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ROLE OF RIGID BRONCHO ENDOSCOPY IN MANAGEMENT OF AIRWAY OBSTRUCTION

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Dr. V. S. Prahadeish Kumar Senior Resident, ENT
Dr. C. Karuppasamy* Associate Professor, Thanjavur Medical College. *Corresponding Author
Dr. G. Suba Jothi Kumar Senior Resident

ABSTRACT

Airway obstruction is a potentially life-threatening condition that requires immediate intervention. Rigid bronchoscopy is a versatile and effective diagnostic and therapeutic tool used in the management of various airway disorders. This research paper aims to review the role of rigid bronchoscopy in the management of airway obstruction. It provides an overview of the procedure, indications, and technical considerations. Furthermore, it discusses the therapeutic interventions facilitated by rigid bronchoscopy, including foreign body removal, airway stenting, and tumor debulking. The paper also highlights the advantages and limitations of rigid bronchoscopy compared to other airway management techniques. Overall, this paper emphasizes the crucial role of rigid bronchoscopy in the successful management of airway obstruction.

KEYWORDS

INTRODUCTION

Airway obstruction refers to the partial or complete blockage of the air passages that carry oxygen to the lungs. It can result from various etiologies, including foreign body aspiration, tumors, infections, trauma, congenital anomalies, and airway stenosis. Airway obstruction is a critical medical emergency that can lead to respiratory distress, hypoxia, and even cardiac arrest if not promptly managed. Timely intervention in cases of airway obstruction is crucial to ensure adequate oxygenation and prevent severe complications or fatal outcomes. Immediate management aims to establish and maintain a patent airway, relieve obstruction, and restore normal respiratory function. Delayed or inadequate management can lead to severe respiratory compromise, hypoxic brain injury, and even death.The purpose of this research paper is to review the role of rigid bronchoscopy in the management of airway obstruction. Rigid bronchoscopy is a specialized procedure that plays a significant role in both diagnostic and therapeutic interventions for various airway disorders. By examining the indications, techniques, and outcomes associated with rigid bronchoscopy, this paper aims to highlight its importance as an effective tool in the management of airway obstruction. Understanding the role of rigid bronchoscopy will contribute to improved clinical decision-making and patient outcomes in cases of airway obstruction.The subsequent sections of this paper will delve into the technical aspects of rigid bronchoscopy, its diagnostic and therapeutic applications, advantages and limitations, comparison with other airway management techniques, safety considerations, and future perspectives. By providing a comprehensive analysis, this paper aims to enhance the understanding of healthcare professionals regarding the role of rigid bronchoscopy in managing airway obstruction.

MATERIALS AND METHODS:

Study Design:

This is a prospective study designed to evaluate the role of rigid bronchoendoscopy as a therapeutic and diagnostic tool in the management of airway obstruction.

Study Centre:

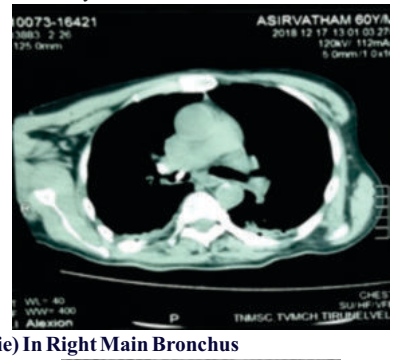
This study was conducted in the department of otorhinolaryngology, Tirunelveli government medical college hospital, Tirunelveli.

Study Duration:

June 2018 to october 2020.

Study Population:

All patients who presented with a history of foreign body aspiration, suspected foreign body aspiration with unresolved bronchopneumonia, for whom rigid bronchoendoscopy was done were included in the study.Patients of all ages including children and adults were included in the study. A total of 23 patients were studied. Out of 23 patients, 18 patients presented with a witnessed event of foreign body inhalation, 5 patients presented with bronchopneumonia not responding to antibiotics,. Patients presenting with witnessed event of foreign body aspiration with severe respiratory distress were taken up for emergency rigid bronchoscopy immediately. Patients who were stable underwent complete physical examination, including clinical history, baseline blood chemistry, coagulation parameters, ECG, Chest X Ray or CT chest (preferred). These patients were taken up for rigid bronchoendoscopy under general anesthesia after a fasting period of 2 hrs (clear liquids) or 4 hrs (solid foods). IV antibiotics were administered for patients with unresolved bronchopneumonia. Appropriate size of the bronchoscope was selected according to the age of the patient. Patients were observed postoperatively for 24 hours. Repeat or check X rays were done after 48 hours.



FB (Bougie) In Right Main Bronchus

FB (Seeds) Removed

RESULTS:

In this study, airway foreign bodies were more common in children (74%). The most common age group affected was in the age of 1-5 years (43%). Overall males are affected more than the females. In children, male children have higher incidence than the female children. Right main bronchus was the most common site for the foreign body to lodge in the airway (55%). Subglottis was the least common site (5%). Most tracheobronchial foreign bodies were food particles. Of which, groundnut was the most common. Cough was the most common symptom in this study group (74%).

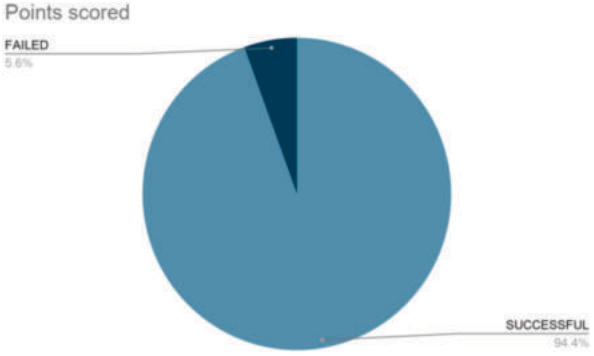
Patients presented with signs ranged from diminished breath sounds to stridor. 21% of patients presented with a stridor which is the least occurrence, while 70 % presented with diminished breath sounds which is the common occurrence.

Obstructive emphysema was the most common radiological finding (43%). CT scan was more sensitive than X rays in visualisation of the foreign body. Foreign body was visualised in 16 patients out of 18 via CT scan.

Most of the patients presented within a day of the incident. 83% presented within a day of the incident, whereas 12% and 5% presented within 1-3 days and more than 3 days respectively. In delayed presentation, fever, lung crepitations and edema around the foreign body were found.

Time	No of patients	Percentage
< 1 day	15	83%
1-3 days	02	12%
> 3 days	01	05%

Successful removal of foreign body was done in 95% of patients. Out of 23, 5 patients (22%) had negative endoscopy. Out of 18 patients, where foreign body was identified, removal was done for 17 patients. Foreign body could not be removed in a single patient, who was a one year old boy presented with a stone lodged in the trachea, as he developed bradycardia and cardiopulmonary arrest during the procedure.



DISCUSSION:

A total of 23 patients were included in the study. Of these 23, 17 (74%) were children below 12 years and 6 (26%) were above the age of 12 years. In children , the majority of the foreign bodies were in the age group of less than 3 years, which corresponds with the study by Francois M et.al, and Balbani APS et al[5]. This age group is mostly affected because of the predisposing factors like smaller diameter of airway, the tendency to put the objects into the mouth, immature dentition, activity while eating and immature swallowing reflex. In older children, anatomic abnormalities and neurological disorders predispose to foreign body aspiration.

In this study involving 23 patients, 17 were male and 4 were females with male:female ratio of 4:1. In children, 76% of patients were males and 24% of patients were females. In adults, all patients were males. This male predilection might be related to their higher activity[3]. This male predilection in this study corresponds with other studies[1,2,3].

Regarding the type of foreign body, organic substances were most commonly found and the majority being seeds and nuts (61%).this observation is also seen in the study by chinmaya sundar ray and krishna arpita sahoo et al[26]. In older children, the metallic foreign bodies, parts of plastic toys were more common. In adults, 50% of patients had organic substances as foreign bodies and the rest were inorganic. The inorganic substances includes a broken artificial denture, capsule and a broken bougie. This corresponds well with the study by sharma et al, showing that adults are more likely to aspirate non-food items[6].

Nearly 83% of patients with a foreign body presented to the OPD within 24 hours of the incident, 12% patients within 3 days and 5% patients after 3 days. Lack of suspicion by parents, misdiagnosis, fatigability of the cough reflex after an acute choking episode, delayed respiratory symptoms are the factors causing delay in treatment[4].complications such as lung collapse, recurrent bronchopneumonia are more common in delayed presentation.

Regarding symptoms in the tracheobronchial tract, choking associated with cough was seen in 74% of patients, 70% had difficulty in breathing and 35% developed wheezing. On examination, diminished breath sounds(70%) was the most common sign, crepitus, ronchi were also seen. Mostly the tracheal foreign bodies presented with stridor. The clinical presentation of the patient depends upon the type of foreign body, site of lodgement, size of the foreign body, duration.

Radiological examination was done in 22 patients. X ray revealed definitive foreign body in 56% of cases and doubtful foreign body in 28% of cases, whereas CT scan revealed definitive foreign body in 89% of cases and doubtful foreign body in 11% of cases. This shows the superior diagnostic value of the CT scan and it should be done wherever possible. Obstructive emphysema was the most common radiological finding(43%).

The foreign bodies were removed by rigid bronchoendoscopy under general anaesthesia. The operating time ranged from 10-33 minutes. The most common site for the foreign body to lodge was the right main bronchus (55.5%), this correlates well with several other studies.This is because of the position of the right bronchus, which is much more in line with the trachea than the left main bronchus which makes a more acute angle with the trachea, also because of the wider right bronchial diameter . The foreign body was successfully removed in 94% of cases. 5 patients had a negative endoscopy with no foreign body in the respiratory tract. The foreign body could not be removed in only one patient, who was a one year old child, with foreign body in the trachea, presented with severe stridor and hypoxia. He developed bradycardia and cardiac arrest during the procedure. No other patient developed any complication in the postoperative period.

CONCLUSION:

Foreign body aspiration is a life threatening condition, which can lead to mortality if timely intervention is not done. In this study to evaluate the role of bronchoendoscopy in removal airway foreign bodies, the following points were made,

1. Foreign body aspiration were more common in children than in adults.
2. Males have a higher incidence than females with a male:female ratio of 4:1.
3. Male children are more affected than female children.
4. The most common age group affected was less than 3 years.
5. Majority of the patients presented to our OPD within 24 hours of the incident.
6. Right main bronchus was the most common site for foreign body impaction was the right main bronchus.
7. Ronchi, crepitations and decreased air entry were present in more than half of the airway foreign bodies. Radiological evidence of a definitive foreign body was present in ⅔ rd of cases.
8. The operating time was greatly reduced by the use of endoscope and optical grasping forceps.
9. The incidence of complication was greatly reduced by the use of endoscope due to its superior visibility.
10. Rigid bronchoendoscopy remains the gold standard in the safe removal of foreign bodies in the trachea and bronchus.

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