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Foreign body aspiration in children and role of flexible bronchoscopy: A 3 year experience

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ABSTRACT

Background: Flexible airway bronchoscopy is an accepted and frequently performed procedure in the evaluation of children with known or suspected airway and lung parenchymal disorders.
Methods: Between 2012 and 2015, retrospective analysis of 134 flexible bronchoscopies was done in Children's Hospital, Cairo University, as regards demographic profile, clinical and radiological presentation and diagnostic indication. The results were analyzed on the basis of bronchoscopy inspection, conclusion and future recommendations.
Results: Patients indicated for flexible bronchoscopy presented clinically with unilateral diminished breath sounds in 24.6%, unilateral bronchial breathing in 17.9%, recurrent lower respiratory tract infection in 11.2%, persistent cough in 4.5% and stridor in 9.7%, others showed radiological findings in the form of unilateral hyperinflation in 9%, bronchiectasis in 3.7% and unilateral wheezes in 1.5%. Out of 134 patients undergoing bronchoscopy, 38% had foreign body (FB) in the airways although only 7.5% of patients had recalled a previous history of FB aspiration (15.6% in the trachea, 52% in the right side and 31.3% in the left side, among those patients 60.8% were males while 39.2% were females), 14.1% had tracheal abnormality, 26.8% had post inflammatory changes, 56.7% had right bronchus abnormality, 55.2% had left bronchus abnormality, bronchoalveolar lavage (BAL) was done in 30.6% of patients, FB was successfully removed in 15.6% of patients and further cardiothoracic intervention was needed in 29.8% of patients.
Conclusion: The combination of history, physical examination, and chest X-ray findings are crucial when investigating a child with suspected foreign body aspiration. Flexible bronchoscopy is effective for diagnostic and sometimes therapeutic purpose of problems in the upper and lower respiratory airways in children, with a high success rate as it significantly reduces the rate of negative rigid bronchoscopies and ultimately saves the child from undergoing an unnecessary procedure.
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Introduction

Bronchoscopy is an invaluable diagnostic tool for many lung disorders and a safe procedure with low (0.1–2.5%) morbidity and very low (0.05%) mortality.[1]

The use of the flexible bronchoscope in investigating pediatric respiratory problems like stridor in infants or pulmonary infections in immunosuppressed children has become routine in many centers.[2]

Flexible or rigid bronchoscopy is the method used to diagnose and remove foreign bodies which is common in the pediatric population and leads to significant complications moreover, the rate of these complications increases with delayed diagnosis and treatment.[3]

Flexible bronchoscopy is more convenient as patients are only lightly sedated, also granulation tissue may grow and cover the foreign body in patients with chronic aspiration. As such, the foreign body may be hard to remove if only suction, forceps, loops, or baskets are used.[4]

It is widely accepted in many centers that in straightforward cases of foreign body aspiration the diagnosis is based on clinical and physical examination, abnormal radiological findings, and eventual removal of the aspirated foreign body by rigid bronchoscopy.[5]

Based on our experience we believe that performing flexible bronchoscopy in children might have a significant impact on the management.

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This study aimed to define the clinical and radiological features of patients indicated for flexible bronchoscopy, characterize the incidence of FBA among the Egyptian population, and evaluate flexible bronchoscopy as a diagnostic tool prior to performing rigid bronchoscopy.

Patients and methods

Retrospective analysis of 134 flexible bronchoscopies was done in Children's Hospital, Cairo University, Egypt between 2012 and 2015, as regards demographic profile, clinical and radiological investigations by X-ray or CT. The results were analyzed on the basis of bronchoscopy inspection, conclusion and future recommendations.

All patients were anesthetized using general anesthesia in the operating room using intravenous propofol and supplemental oxygen via nasopharyngeal catheter under complete cardiorespiratory continuous monitoring.

93.3% of patients were done using Pentax bronchovideoscope 1170k (external diameter 3.8 mm) while 6.7% were done using Pentax 8v (external diameter 2.7 mm) according to the age of the patient.

During different stages of the research, ethical considerations were important and the specifics of the patients were kept confidential (the study was performed according to the declaration of Helsinki). The variables of interest were analyzed using SPSS software.

Results

Our retrospective study of 134 patients who underwent flexible bronchoscopy included 58 (43.3%) females and 76 (56.7%) males, with a mean age of 2.99 ± 2.87 years.

Patients indicated for flexible bronchoscopy presented clinically with unilateral diminished breath sounds in 24.6%, unilateral bronchial breathing in 17.9%, recurrent lower respiratory tract infection in 11.2%, persistent cough in 4.5% stridor in 9.7% and history of foreign body aspiration in 7.5%, others showed radiological findings in the form of unilateral hyperinflation in 9%, bronchiectasis in 3.7% and unilateral wheezes in 1.5% as shown in Table 1 and Fig. 1.

In our study, 51 patients (38%) had foreign body (FB) in the airways although only 7.5% of patients recalled a previous history of FB aspiration (15.68% in the trachea, 52.94% in the right side, and 31.37% in the left side). Among those patients 60.8% were males while 39.2% were females.

Foreign body included nuts in 48 patients, plastic part of toy in 2 patients and bone in 1 patient (Fig. 2).

In the remaining patients, 14.1% had tracheal abnormality, 26.8% had post inflammatory changes, 56.7% had right bronchus abnormality, 55.2% had left bronchus abnormality either in the form of tracheomalacia, bronchomalacia, airway hyperreactivity, narrowing of the airway or inflamed mucosa (Table 2 and Fig. 3).

Bronchoalveolar lavage (BAL) was done in 30.6% of patients, FB was successfully removed in 15.6% of patients and further cardiothoracic intervention was needed in 29.8% of patients.

Discussion

In the present retrospective study, we analyzed the data of children who underwent flexible bronchoscopy in Children's hospital, Cairo University during the 3 year period from 2012 to 2015. Our data had shown that FBAs were found in 38% of the children. However, this number is not different to that reported in other retrospective studies. That was nearly the same 38.3% as a retrospective study done in Israel.[3] In other studies, the percent of children with FBA who underwent bronchoscopy is variable and ranged from 25% to 90%,[6,7] while in two prospective studies from Israel it was shown that FBA was found in 57% and 43% of the children who underwent bronchoscopy due to suspected foreign body aspiration.[7,8]

In our study, foreign body occurred more in boys (60.7%) than in girls (39.2%) which is similar to previous reports[3,9] mostly due to the hyperactivity and curiosity more in boys than girls.

In this study, unilateral diminished breath sounds (24.6%), unilateral bronchial breathing (17.9%) and recurrent lower respiratory tract infection (11.2%) were the most prevalent complaints among the patients. Unilateral collapse was the most prevalent radiological finding and the existence of a history of suspected foreign-body aspiration (observation of aspiration by others or acute choking following foreign body aspiration) had a prevalence of 7.5%.

That was the same in the study done by Haddadi et al. which showed unilateral decreased pulmonary sound to be the most prevalent.[10]

Farzizadeh et al. found that coughing and respiratory disorders were the most prevalent complaints of patients.[11] A triad of foreign-body aspiration (initial suspicion, respiratory distress, and choking attack during eating) had a high prevalence and it was noted that history, particularly initial suspicion of foreign-body aspiration and choking while eating, can be helpful in diagnosis.

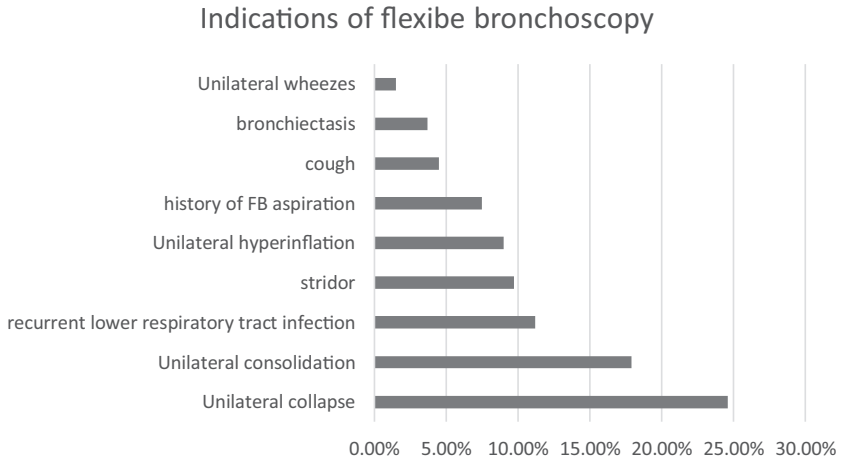

Fig. 1. Indications of flexible bronchoscopy in patients.

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