundation in 1982 till present 2768 children (aged from 7 months to 16 years) with a diagnosis of a foreign body aspiration were treated in Pediatric Thoracic Surgery Department of our Medical Centre; 3380 bronchoscopies were done, 328 patients underwent this procedure twice and 145 of them three or more times.

Table 1 demonstrates that the main part of patients were 1-3 years old. At this age children are very active, like to taste and put everything in the mouth, to run and jump with the food in the mouth which mainly becomes a reason for

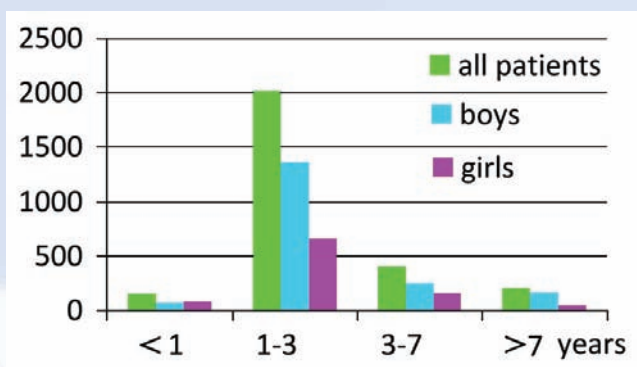


Figure. Patients' allocation according to sex.

foreign body aspiration. In all age groups boys prevail over girls. This has its explanation as well: boys are more active than girls (Figure).

For correct diagnosis and medical treatment it is very important to know how long the foreign body has been in the airways. In Table 2 it is shown that children admitted to the hospital in one day after aspiration make a very small percent in all patients. Mainly, these children are admitted in a period from 1 to 7 days after aspiration, whereas for an organic foreign body even 1 day is enough to initiate the inflammatory process.

One of the most important things for a good diagnosis is the anamnesis. After lung auscultation, chest X-ray was done to all the patients. The most informative way for an airway foreign body aspiration diagnostics is bronchoscopy.

At the "Sourb Astvatsamayr" Medical Centre bronchoscopy is done under general anesthesia with artificial lung ventilation with a special pediatric "Fridel's" and "Karl Storz" bronchoscopes. The manipulation is done by a thoracic surgeon to skip and manage complications as rupture of the bronchus, bleeding, etc.

During the last years, flexible bronchoscopy is widely used in our Medical Centre. This procedure allows to evaluate the condition of the bronchus more properly and atraumatically. In

our clinic, we use "Olympus" flexible bronchoscopes with an external diameter of 3.2 mm and 5.4 mm. In many cases when it is not possible to fully remove the foreign body using the rigid "Fridel's" bronchoscope, flexible bronchoscopy is helpful.

### Discussion

The most dangerous complication of the foreign body aspiration is the asphyxia in case of total obstruction of the trachea. Similar situation can also happen in case of total obstruction of the mainstem bronchus, which leads to tensioned emphysema and mediastinal shift to the contralateral side.

Auscultation and percussion are mostly informative in case of total obstruction. When the bronchus is not fully obstructed, X-ray is also helpful and shows mainly not the foreign body itself, but the changes it makes to the lung: obstructive emphysema, inflammatory process, etc. [Isakov Y., Orlovskij S., 1979; Dyakonov V., 1993].

Very often cough caused by a foreign body is taken as a symptom of asthma, bronchitis, etc.

Late inflammatory and purulent complications after foreign body aspiration are also dangerous, because they can lead to radical surgical procedures such as lobectomy or even pneumonectomy. This is the reason that a repeated bronchoscopy is required in cases of long anamnesis of a foreign body.

The type of a foreign body is also very important. In children of the first year of life mostly organic foreign bodies occur. In elder children, foreign bodies are mostly inorganic [Enzan K., 1991].

In the last years coffee beans became very rare as a foreign body (12 cases out of 92 in 1989, and 0 cases out of 62 in 2008). Watermelon seeds were a common thing to happen, but now

Table 2.

Admission time after aspiration

Days	24 hours	1-3 days	3-7 days	> 7 days	1 month and more
Patients	387 (14%)	1328 (48%)	581 (21%)	304 (11%)	166 (6%)

are not seen for years.

Diagnosis of the foreign body aspiration in children is based on clinical symptoms such as:

- Choking in the anamnesis;
- Wheezing;
- Coughing, with non-effective medical therapy.

Confirmation of the diagnosis is done by objective examination, X-ray and bronchoscopy [Black R. et al., 1994; Umiskova T., 1996].

### Conclusions

For correct diagnosis and medical treatment of foreign body aspiration in children parents and general pediatricians must be comprehensively informed about this pathology and the children must be admitted to the specialized department in case of any doubt on a foreign body aspiration.

Bronchoscopy with the foreign body removal must be done as soon as possible to prevent the late complications.

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