Romanian Journal of Rhinology, Vol. 1, No. 4, October - December 2011

ORIGINAL STUDY

An epidemiological study of foreign bodies in the respiratory tract - the experience of two ENT departments in Romania

C. Sarafoleanu[1], D.C. Gheorghe[2], C. Manea[1], D. Lupoi[1], Andreea Pîrvan[1], Roxana Duda[1]

[1]Sfânta Maria Hospital, ENT&HNS Department, Bucharest, Romania

[2]ENT&HNS Department, M.S. Curie Hospital, Bucharest, Romania

ABSTRACT

INTRODUCTION. Being one of the most frequent ENT emergency, foreign bodies (FB) could lead to, even if not frequent, potential life-threatening complications.

STUDY OBJECTIVES. To identify the epidemiological aspects of foreign bodies in the respiratory tract (age/sex distribution, type of foreign bodies, complications, type of extraction maneuvers).

STUDY DESIGN. A retrospective clinical study performed using medical records in two ENT Departments from Bucharest, Romania, one of adults, and the other one pediatric, between January 2006 and December 2010.

RESULTS. 467 patients (156 adults and 311 children) were enrolled in the study. Main localization of FB in children was nasal fossae (65,27%) - seeds(24,7%) and plastic fragments (16.39%) were the most frequent FB; mean age was 4.12 years. Fish bones (87,17%) were the majority of FB in adults with localization at oropharynx (56,41%) and hypopharinx (37,82%). No major complications were recorded due to the foreign bodies presence or because of the extraction maneuvers.

CONCLUSIONS. Even if the incidence of foreign bodies in the nose and throat remains relatively low, they could be potentially harmful or even life-threatening to the patients. It is better to prevent aspiration of FB that cure it, so public awareness through needs attention furthermore to prevent foreign bodies inhalation.

INTRODUCTION

Foreign bodies (FB), whether in the upper airway, or the lower airway continue to represent a challenge to physicians who care for children and adults in the acute setting and can lead to important complications[1,2]. According to the literature[1-4], foreign bodies are responsible, on average, for 11% of otorhinolaryngological emergencies; complications ensue in 22% of cases. With children and infants who have foreign bodies in their upper or lower airway, a high index of suspicion is required in order to make a timely diagnosis. Proper anticipatory guidance and education is the optimal way of reducing the tragic outcomes of choking events. In order to identify the circumstances of accidents and the impact of pathology, the epidemiological aspects are crucial.

This study reviews the most important epidemiological aspects encountered in this pathology and the current principles in the management of children and adults with foreign bodies in their respiratory tracts.

MATERIALS AND METHODS

We performed a retrospective study in two ENT Departments - one of adults and the other one pediatric. The analysis of the cases was made on patients between January 2006 and December 2010. Were enrolled 467 patients (156 adults and 311 children). Each patient was analyzed according to his age, sex, type and localization of the foreign body, symptoms and complications due the FB presence and also type of extraction maneuvers analyzing medical records from both ENT Departments. Study period: January 2006 - December 2010.

Corresponding author: Codrut Sarafoleanu
email: csarafoleanu@gmail.com

RESULTS

Childrens

- No of cases: 311;
- Ages ranging between 1-17 years, MEAN AGE = 3.68 years;
- Sex Ratio: M/F= 148/163.

The most common localization of foreign bodies in pediatric population were nasal fossaes (203 cases, 65.27%) (Figure 1), followed by the tracheobronchial presence (67 patients, 21.54%), oropharynx (24 patients, 7.71) and hypopharynx (14 cases, 4.50%) (Table 1). Larynx and rhynopharyx are the less encountered sites, with two and respectively one cases.

A very interesting analysis was made according to the type of foreign bodies encountered in the pediatric population. Most of the FB were organic (176 cases, 56,59%) (Chart 1), different types of seeds being the most frequent finding - 47 cases of sun-flower seeds, 23 peanuts, corn - 11 cases (Chart 2). Fish bones were also frequent - 26 cases (8,36%). From the anorganic FB (135 cases, 43,40%), plastic was the most frequent material encountered - 19 cases of toys, 17 cases of plastic marbles, 11 cases of plastic fragments. Also the watch batteries of various sizes (20 cases) and other types of marbles (20 cases) were other frequent recordings.

Adults

- No of cases: 156;
- Ages ranging between 17-84 years, MEAN AGE = 46,04 years;
- Sex Ratio: M/F= 85/71.

Comparative with the children population, in adults the most commune localization of FB was at the level of the oropharynx (88 cases, 56,41%), followed by hypopharynx (59 cases, 37,82%) and far less frequent nasal and laryngeal localization (5 and respectively 3 cases) (Chart 3).

Concerning the most frequent types of foreign bodies, in adult population the vast majorities were organic foreign bodies (151 cases, 96,8%) (Chart 4) being represented mostly by fish bones (136 cases,

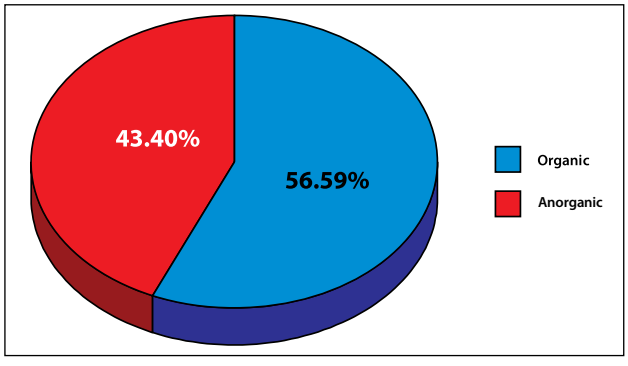

Chart 1 Type of FB in the pediatric population

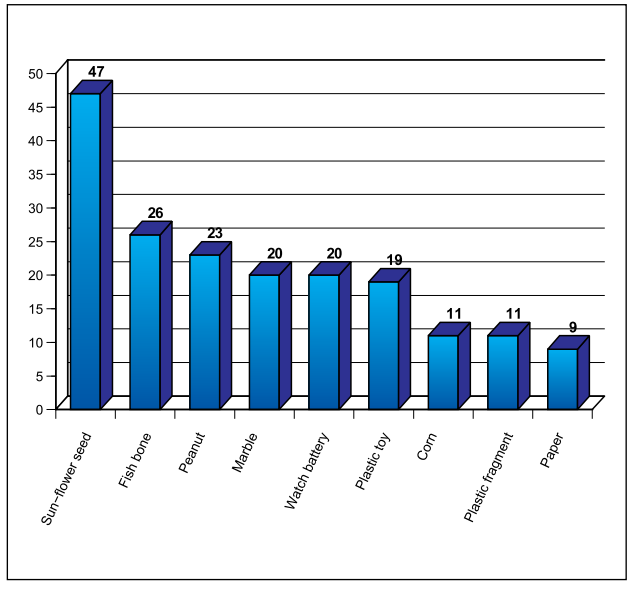

Chart 2 Most frequent types of FB in children

Table 1
Comparative results of FB localization in adult and pediatric population

Localization	Children		Adults	
	No. of FB	Percent %	No. of FB	Percent %
Nasal fossae	203	65.27	5	3.20
Tracheobronchial	67	21.54	1	0.64
Oropharynx	24	7.71	88	56.41
Hypopharynx	14	4.50	59	37.82
Rhynopharynx	2	0.64	-	-
Larynx	1	0.32	3	1.92

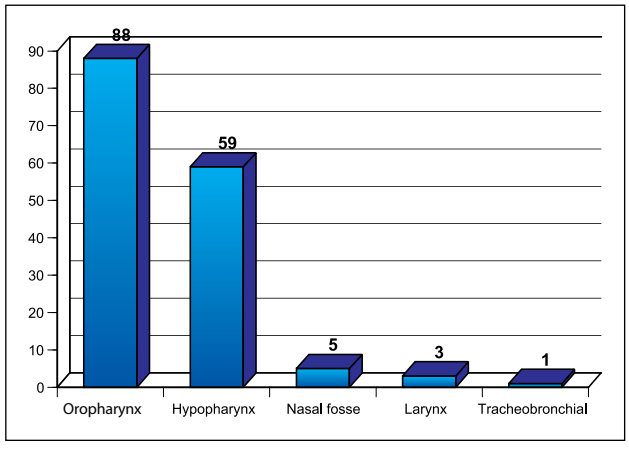

Chart 3 Foreign bodies localization in adults

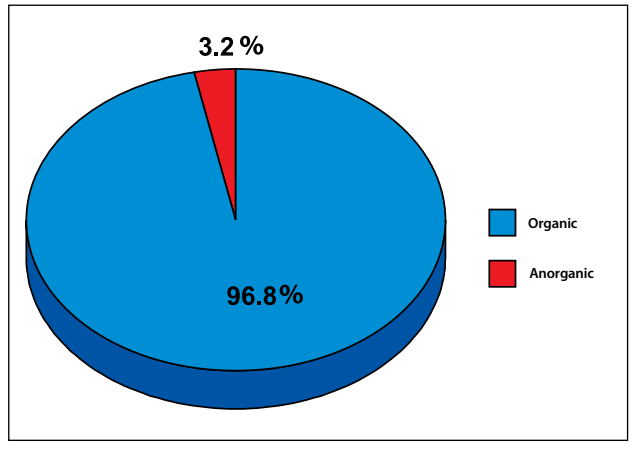

Chart 4 Type of FB in adult population

Table 2
Summary of foreign bodies encountered in adult population

Type of foreign body	No.:	%
fish bone	136	87.17
chicken bone	3	1.92
seed	3	1.92
wood fragment	2	1.28
bay leaf	2	1.28
insect	1	0.64
garlic	1	0.64
metal fragment	1	0.64
ballpoint pen fragment	1	0.64
fried potato	1	0.64
apple piece	1	0.64
beef bone	1	0.64
glass piece	1	0.64
needle	1	0.64
pill	1	0.64
TOTAL	156	100

87,17%). The other types of FB (as showed in Table 2) are encountered sporadically.

Regarding complications encountered due to the presence of the foreign bodies or due to the extraction maneuvers:

• No life-threatening complications were reported in the study period;

• 58 pediatric patients (18,73%) (Chart 5) and 12 adult patients (7,70%) developed inflammatory-infectious local complications (rhinosinusitis, pharyngitis, tracheobronchitis,etc.) (Table 3).

Another interesting aspect of this epidemiologic study was to determine the population at risk using the age parameter. In pediatric population, the majority of foreign bodies were encountered between the ages of 0-5 years (267 cases, 85,85%), as in adults, the most frequent of them were found at young adults - 20-39 years old (71 cases, 45,51%) (Chart 6).

Table 3
Complications encountered due to FB presence or extraction maneuvers

Complications	Children	Adults
	No.	No.
Rhinosinusitis	24	3
Pharyngitis	15	9
Tracheobronchitis	18	-
Laryngitis	1	-

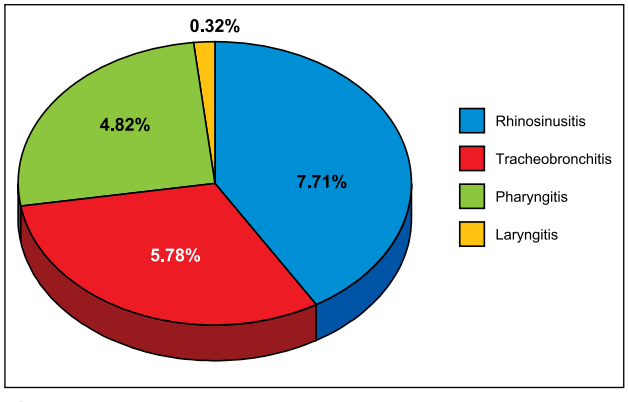

Chart 5 Complications encountered in pediatric population

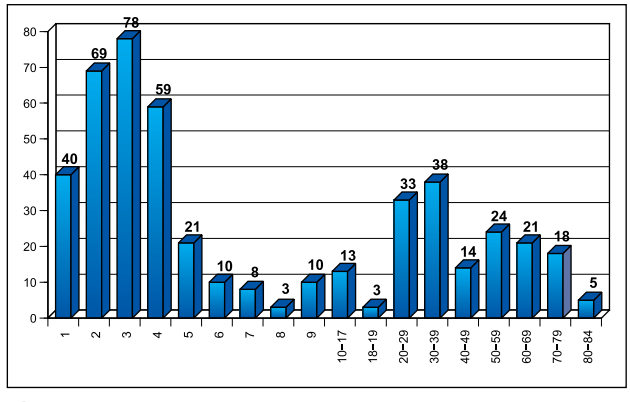

Chart 6 Number of FB in accordance to patient's age

Figure 1 Metallic pen cup in nasal fossae

DISCUSSIONS

Foreign objects are commonly placed by young children into their nose (203 patient in present study - 65.27%). The classic presentation - unexplained unilateral and persistent nasal discharge which is common in unwitnessed events. Other less specific symptoms include chronic sinusitis, recurrent epistaxis and halitosis[2,3,4].

Young children comprise the most common age group for foreign body aspiration because of the following[5,6,7,8,9]:

- they lack molars for proper grinding of food;
- they tend to be running or playing at the time of aspiration;
- they tend to put objects in their mouth or nose more frequently;
- they lack coordination of swallowing and glottic closure;
- lack of surveillance.

In adults, food related foreign bodies are the most frequent reported (151 patients in the present study - 96.8%). Most authors[7] suggest that the most frequent causes are the association between choking on food, excessive alcohol intake and poorly fitted dentures.

Different localization of FB requires different approaches.

FB in nasal fossae can occur usually in children (age <5 years) - they lay between the septum and inferior turbinate and can be easily visible at anterior rhinoscopy but endoscopic examination is a valuable way for diagnose. The material FB is made of can determine intense inflammatory reaction (this is the case of organic materials like tissue paper, sponge, nuts, and seeds). The methods

of extraction consist in pulling out the objects with a crocodile forceps and should be done at first attempt, before the child became uncooperative; also small suction catheter may be successfully used to gently withdraw objects. Children should not be allowed to aspire/swallow from nasal fossae. Anyway, both nasal fossae must be examined before externalization the patient.

Even it is not the most frequent FB, one of them require attentions and a prompt reaction. Watch battery - a history of battery inserted into nasal fossae requires urgent examination and treatment because of leakage from it occurs within hours with dangerous corrosive burns and risk of destruction of nasal septum and inferior turbinate[10].

Adults usually present unilateral symptomatology - nasal congestion and discharge, sometime acute/chronic rhinosinusitis. Calcium and magnesium compounds deposit around the foreign body forming a rhinolith, which must be extracted under endoscopic surgery with local/general anesthesia.

Patients with foreign bodies localized in throat present with odynophagia (usually on lateral side of neck) and dysphagia. Most patient are adults with small fish bones witch are impacted in the tonsil or tongue base; larger bones (chickens, big fishes) lodge in the hypopharynx[8].

Diagnosis may be established at direct visualization of oropharynx with a good light source; FB situated in hypopharynx or larynx may be visualized with a laryngeal mirror or flexible rhino-laryngo-fibroscope. Conventional radiography may be useless because not all FB are radio-opaque[7].

FB in the tonsils can be removed with a headlight and a forceps. FB in the tongue base, vallecula and pyriform fossa may be removed using indirect laryngoscopy and extraction with laryngeal forceps. Small FB may be extracted using flexible nasoendoscope equipped with forceps inserted into the instrument port of the endoscope. A good local anesthesia is required[6].

Tracheobronchial FB - at this level is one of the main causes of accidental death in children. Usually foreign bodies include coins, buttons, beads or organic material (such as nuts and seeds, which may provoke an intense inflammatory reaction). There may be unilateral chest signs (e.g. crepitations). A chest radiography may demonstrate hyperinflation or hyperlucency[1].

For extraction, a rigid bronchoscope with a selection of forceps, graspers and suckers is needed[3]. Objects usually are found in the right main bronchus because it is larger and more vertical than the contralateral one. Areas of excess secretions or inflammation must be treated with extreme caution and suspicion. Any foreign body must be grasped firmly and slowly withdrawn with the appropriate instrument (grasping forceps, hooks, suction apparatus) under rigid bronchoscopic guidance to prevent it falling deeper into the bronchial tree. There may be more than one foreign body, hence bronchopulmonary segments should be inspected. Adults (and very occasionally cooperative children) can have foreign material retrieved under sedation with the flexible bronchoscope. This has an instrument port allowing the insertion of flexible forceps which may be used to extract the material, thus obviating the need for general anaesthesia. Very occasionally, foreign bodies require thoracotomy for extraction. If there is inflammation of the upper airway due to, for example, an organic laryngeal foreign body, a tracheostomy may be required.

CONCLUSIONS

Regulatory changes and increased public awareness have reduced the number of choking deaths, but foreign bodies in the airway still remain a significant problem.

Tragic outcomes will only be reduced when primary care physicians stress to their patients, their patient's families, and the communities the importance of prevention through anticipatory guidance.

The appropriate maneuvers of relieving foreign body airway obstruction should be taught to parents and caretakers.

In an emergency department setting, laryngoscopy and forceps extraction must be rapidly undertaken when indicated.

Finally, it is important to remember, if one foreign body is found in the respiratory tract, always look for others.

REFERENCES

1. Steen K., Zimmerman T., Tracheobronchial aspiration of foreign bodies in children: a study of 94 cases. Laryngoscope 1990; 100:525-527.
2. Laks Y., Barzilay Z., Foreign body aspiration in childhood. Pediatr Emerg Care 1988; 4:102-106.
3. Esclamado R., Richardson M.., Laryngotracheal foreign bodies in children. Am J Dis Child 1987; 141:259-262.
4. Lima J., Laryngeal foreign bodies in children: a persistent, life threatening problem. Laryngoscope 1989; 99:415-420.
5. Black R., Johnson D., Matlak M., Bronchoscopic removal of aspirated foreign bodies in children. J Pediatr Surg 1994; 29:682-684.
6. Harris C., Baker S., Smith G. et al., Childhood asphyxiation by food: A national analysis and overview. JAMA 1984; 251:2231-2235.
7. Haugen R., The cafe coronary: Sudden deaths in restaurants. JAMA 1963; 186:142.
8. Rovin J, Rodgers B., Pediatric foreign body aspiration. Pediatr Rev 2000; 21:86-90.
9. Tinsworth D., Analysis of Choking-Related Hazards Associated With Children's Products. Washington DC: US Consumer Product Safety Commission, 1989.
10. Sukhbir Ahluwalia, Antony A. Narula., Foreign bodies in the ear, nose and throat. Head and Neck 2004; 22.8:182-183.