

Case Report

Challenges Enroute to a Foreign Body Removal via Rigid Bronchoscopy in an 8-month-old Infant

Mahesh Virupakshi Kattimani^{1*}, Tvarita Bharaksale², Kashmiri Kumawat², Divya Kumar Dubey³ and Antarikhya³

¹Associate Professor, ²Assistant Professor, ³Junior Post Graduate Resident

Department of ENT,
Pacific Medical University, Udaipur, Rajasthan, Bharat.

***Corresponding Author Email:** magz0705@gmail.com

ABSTRACT

An 8-month-old baby presented with symptoms respiratory distress and history of aspiration of food particle. Physical examination and investigations revealed that the left main bronchus was obstructed due the foreign body being lodged in its distal part. The foreign body was carefully retrieved by direct bronchoscopy in Emergency OT following which the condition of child drastically improved.

KEYWORDS: Foreign body, Tracheobronchial foreign body, Rigid bronchoscopy, Obstructive emphysema

PRESENTATION OF THE CASE

An 8-month-old baby presented with dyspnea for one day at the ENT OPD. Attendants of the patient gave history of feeding watermelon fruit to the baby who was crying previously, following which the patient apparently developed difficulty in breathing.

The patient displayed refusal to feeds and labored breathing.

On examination use of accessory respiratory muscles, an increased respiratory rate and features of labored breathing were noted. On percussion hyper resonant note was elicited on the left lung fields. Auscultation revealed decreased breath sounds and decreased vocal resonance on left lung fields.

Chest x ray revealed hyperlucency in left lung fields. Midline appeared to have shifted to right side [Figure 1]. HRCT chest revealed soft tissue density 8mm * 3mm in distal left main bronchus with hyperinflation of left lung and diffuse air trapping noted [Figures 2, 3, 4 and 5].

Patient was planned for diagnostic cum therapeutic rigid bronchoscopy under general anaesthesia. Consent explaining the procedure, complications and post operative management including possible ventilatory support was taken. Most importantly, 'on table death possibility' consent was also explained and video documented.

PROCEDURE

After general anesthesia was given, position of flexion at neck-thorax and extension at atlanto-occipital junction given.

Storz Rigid bronchoscopes of the sizes 3.5 and 4.5, led white light source, light carrier, straight blade pediatric macintosh laryngoscopes were used.

Upper end of endotracheal tube was used to connect to the ventilating port of rigid bronchoscope and connected to pediatric anesthesia circuit.

Patient was ventilated till oxygen saturation reached 100%. Macintosh laryngoscope used to visualize the larynx and guide the rigid bronchoscope.

Initially 4.5 sized rigid bronchoscope used which could not negotiate the glottis. Following which 3.5 sized rigid bronchoscope was used. The 3.5 sized bronchoscope was so narrow that it did not allow passage of optical foreign body retrieval forceps. Hence a non-optical foreign body forceps was used to remove the foreign body. Even with normal forceps the procedure was almost blind as the lumen of the 3.5 sized

scope is very narrow. A positive pressure ventilation with intermittent apnea technique used. Sometimes during the procedure, the entire bronchoscope had to be removed as the ventilation of the opposite lung was inadequate at times. This led to quick desaturation leading to a cycle of endotracheal intubation, ventilation, saturating unto 100% and handing over to surgeon.

Finally, after some attempts foreign body was visualized from left main bronchus and retrieved intact [Figure 8]. Following which breath sounds and ventilation of left lung drastically improved. The oxygen saturation also started to remain more than 98% on spontaneous ventilation.

Five hours postoperatively the signs of distress were notably absent. Child appeared calm and more playful. Improved vocal resonance and breath sounds were noted on left lung fields. Post operative x ray showed shift of cardia and trachea towards normal (fig 6), improved broncho-vascular markings and decreased lucency suggesting the air trapping was relieved. The patient was discharged the following day.



Figure 1: X ray showing Obstructive Emphysema on the Left Side and Tracheal Deviation

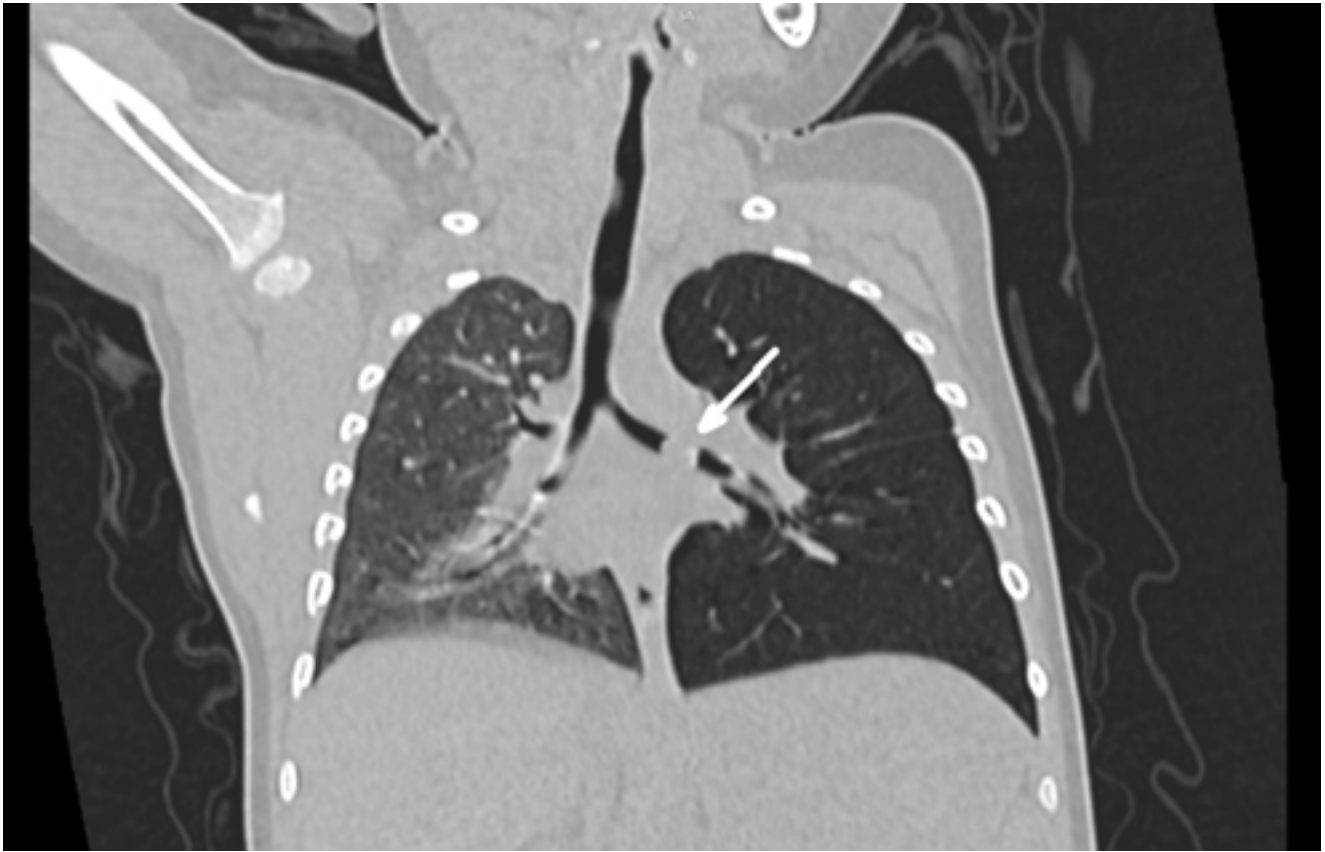


Figure 2: CT Chest showing Foreign Body in Left Main Bronchus



Figure 3: Axial View CT Chest showing Foreign Body in Left Main Bronchus and Obstructive Emphysema



Figure 4: Coronal CT Chest showing Foreign Body in Left Main Bronchus

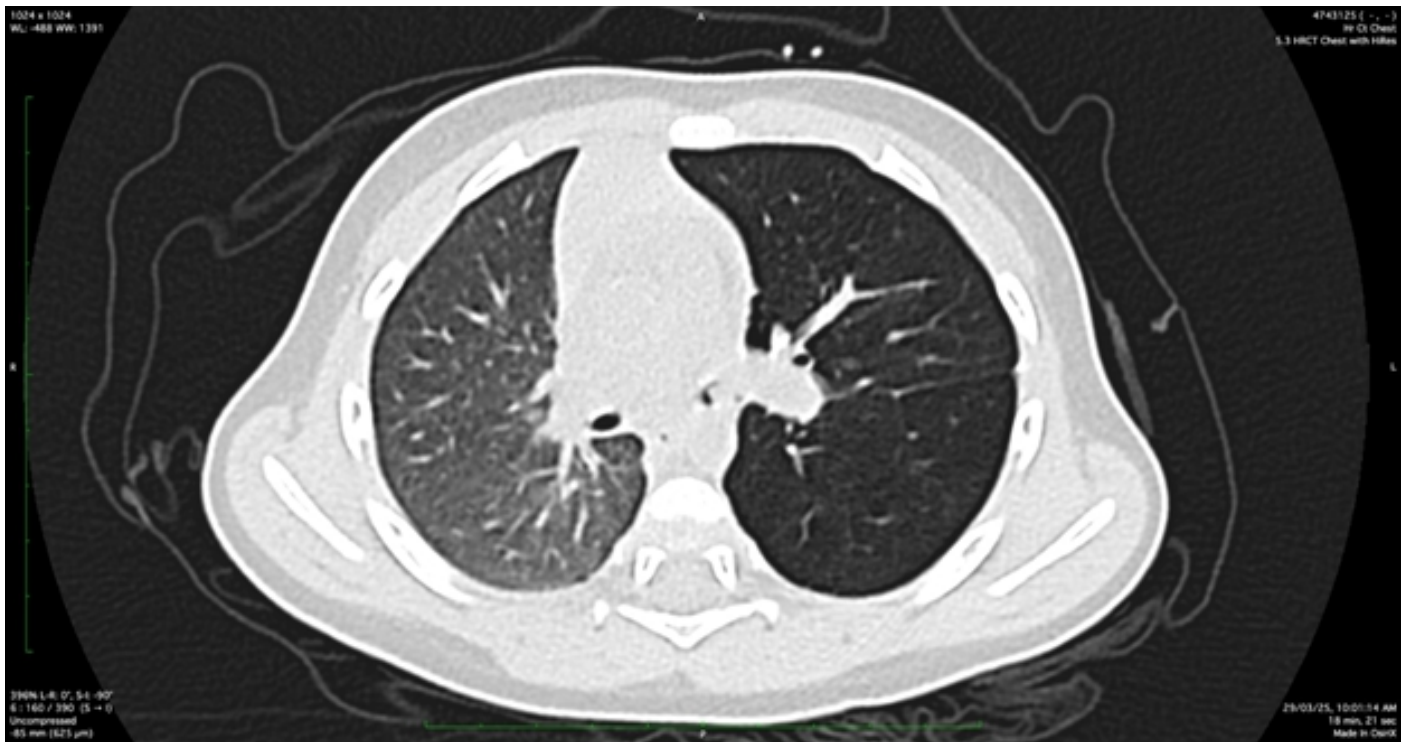


Figure 5: CT Chest showing Foreign Body in Left Main Bronchus



Figure 6: Post-operative X-ray shows Normal Left Lung Fields

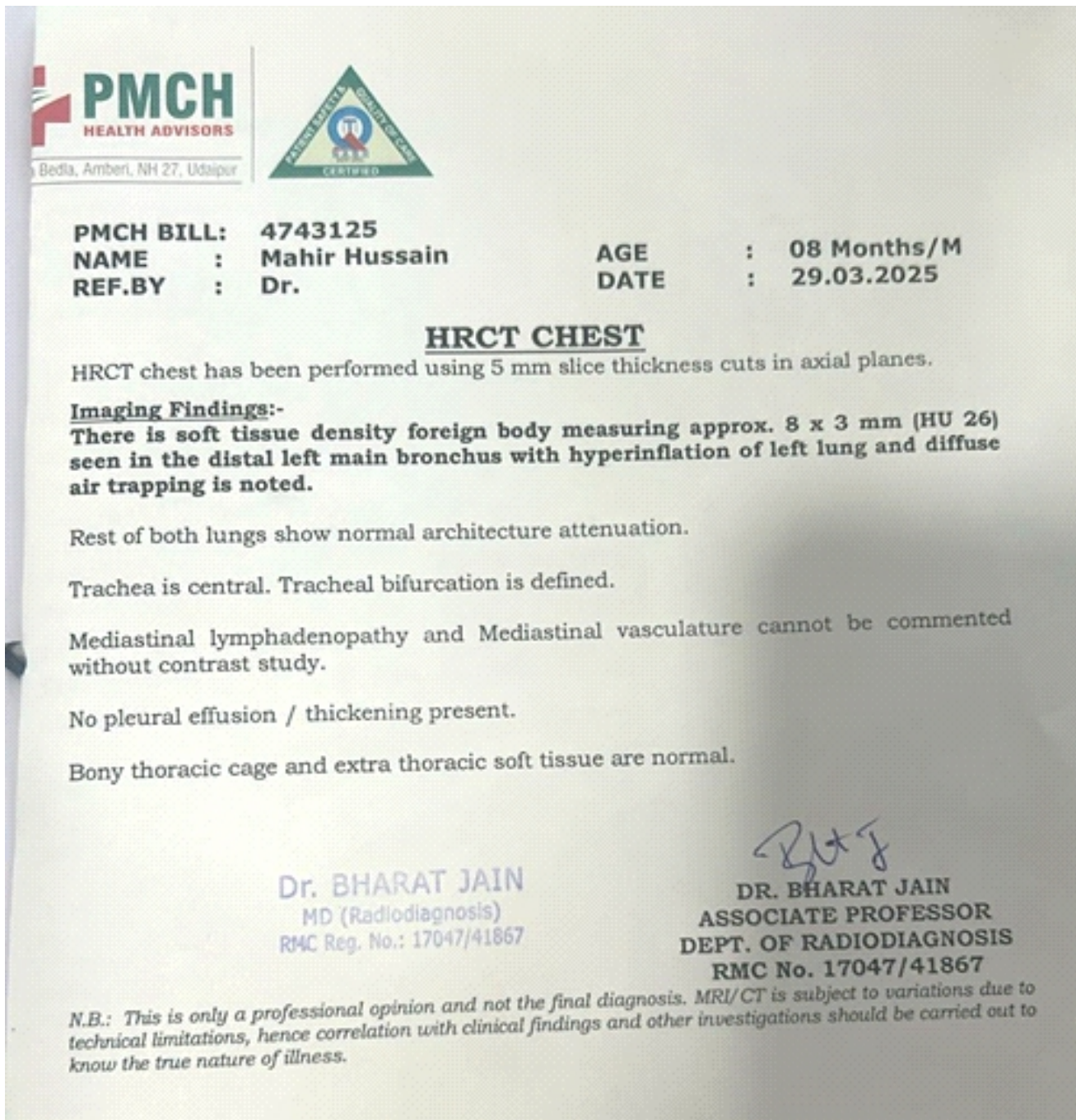


Figure 7: HRCT Report

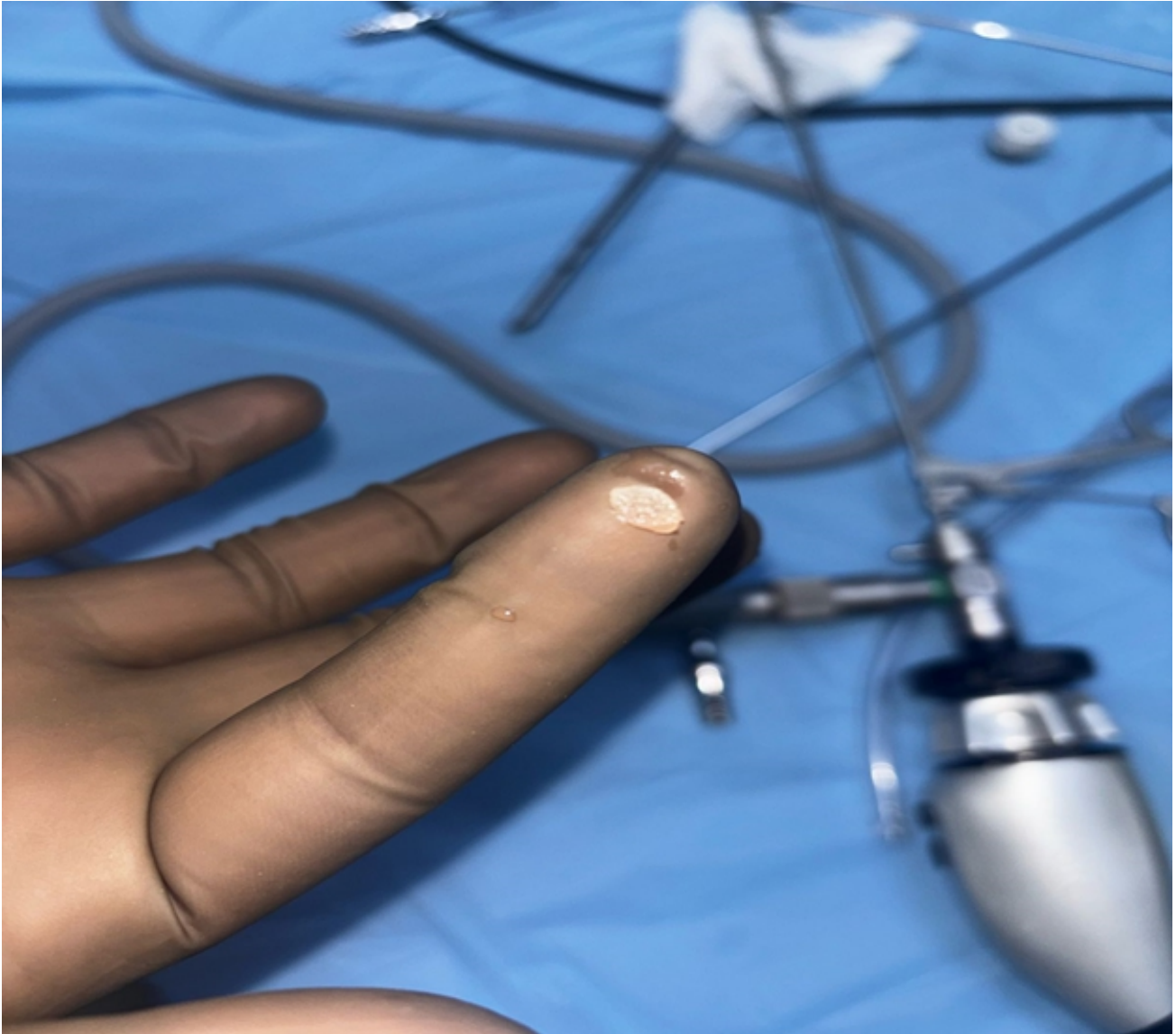


Figure 8: Post-operative Picture shows Foreign Body Retrieved from Left Bronchus

DISCUSSION

Gustav Killian is considered as the first surgeon to have performed rigid bronchoscopy in 1897. Incidentally he performed bronchoscopy using a rigid esophagoscope to remove a pig bone from bronchus. Tackling a case of pediatric foreign body in the operation theatre gives its fair share of jitters to the operating surgeon and anesthetist involved. Often this surgery involves adrenaline packed atmosphere in the O.R as this procedure mandates each and every personnel tackling this emergency to be at their best of reflexes.

The anesthetist and the operative surgeon juggle taking turns with precision to ventilate the lungs and visualize the foreign body respectively to ultimately retrieve it. This sharing of the airway space makes it more complicated.

Foreign body of the tracheobronchial pathway comprises one of the leading causes of death in pediatric patients aged 1-3 years is due to foreign body lodged in airway. Some of these cases could be due the inability to reach emergency department and O.R on time.

Most of the patients of tracheobronchial foreign bodies present with cough and dyspnea ranging till stridor⁴. However, some patients are asymptomatic on presentation. Chronic foreign bodies usually present with cough not relieving on medication. So, for a child with unrelenting cough a suspicion of tracheobronchial foreign body must be at the back of pediatrician's mind.

Most frequently the radiological finding encountered is of obstructive emphysema or an air trapping picture because of the ball valve mechanism. Other radiological features may range from collapse of segment, consolidation or rarely normal skiagram. Consolidation and a normal skiagram may have a long seated foreign body⁵.

The surgeon ideally expects the patient's airway to be adequately ventilated, adequate depth of anesthesia and minimal secretions while navigating the airway. Some surgeons prefer spontaneous ventilation over positive pressure ventilation during this procedure. Some studies noted less chance of dislodging of foreign body further distally, less chances of pneumothorax, laryngospasm or arrhythmias in perioperative periods. Even the disruption of breathing is absent in cases of spontaneous ventilation¹. Whereas when a foreign body is in the distal part of tracheobronchial tree, positive pressure ventilation and intermittent apnea technique is used.

Cases of injury to tracheobronchial mucosa especially when operating using smaller bronchoscopes is common due to the small working channels. This can be mitigated to some extent by using or applying masking tapes on the retrieving forceps at lengths of bronchoscope and successively at every 3mm interval². If at all a forceps accidentally grasps mucosa and is stuck, gentle closing of the forceps and retrieving of the forceps must be done. Some institutions have the optical forceps which likely may mitigate injury to tracheobronchial mucosa.

Vegetative foreign bodies like peanuts, cashew nut pieces, walnut pieces, areca nut are found to be commonly found in children generally aged less than 4 years of age. However older children being more curious often are found with plastic toys as foreign bodies in bronchus³. If a sharp foreign body like a pin is stuck in the mucosa, it must be gently dislodged and carefully retrieved.

After the procedure of bronchoscopy and foreign body retrieval some complications may occur. They may vary from simple bronchospasm, post operative bleeding or even bronchopneumonia.

CONCLUSION

Tracheo-bronchial foreign bodies consistently remain as one of the dire emergencies involving the pediatric age group. In managing this emergency there must be a well-orchestrated team effort while tackling this situation.

The possibility of tracheobronchial foreign must be kept in mind in cases of unrelenting cough.

CONFLICT OF INTEREST: None

FINANCIAL SUPPORT: None

REFERENCES

1. Shen X, Hu CB, Ye M, Chen YZ. Propofol-remifentanyl intravenous anesthesia and spontaneous ventilation for airway foreign body removal in children with preoperative respiratory impairment. *Paediatr Anaesth*. 2012 Dec;22(12):1166-70. doi: 10.1111/j.1460-9592.2012.03899.x. Epub 2012 Jun 14. PMID: 22694274.
2. Patigaroo S A et.al *Indian J Otolaryngol Head Neck Surg* December (2022), 74 (Suppl 3): S 6422 - S 6437
3. Chuan-Shan Zang et al. Inhaled foreign bodies in pediatric patients: a review and analysis of 3028 cases. *Int J Clin Exp Pathol* 2017;10(1):97-104.
4. Pinzoni F, Boniotti C, Molinaro SM, Baraldi A, Berlucchi M. Inhaled foreign bodies in pediatric patients: review of personal experience. *Int J Pediatr Otorhinolaryngol*. 2007 Dec;71(12):1897-903. doi: 10.1016/j.ijporl.2007.09.002. Epub 2007 Oct 23. PMID: 17936370.
5. Amith. I et.al. Tracheo-Bronchial Foreign Body Aspiration in Children: A One Year Descriptive Study: *Indian J Otolaryngol Head Neck Surg* (January 2014) 66(Suppl 1):S180–S185.