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The Incidence of Metal Pin Inhalation Among Patients in Maysan Governorate

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Abstract

Objective: Foreign body (FB) inhalation in the tracheobronchial tree is a significant emergency, particularly affecting children due to anatomical and behavioral factors. This study examines the characteristics, diagnosis, and management of FB inhalation cases at Al Sadder Teaching Hospital, Maysan Governorate, over three years. **Methods:** We conducted a retrospective analysis of 50 patients diagnosed with FB inhalation from January 2020 to December 2022. Patient demographics, clinical presentations, FB types and locations, imaging findings, bronchoscopy interventions, and outcomes were reviewed. All patients underwent chest X-rays, with subsequent rigid bronchoscopy under general anesthesia for FB removal when indicated.

Results: The sample comprised 58% females and 42% males, with ages ranging from 9 months to 60 years. FBs were visualized on X-ray in 72% of cases, though bronchoscopy remained the primary diagnostic and treatment tool, showing a success rate of 76% on the first attempt. Metallic foreign bodies (pins) predominated (52%), followed by organic items. The right main bronchus was the most common site of FB impaction (40%), reflecting anatomical vulnerability.

Conclusion: Timely diagnosis and intervention are essential to reduce morbidity in FB inhalation cases. Rigid bronchoscopy proved effective and safe for FB removal. Public awareness and preventive measures are recommended, particularly for children under five years who are most at risk.

Keyword: Incidence, Metal pin, Inhalation, Maysan governorate

Introduction:

A tracheobronchial foreign body (TFB) is considered an emergency case, especially in pediatric patients. Children under five years old are considered more vulnerable to air obstruction. Many factors can increase the opportunity for TFB in these groups of population. Furthermore, physiological, anatomical, and psychological can increase the incidence of children's TFB [1].

Foreign bodies can become lodged anywhere from the laryngeal inlet to the terminal bronchioles, with many getting stuck in the right main bronchus due to its alignment with the trachea [2].

Foreign bodies can vary in type and material, including inorganic items that can be metal and plastic materials [3]. Detecting the texture and material of FB is a crucial step in the first step of surgical intervention which can change the type of

procures. In addition, the type of FB can induce different types of pathological changes. These changes can extend from simple inflammation to complex abscesses [4].

Another type of FB classification depends on the airway obstruction which can be partial or complete obstruction [5].

More importantly, many factors that been used to guide the clinical course for FB. The type of location and texture of FB are crucial factors that can change the outcome and treatment procedure. Tracheobronchial foreign bodies (TFBs) can lead to complications such as non-resolving pneumonia, hemoptysis, pulmonary atelectasis, bronchiectasis, and even death [3,4]. Chest radiography and rigid bronchoscopy are commonly used in the diagnosis of foreign body aspiration (FBA) [5].

Most FB cases begin with an X-ray, and the doctor must be knowledgeable in how to interpret them. FBA typically presents as obstructive lobar or segmental overinflation or atelectasis on a chest x-ray.

The management of FB inhalation depends on the kind and location of the FB. For the removal of these FBs, rigid bronchoscopy is the gold standard; tracheotomy is used infrequently [6]. These days, cardiovascular thoracic surgeons seldom ever conduct thoracotomy and segmental lung resection.

Many factors can change the severity of the signs and symptoms for the person who suffers from foreign body obstruction. These factors are the location of the obstruction, the foreign body size, and the severity of the obstruction [7]. According to the location of the foreign body, the mainstem or lobar bronchus is the majority of the cases [8]. The severity of symptoms can vary according to the severity of airway obstruction and these symptoms can start with sudden coughing, choking, and/or wheezing when the severe airway obstruction; however, on the other hand, symptoms can develop

more gradually with less severe if the airway is not fully close [7].

Moreover, the airway obstruction can be partial or complete and that will change the severity of symptoms and signs [9]. Anatomically, the right lower lobe of the lung is more vulnerable to foreign body aspiration since it has a wider and steeper diameter compared with the left lung.

In terms of treatment, finger investigation in the upper part of the respiratory tract is not recommended since this manipulation can push the foreign body further and make the case complicated [5,7].

The most common noninvasive diagnostic foreign body is X-rays. In addition, this approach is also very helpful with foreign body location [7,8]. However, this diagnostic tool cannot diagnose and visualize all of the aspiration substances. Bronchoscopy under general anesthesia is the best option for most foreign body obstructions [9,10]. Two conditions need to be there for using Rigid bronchoscopy: any abnormal lung physical and X-ray exam, and a patient's or witness's report of aspirating a foreign body [11].

Patients and Methods

A hospital file-based retrospective study included fifty patients admitted to Al Sadder Teaching Hospital in Maysan governorate with witnessed or accidentally diagnosed foreign body inhalation during the last 3 years period (starting from January 2020 and till the end of December 2022).

All patients were immediately admitted to The Thoracic and Vascular Department of the Al Sadder Teaching Hospital, where a full history was taken to elucidate in detail the event of foreign body inhalation (witnessed inhalation). Nothing per orum (NPO) regimen was started. Immediate plain chest x-ray was taken for those who had time for diagnosis and the exact location of the inhaled foreign body was verified for those with metal foreign body inhalation. Antibiotic cover was initiated, and

endoscopic suite personnel were informed to be ready for endoscopic removal of the foreign body. We used general anesthesia in all the patients. Inhalation techniques using halothane always were used for induction, Muscle relaxant scoline (suxamethonium), 1mg/kg body weight was administered, and bronchoscopy was done. Artificial ventilation is maintained throughout the procedure. Specially designed bronchoscopy forceps were used to remove the ingested foreign bodies, which were seen or not seen by plain chest x-ray, to be located either at the level of the trachea, carina, right main bronchus or left main bronchus (Figure 1,2). All the

patients tolerated the procedure very well. After the removal of the foreign body, the patients were extubated and closely monitored until full recovery. The special formula was used to classify patients according to their age, gender, clinical features, time of presentation, imaging study, location of the foreign body in the airway, type of foreign body identified, attempts to remove the foreign body and post-endoscopic complications. Data was collected from the patient hospital record and endoscopy unit record and presented as tables and figures after analysis by using SPSS and EXCEL software.

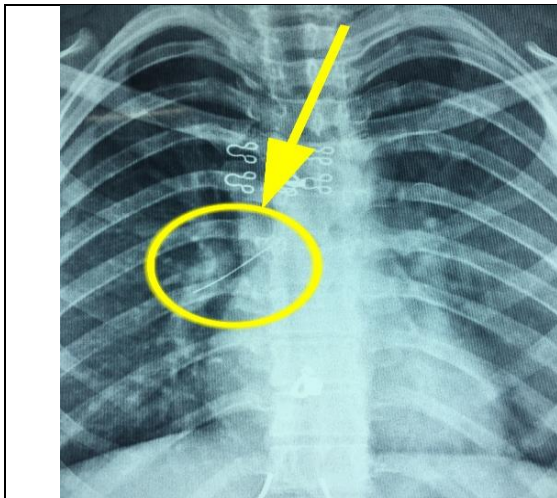


figure 1: Chest X-ray of the patient



figure 2: bronchoscope was done by the surgeon

RESULTS

Gender distribution: Among all 50 cases admitted to Al Sadder Teaching Hospital the sex distribution was more in females than males but there was no big difference between both sexes, there were 29 females (58%) and 21 males (42%) so the foreign body inhalation was not significant between male and female, The distribution of patients as regard their sex distribution is illustrated in figure 3.

Age distribution: The youngest age was 9-month-old male patient and oldest age was 60 years old male patient with a mean \pm SD age of (12 ± 14 years), only 3 patients (6%) were below 1 year, 17 patients (34%) were between (1-5) years old, 5 patients (10%) were between (6-10) years, 14 patients (28%) were between (11-20) years old, 6 patients (12%) were between (20-30) years, and only

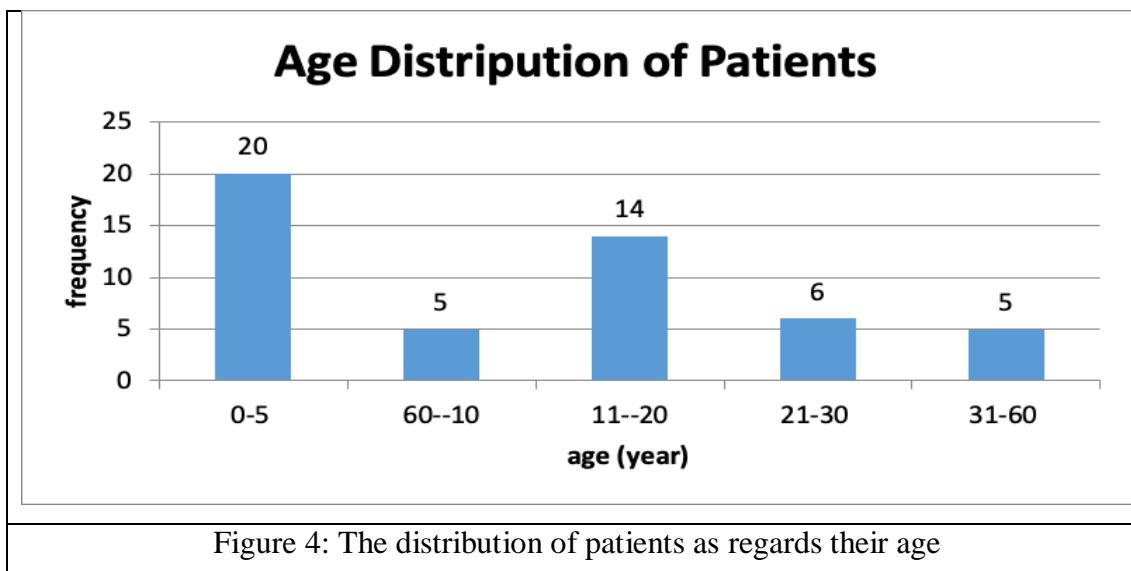
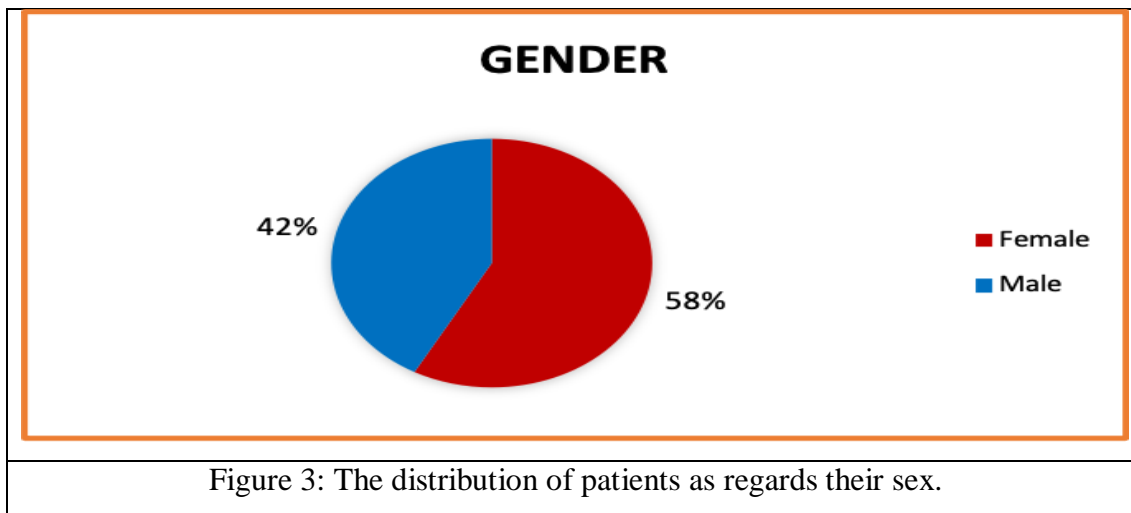
5 patients(10%) were between (31-60) years old as shown in figure 4.

Geographic distribution: Among all the fifty patients, 31 patients (62%) were from the city center and 19 patients (38%) were from the periphery of the city and rural areas as in Figure 5.

Radiology Exam: All the patients were admitted to Al Sadder Teaching Hospital in Amarah/ Maysan governorate in Iraq, CXR was done as a routine investigation, and only 4 patients the CXR were not done due to their urgent and difficult condition that

needs to do urgent bronchoscopy due to choking and suffocation, 36 patients (72%) the foreign body was seen by the routine CXR, 10 patients (20%) the foreign body was not visualized by the CXR (figure 6).

Clinical Presentation: Among all the fifty patients 21 patients (42%) suffered from cough, 14 patients (28%) were Asymptomatic, 11 patients (22%) were complaining of shortness of breath, fever, and cough and only 4 patients (8%) were complaining from choking as in figure 7.



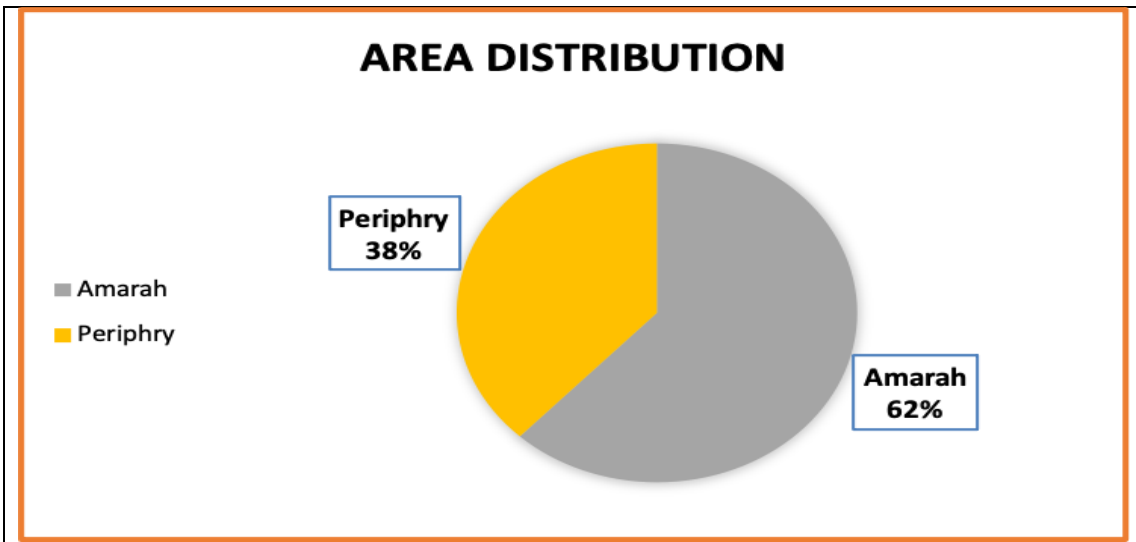


Figure 5: the distribution of patients as regards their area

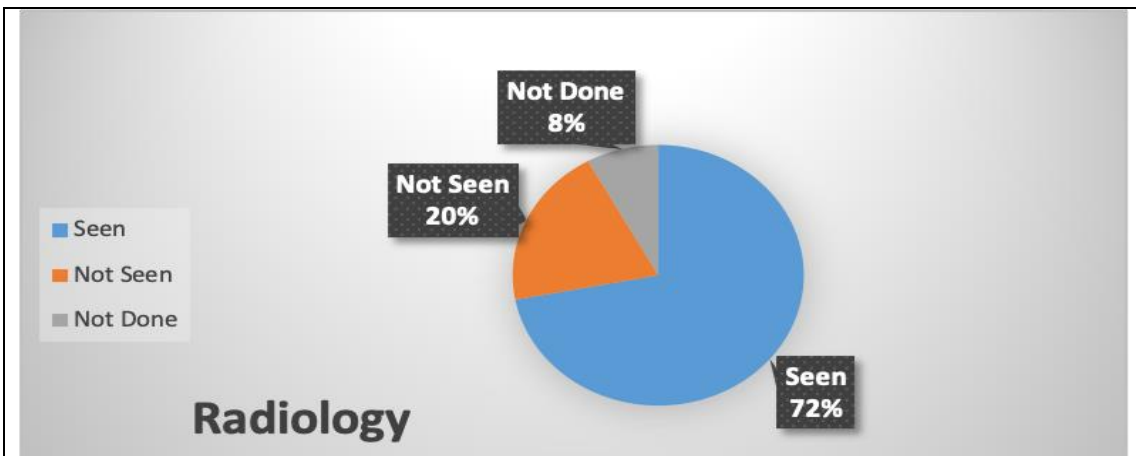


Figure 6: the distribution of patients according to the CXR finding

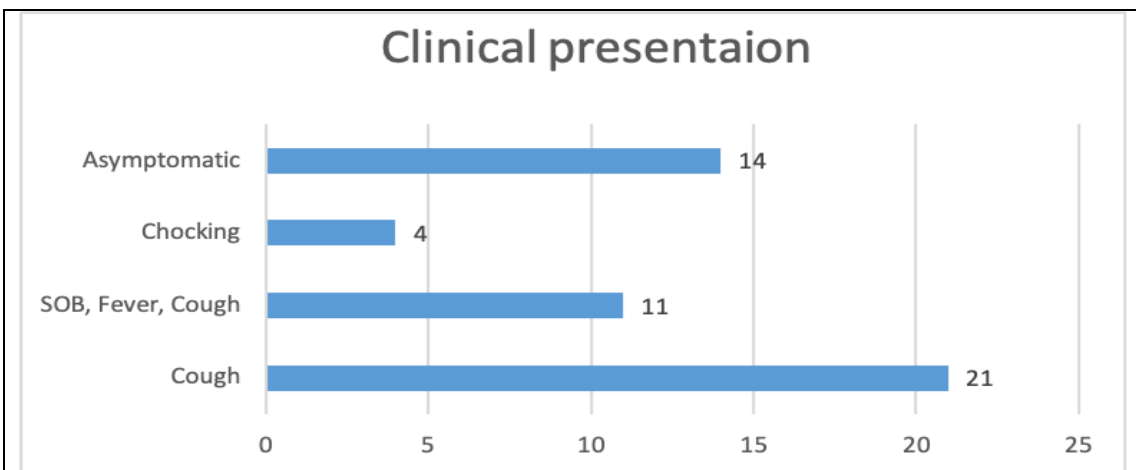


Figure 7: The distribution of patients as regards their clinical presentation

Physical Examination: Rapid and careful history and physical examination were adopted for all the patients, 25 patients (50%) had a history of foreign body inhalation of less than 1 day, and 24 patients (48%) had a history of foreign body inhalation from 1-5 days of duration (figure 8).

Foreign Body Type: Among all the fifty patients only 5 patients the foreign body was not found in the trachea and bronchi while doing the rigid bronchoscopy, the diagnosis was chest infection so bronchial wash was taken for culture and sensitivity, the other 45 patients the foreign bodies were extracted smoothly, 26 patients (52%) the foreign bodies were metal pine needles for hijab, in 10 patients (20%) the foreign bodies were sunflower bean, in 5 patients (10%) the foreign bodies were organic food in form of small pieces of chicken bone, fava bean, small peanut bean, and a small

piece of fruit and meat. 3 patients (6%) the foreign bodies were metal screws, and only 1 patient (2%) had a small watch battery impacted in the right main bronchus (RMB) (figure 9).

The distribution of foreign bodies: During the bronchoscopy as we said only 5 (10%) patients there were no foreign bodies seen, the other 45 patients, 20 of them (40%) the foreign bodies lodged in the right main bronchus, 15 patients (30%) the foreign bodies were lodged in the trachea, and only 10 patients (20%) the foreign bodies were lodged in the left main bronchus, as shown in figure 10.

Attempts for Removal: Through all the bronchoscopies that were done for the patients under general anesthesia, the foreign bodies were extracted by first attempt in 38 patients (76%), and extracted by several attempts in 7 patients (14%). As shown in figure 11.

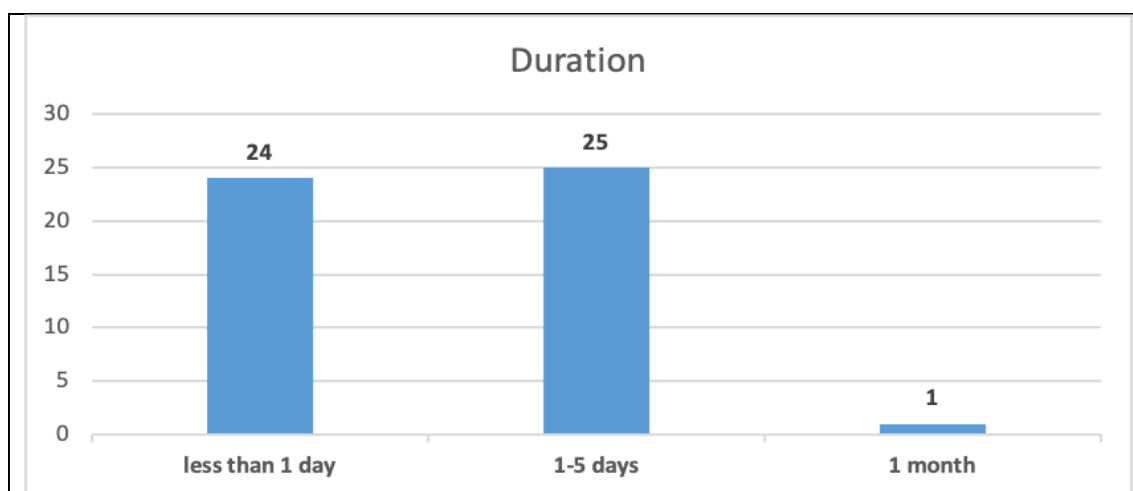


Figure 8: The distribution of patients as regards their duration of clinical complaints

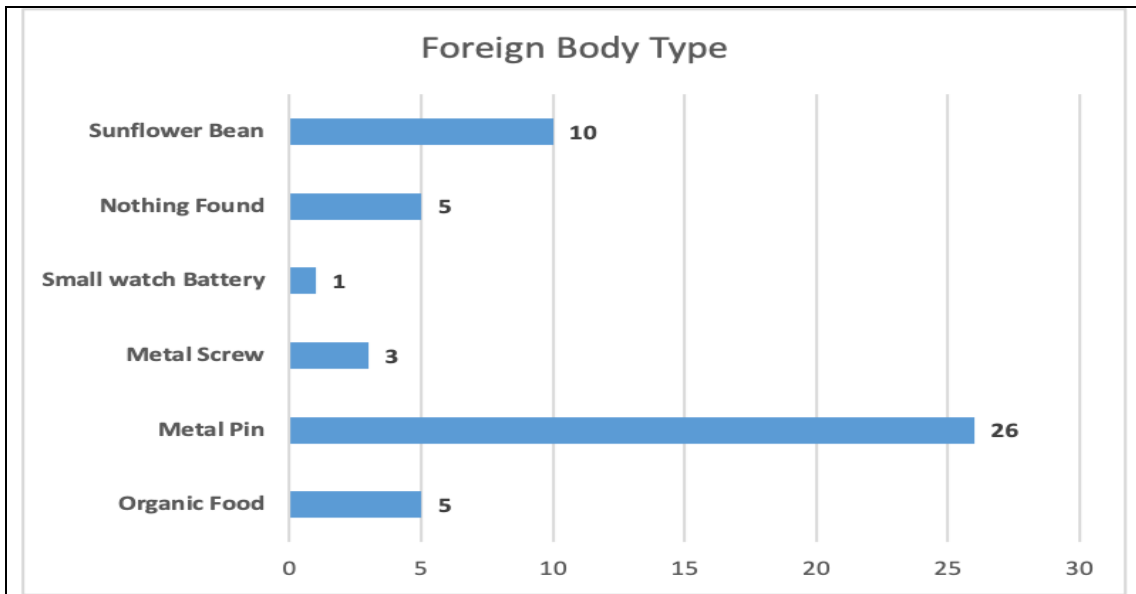


Figure 9: The distribution of patients regarding foreign body type

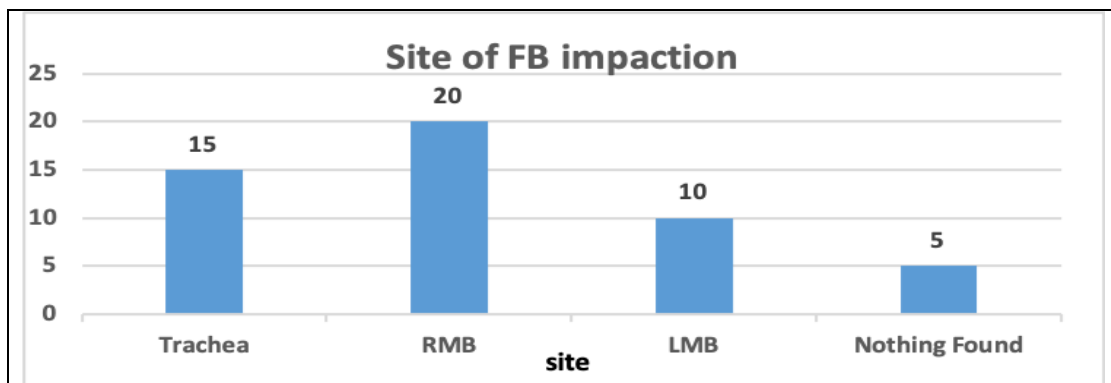


Figure 10: The distribution of foreign bodies regarding to site.

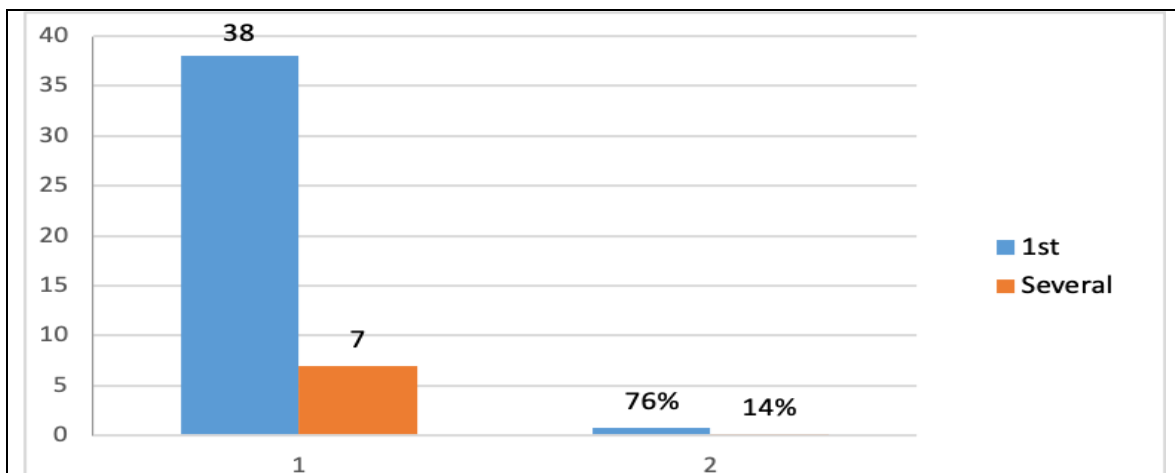


Figure 11: The distribution of patients regarding attempts of foreign body removal.

Discussion

One of the most common cases seen in ER is foreign body aspirations (FBA) (10). More, children under five years are more vulnerable to FBA aspiration (11). The findings underscore the critical importance of timely diagnosis and intervention in managing TFB, especially in young children, who were disproportionately affected.

The current study revealed a higher incidence of TFB inhalation in children aged 1-5 years, a pattern consistent with global findings (12-15). Children in this age group are at higher risk due to immature chewing and swallowing mechanisms, lack of molars, and behavioral tendencies to explore objects orally. While slightly more females were affected (58%), this gender difference was not statistically significant and may be incidental rather than indicative of a true pattern (13).

The study revealed that while chest X-rays detected foreign bodies in 72% of cases, they missed 20% of cases, underscoring the limitations of radiography, particularly for organic or non-radiopaque materials. Given that some patients presented with critical symptoms necessitating immediate intervention, the study supports the view that a negative X-ray does not rule out TFB. Rigid bronchoscopy remains the gold-standard diagnostic tool and is essential when clinical suspicion persists despite negative imaging findings (16-18).

Coughing emerged as the predominant symptom, a common finding in TFB cases, where coughing acts as a reflex to expel the foreign object. Interestingly, 28% of patients were asymptomatic, highlighting that some TFBs may not elicit acute symptoms or may cause only minor obstruction. This finding aligns with previous studies showing that partial obstructions, especially with organic materials, may have a more insidious onset, increasing the risk of delayed diagnosis. (14,19)

Metallic foreign bodies, especially hijab pins, represented the majority of cases (52%), reflecting local cultural practices (20). These findings suggest that region-specific preventive strategies, such as

educational campaigns, may be beneficial. Organic materials, including seeds and food fragments, were also common, which aligns with known causes of TFB in children. Anatomical factors, particularly the steeper, wider structure of the right main bronchus, explain why 40% of foreign bodies were lodged there. This anatomical predisposition underscores the importance of targeted radiographic evaluation for suspected right bronchus obstructions (20). Rigid bronchoscopy proved effective in the management of TFB, with a 90% success rate in foreign body removal, achieving extraction in 76% of cases on the first attempt (21). This high success rate demonstrates the proficiency of the bronchoscopy team and supports the role of rigid bronchoscopy as both a diagnostic and therapeutic tool. Additionally, the absence of complications post-procedure highlights the safety and reliability of this approach when performed in a specialized setting. The 10% of cases where bronchoscopy found no foreign body points to the importance of careful clinical evaluation to prevent unnecessary procedures (21,22).

Conclusion:

The study reinforces the need for early diagnosis and intervention in TFB cases. Rigid bronchoscopy, as demonstrated, is an effective and safe approach for foreign body removal. Future efforts should focus on public awareness, prevention, and improved training for healthcare professionals to reduce the incidence and impact of TFB, particularly in vulnerable populations such as young children.

Author Contributions

The study was designed and performed By Husam AL-hraishawi and Ahmed Ali Al mashhadani. Additionally, all authors analyzed the data and wrote the manuscript.

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Ethics

The study protocol was reviewed by the Human Ethics Committee of the College of Medicine,

University of Misan, Iraq (No 1398 Deans office M4, dated 28/12/2023).

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Conflict of Interest:

There are no conflicts of interest.

Reference

- Liang J, Hu J, Chang H, Gao Y, Luo H, Wang Z, Zheng G, Chen F, Wang T, Yang Y, Kou X. Tracheobronchial foreign bodies in children—a retrospective study of 2,000 cases in Northwestern China. *Therapeutics and clinical risk management*. 2015 Aug 28;1291-5.
- Asif M, Haroon T, Jamil M, Malik S, Ghani R. Correlation of operative findings with pre-operative clinical signs and analysis of x-rays in patients with airway foreign bodies. *Journal of Ayub Medical College Abbottabad*. 2010 Mar 1;22(1):32-4.
- Sahin A, Meteroglu F, Eren S, Celik Y. Inhalation of foreign bodies in children: experience of 22 years. *Journal of Trauma and Acute Care Surgery*. 2013 Feb 1;74(2):658-63.
- Gregori D, Salerni L, Scarinzi C, Morra B, Berchiolla P, Snidero S, Corradetti R, Passali D, ESFBI Study Group. Foreign bodies in the upper airways causing complications and requiring hospitalization in children aged 0–14 years: results from the ESFBI study. *European archives of oto-rhino-laryngology*. 2008 Aug;265:971-8.
- Tuckett P, Cervin A. Reducing the number of rigid bronchoscopies performed in suspected foreign body aspiration cases via the use of chest computed tomography: is it safe? A literature review. *The Journal of Laryngology & Otology*. 2015 Jan;129(S1):S1-7.
- THOMAS A, Ling Xiu NG, Li Yun LI. Tracheotomy: an alternative for tracheobronchial foreign body removal. *Med J Malaysia*. 2014 Oct;69(5):241.
- Wang AY, Peura DA. Foreign bodies. *The Esophagus*. 2012 Mar 4:689-706.
- Swerdlow M, Fenton LZ. Bronchopulmonary Foreign Malformations. *Pediatric Radiology*. 2013 Dec 17:28.
- Brown, Anthony FT, and Michael D. Cadogan. *Emergency medicine: diagnosis and management*. CRC Press, 2020.
- Albirmawy OA, Elsheikh MN. Foreign body aspiration, a continuously growing challenge: Tanta University experience in Egypt. *Auris Nasus Larynx*. 2011 Feb 1;38(1):88-94.
- Fenane H, Bouchikh M, Bouti K, El Maida M, Ouchen F, Mbola TO, Damessane L, Achir A, Benosman A. Scarf pin inhalation: clinical characteristics and surgical treatment. *Journal of Cardiothoracic Surgery*. 2015 Dec;10:1-4.
- Sehgal IS, Dhooria S, Behera D, Agarwal R. Use of cryoprobe for removal of a large tracheobronchial foreign body during flexible bronchoscopy. *Lung India*. 2016 Sep 1;33(5):543-5.
- Ilan O, Eliashar R, Hirshoren N, Hamdan K, Gross M. Turban pin aspiration: new fashion, new syndrome. *The laryngoscope*. 2012 Apr;122(4):916-9.
- Subkhan M, Pradjoko I. Seorang wanita dengan aspirasi jarum pentul hari ke-14. *Medika* 2018; 14: 55-62.
- Baram A, Sherzad H, Saeed S, Kakamad FH, Hamawandi AM. Tracheobronchial foreign bodies in children: the role of emergency rigid bronchoscopy. *Global pediatric health*. 2017 Nov 24;4:2333794X17743663.
- Zaghba N, Benjelloun H, Bakhatar A, Yassine N, Bahlaoui A. Scarf pin: An intrabronchial foreign body who is not unusual. *Revue De Pneumologie Clinique*. 2013 Jan 21;69(2):65-9.
- Hebbazi A, Afif H, El Khattabi W, Aichane A, Bouayad Z. Scarf pin: A new intrabronchial foreign body. *Rev Mal Respir* 2010;27:724-8.
- El Koraïchi A, Mokhtari M, El Haddoury M, El Kettani SE. Rigid bronchoscopy for pin

- extraction in children at the Children's Hospital in Rabat, Morocco. *Revue de Pneumologie Clinique*. 2011 Feb 3;67(5):309-13.
18. Passàli D, Lauriello M, Bellussi LU, Passali GC, Passali FM, Gregori D. Foreign body inhalation in children: an update. *Acta Otorhinolaryngologica Italica*. 2010 Feb;30(1):27.
 19. Zaghba N, Benjelloun H, Bakhatar A, Yassine N, Bahlaoui A. Scarf pin: An intrabronchial foreign body who is not unusual. *Revue De Pneumologie Clinique*. 2013 Jan 21;69(2):65-9.
 20. Baram A, Kakamad FH, Bakir DA. Scarf pin-related hijab syndrome: A new name for an unusual type of foreign body aspiration. *Journal of International Medical Research*. 2017 Dec;45(6):2078-84.
 21. Parvez Y, Kandath MA. Accidental aspiration of head scarf pin in left bronchus piercing the lung parenchyma: A rare case in a child. *Lung India*. 2016 Jul 1;33(4):424-6.