

Foreign body aspiration in tracheobronchial tractus at RSUP H. Adam Malik Medan

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Abstract. Aspiration of foreign bodies, especially when found in the airways of the tracheobronchial tract, is very dangerous and can sometimes be fatal. Some retrospective studies have reported in several countries that these cases can cause severe complications and life threatening consequences, due to patients frequently coming late to the hospital, which can cause misdiagnosis. Foreign body aspiration can occur at any age, from children to elderly people. There is no current data about the description of patients with foreign body aspiration in the tracheobronchial tract at H. Adam Malik General Hospital in Medan, bringing the authors of this study to carry out a study on the profile of patients with foreign body aspiration in the tracheobronchial tract in the ENT Department of H. Adam Malik Hospital in Medan. With this data, it is expected that the doctors who treat a tracheobronchial foreign body aspiration can be better prepared. Data was taken from the medical records of patients diagnosed with foreign body aspiration in tracheobronchial tract at H. Adam Malik General Hospital in Medan in this observational descriptive study. The percentage of sexes who suffered from foreign body aspirations was higher in males with a total number of 36 (72%) compared to 14 females (28%). The highest prevalence of foreign body aspirations was found in children under 3 years old, consisting of 13 patients (26.0%), followed by 24 patients aged 3-5 years old (48%). Of the symptoms, cough was most frequently reported by patients (88%), and choking (66%) was second most frequently reported. Toys were the most frequent foreign body found in the body with 29 patients (58%) and the most common location of foreign bodies in patients was in the tracheobronchial tract, on the right bronchus, with 25 reported cases (50%). Foreign body aspiration is most common in children, especially for boys aged 3-5 years. The most common symptom is coughing with choking. The location of the foreign body was most often found in the right bronchus.

Key words: Aspiration, foreign body, tracheobronchial.

Introduction

Foreign body aspiration in the airways, especially in the tracheobronchial tract is very dangerous and can sometimes be fatal. Foreign body aspiration can occur at any age, but is more frequent for children and elderly people. This case can be life threatening and is a cause of fatal accidents in households for children younger than 6 years and causes 300 deaths in the United States each year.

In some retrospective study reports at hospitals in several countries, foreign body aspiration cases in the tracheobronchial tract can vary. They are not very common, but they can cause severe complications and even death if the patients are not brought to the hospital expediently or, while at the hospital are misdiagnosed. These unfortunate cases are often caused by symptoms and signs that are not typical of foreign body aspiration or because there were no witnesses when foreign body aspiration occurred.

Likewise, there have been no national studies on this topic in Indonesia until now, but several educational hospitals such as Cipto Mangunkusumo Hospital in Jakarta, Hasan Sadikin Hospital in Bandung, Dr.

Soetomo Hospital in Surabaya, and H. Adam Malik Hospital in Medan have reported cases of foreign body aspiration in the tracheobronchial tract over various periods of time. The incidence rate is relatively low but various complications can arise, ranging from establishing a diagnosis, how to remove the foreign body, among other complications and deaths that can occur.

Foreign body aspiration in the tracheobronchial tract often occurs in children younger than 3 years of age (75-85%) where the incidence is higher in boys than girls (2.5: 1). The most common symptoms and signs found in people with foreign body aspiration in the tracheobronchial tract are coughing and choking (54.9%-94.4%). Mostly, types of foreign bodies are foods such as grains (peanuts, green beans, and corn), animal bones, fish bones, and inedible items like small objects made of plastic and metal, such as whistle toys and safety pins.

The reported radiographic results vary, ranging from normal radiological features, to radiopaque, unilateral over distance, atelectasis, pneumonia, bronchiectation, and broncho esophageal fistulas and

hyperinsufflation. The most common location where a foreign body is lodged is in the right main bronchus, due to a person's anatomy which makes it easy for the foreign body to glide toward the right bronchus.

The tracheobronchial tract consists of trachea and bronchi. The trachea is a cartilaginous tube and muscle lined with a layer of pseudostratified ciliated columnar epithelium that begins from cricoid cartilage and ends at the two divided primary bronchi, the right main bronchus and left main bronchus, at the second ribs in adults and at the third ribs in children. The trachea is located in the middle of the neck and is increasingly shifted to the right and into the mediastinal cavity behind the sternal manubrium. The trachea is very elastic and long and its shape changes depending on the position of the head and neck.

At the carina of the trachea, it branches into two primary bronchi. The right bronchus is shorter than the left bronchus. Its length in adults is 2-5 cm and it has 6-8 cartilage rings. The length of the left main bronchus is about 5 cm and it has 9-12 cartilage rings. The right main bronchus forms an angle of 25° to the right of the center line, while the left main bronchus makes an angle of 45° to the left of the center line. Thus, the right main bronchus almost forms a straight line with the trachea.

The function of tracheobronchial is for ventilation, pulmonary drainage, lung protection from the production of mucus, and mucociliary mechanism with the contraction of bronchial muscles and alveolar macrophages. In addition, the tracheobronchial plays a role in regulating cardiovascular balance and regulating CO₂ pressure in the blood.

The causes of foreign body aspiration in the tracheobronchial tract are influenced by several factors. Various factors facilitate the aspiration of foreign bodies into the airways include: personal factors (age, sex, occupation, social conditions, residence); failure factors for normal protective mechanisms (sleeping conditions, decreased awareness of alcoholism and epilepsy); physical factors; dental factors; psychological factors (emotions and psychological disorders); the size, shape and nature of foreign bodies, namely organic (nuts, bones) and inorganic (toy whistles, needles, pins, beads, buttons, toys, gravel); and carelessness factor. The main reason patients looking for treatment at a hospital is a history of inhaling or choking on foreign bodies. However, there are also those who come because they have a cough that does not heal and shortness of breath or other chronic respiratory symptoms, similar to bronchial asthma but which does not heal with appropriate treatment. The symptoms and signs of foreign bodies in the tracheobronchial tract depend on the location, degree

of blockage (total or partial) and the nature, shape and size of the foreign body. If a foreign body is in the trachea, the symptoms will arise suddenly, such as sudden coughing and choking. There are also symptoms of hoarseness, shortness of breath, a sense of choking, and cyanosis. There are pathognomonic signs such as audible slap, palpatory thud, and asthmatic wheeze (breathing makes sounds while exhaling). The degree of bronchial obstruction and the resulting symptoms vary depending on the shape, size, and nature of foreign bodies, and this can lead to emphysema, atelectasis, drowned lung, and lung abscess.

Foreign bodies which enter the bronchi mostly go down into the right bronchus because the right bronchus is almost parallel with the trachea, while the left bronchus angles away from the trachea. Patients with foreign bodies in the bronchus who come to the hospital are mostly in the asymptomatic phase. In this phase, the general condition of the patient is still good and the thoracic X-ray has not shown any abnormalities.

The diagnosis of foreign bodies in the tracheobronchial tract is based on a thorough and careful history of symptoms (a history of suffocating, sudden choking, coughing, shortness of breath, etc.), and signs found after a physical examination (palpation and auscultation), and radiological examination as a support. A definitive diagnosis is made after an endoscopy for diagnostic and therapeutic indications.

The majority of patients with foreign bodies in the tracheobronchial tract coming to the hospital have passed the acute phase, so the endoscopic removal must be optimally prepared for both in terms of equipment and trained personnel. Foreign bodies in the tracheobronchial tract must be removed using bronchoscopy or rigid bronchoscopy. Complications that may occur due to foreign bodies include emphysema, atelectasis, pneumonia, abscess formation, sepsis, perforation, or fistula.

Methods

This research is a descriptive study to determine the profiles of people suffering from foreign body aspiration in the tracheobronchial tract in the Department of ENT Faculty of Medicine, University of North Sumatra / RSUP H. Adam Malik Medan in the period of January 1st, 2006 to December 31st, 2010. The research was conducted in the Department of THT-KL FK USU/ RSUP H. Adam Malik Medan. The population of the study is all patients diagnosed with foreign body aspiration in the tracheobronchial tract and data were taken from the medical records of RSUP H. Adam Malik in Medan and 50 samples were taken.

The data obtained is presented in tabular and graphical forms. The data obtained were calculated statistically to assess the percentage of foreign bodies in the tracheobronchial tract based on age, sex, main complaint, symptoms, type of foreign body, and location of foreign body. A statistical analysis was performed to see the relationship between types of foreign bodies with physical symptoms and signs that arise using a chi-squared test. The data is taken from the medical record of RSUP H. Adam Malik in Medan.

Results

TABLE 1. Percentage of people with foreign body aspiration in the tracheobronchial tract by sex

Sex	N	%
Male	36	72
Female	14	28
Total	50	100

The highest proportion of sexes suffering from foreign body aspirations were male, with 36 patients (72%) and female with 14 patients (28%). Several other studies reported a similar result: in a retrospective study of 112 foreign body aspiration

patients who underwent bronchoscopy for 20 years (1976-1996) at a hospital in Belgium, there were 60.8% male and 39.2% female.

TABLE 2. Percentage of people with foreign body aspiration in the tracheobronchial tract by age group

Age	N	%
0 - 1 yr	2	4
1 - 3 yr	13	26
3 - 5 yr	12	24
5 - 10 yr	11	22
10 - 15 yr	10	20
15 yr	2	4
Total	50	100

From the table above it can be seen that the largest age group is the age group is 1-3 years with 13 patients (26.0%) and the age group 3-5 years with 24 patients (24%), with an average age of 3.4 years. Several other studies reports a similar result: in a retrospective study of 112 patients, 75% are children under 3 years old. Emir et al. (YEAR) reports on a 10-year descriptive study of 698 bronchoscopy cases, the youngest age of patients was 1 day and the oldest was 16 years, with the most common age group being 1-5 years, at 53.8% of the population.

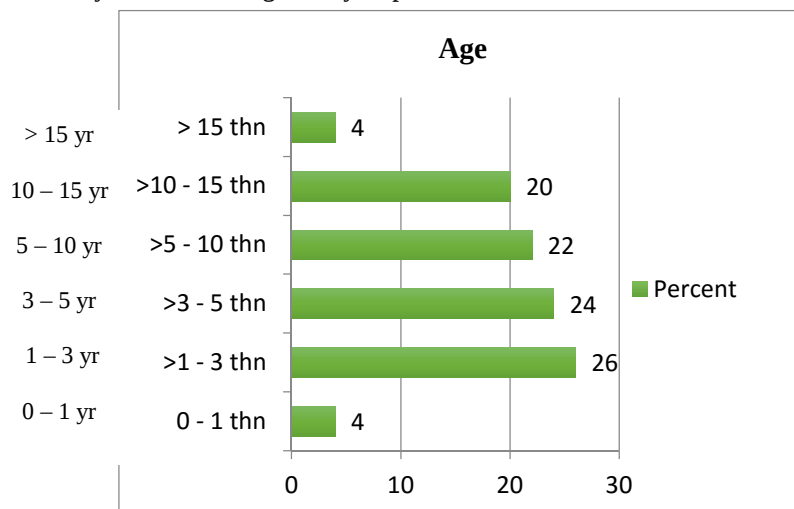


Table 3. Percentage of people with foreign body aspiration in the tracheobronchial tract based on symptoms.

Symptom	Status				Total	
	Positive		Negative			
	n	%	n	%	n	%
Coughing	44	88	6	12	50	100
Suffocating	13	26	37	74	50	100
Cyanosis	1	2	49	98	50	100
Stertor	26	52	24	48	50	100
Choking	33	66	17	34	50	100
Fever	13	26	37	74	50	100

From the table above, it can be seen that the most common symptoms are coughing with 44 cases (88%), followed by choking with 33 cases (66%). Another descriptive study reports similar results:

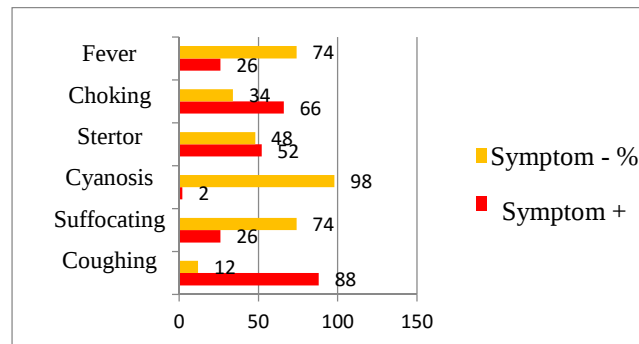


TABLE 4. Percentage of people with foreign body aspiration in the tracheobronchial tract based on the type of foreign body inhaled.

Type of Foreign Bodies	N	%
Sawo seeds	1	2
Grains	10	20
Needle	5	10
Cap	2	4
Earrings	1	2
Stone	1	2
Dentures	1	2
Toys	29	58
Total	50	100

Toys are the most commonly inhaled foreign body at 29 patients (58%). Several other descriptive studies reports the similar result, the most common type of foreign bodies are inorganic foreign bodies, such as plastic whistles, as reported by Nurbaiti et al. (2003), while the most common type of inorganic foreign body found in this study in the category are sewing pins with 53.6%, or 41 cases.

TABLE 5. Percentage of people with foreign body in the tracheobronchial tract based on the location of the foreign body

Location of the foreign body	N	%
Trachea	4	8
Left bronchus	17	34
Right bronchus	25	50
Carina	4	8
Total	50	100

The largest percentage of foreign body locations in patients with foreign body aspiration in the tracheobronchial tract is in the right bronchus, with 25 patients (50%).

symptoms and signs that often occur in patients with foreign body aspiration in the tracheobronchial tract are called “penetrated syndrome”, which is a sudden suffocation followed by coughing, and may be accompanied by vomiting.

Conclusions

Based on the results of the study, it can be concluded as follows: Based on the sex of the patient, a higher percentage of males suffered from foreign body aspirations at 36 male patients (72%), in contrast to 14 female patients (28%). The highest percentage of foreign body aspirations were found in the age group 1-3 years with 13 patients (26.0%) and the age group 3-5 years were 24 patients (48%). Additionally, the most reported common symptom in patients with foreign body aspiration in the tracheobronchial tract was coughing with 44 patients (88%), followed by choking with 33 patients (66%).

Foreign bodies that most often cause choking in the tracheobronchial tract are toys, with 29 patients (58%). Finally, foreign bodies are most often caught in the right bronchus, found in 25 patients (50%).

Suggestions

It should be required for doctors to have comprehensive knowledge and mastery of materials about the aspirations of foreign bodies in the tracheobronchial tract. It is necessary to have the appropriate tools to remove foreign bodies and know the age of the patient before performing a bronchoscopy, in order to increase the success rate and reduce the failure of bronchoscopy. An appropriate and complete medical record is needed, so that it can become a valid source of data in the future.

To prevent the occurrence of foreign body aspirations in the tracheobronchial tract, parents should be counseled and taught about all aspects related to the aspirations of foreign bodies, including cautionary information about toys or small objects that are around children.

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