

Multivariate Analysis of Witnessed Foreign Body Aspiration Outcomes in Children Case series study was performed on children diagnosed as foreign body aspiration who referred to ENT clinic, Benghazi children hospital, Benghazi- Libya

Authors:

YOSEF. H. SAEED ABDELKARIM¹, KHALED G HASEN², FARAJ SABIR SULAYMAN³, SULIMAN SAAD SABER ASMAEIL⁴

¹Otolaryngology Department, Medical College, Benghazi University, Consultant in ENT Department, Benghazi medical Center.

²Otolaryngology Department, Medical College, Amukhtar University, Consultant in ENT Department, Albeda Hospital.

³Department of Community Medicine, Faculty of Medicine, Omar Al-Mukhtar University, El- Beyda

⁴Senior Specialist in ENT Department, Benghazi Medical Center.

Corresponding Author:

YOSEF. H. SAEED ABDELKARIM

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ABSTRACT:

Background: Aspirated foreign body is a frequently seen in children and may end with serious complications. Diagnosis depends on history of witnessed aspiration by attendant, clinical findings along with a radiograph or CT scan if permissible but bronchoscopy remains the procedure of choice for ruling out foreign body. **Aims of the study:** to investigate the association of witness in presentation of aspirated foreign body with clinical outcomes in the pediatric patients presenting to local otolaryngology practice in Benghazi. **Methodology:** Case series study of 378 cases with review of records and analysis made by SPSS version 23. **Results:** (75.9%) of patients had history of witnessed foreign body aspiration by attendance. (87%) of patients had positive physical finding on examination. (87.4%) of patients, foreign body was found during bronchoscopy and (97%) of patient's, foreign body was successfully removed. **Conclusion:** Rigid bronchoscopy is a safe and effective procedure in diagnosis and treatment of aspirated foreign body in children. History of witnessed aspiration and physical findings are important predictors for finding the foreign body.

Keywords: Foreign body aspiration, bronchoscopy.

INTRODUCTION:

Foreign body (FB) aspiration is one of the most common problems faced by Otorhinolaryngologists in our day to day dealings. It poses a challenge each and every time a case is encountered [1]. Children are more commonly presenting with FB aspiration than adults do in otolaryngology unit [2]. Diagnosis of airway foreign body lodgement depends a great deal on history of witnessed aspiration by attendant, clinical findings along with a radiograph or CT scan if permissible but bronchoscopy remains the procedure of choice for ruling out foreign body in laryngotracheobronchial tree [1]. Patients may be asymptomatic, but when symptoms occur, they may range from acute onset of cough, shortness of breath and at times, asphyxiation to sub-acute presentations including hemoptysis or with post obstructive pneumonia and lung abscess formation [2].

Chest radiograph (CXR) remain essential in determining the characteristics of radio-opaque FBs, whereas radiolucent FBs may present with signs of indirect airway obstruction (atelectasis, unilateral hyperinflation, or localized bronchiectasis) [3,4]. Computed tomography (CT) of chest helps in localizing and evaluating the nature of the FB and provides better information compared to a plain chest radiograph [5]. Rigid bronchoscopy (RB) and flexible bronchoscopy (FLB) are useful modalities for the extraction of FBs [6,7]. Despite advancement in technology and introduction of flexible bronchoscopy (FLB) use of rigid bronchoscopy is still in charge especially for children [8–10]. Misdiagnosed FB can lead to severe outcomes, including respiratory failure and death. Therefore, early correct diagnosis and removal of the foreign body are essential in these children. However, FB is easily misdiagnosed,

due to variability of clinical presentations, types and locations of the FBs, and accompanied complications [11].

In the current research, we investigate the association of witness in presentation of aspirated foreign body with clinical outcomes in the pediatric patients presenting to local otolaryngology practice in Benghazi.

PATIENTS AND METHODS:

Study Design: Case series study.

Ethical considerations: Maintaining the confidentiality of the personal data along all of the study steps. Work up for all of the cases had already written consent for the procedure.

Reference population: General children population in Benghazi.

Sample size and sampling method: All of the cases were included.

Settings: Review of records in Benghazi Children Hospital. All of cases presented during the period between 2014 and 2019 were included.

Patient selection criteria: All of the records of the relevant patients were investigated.

Variables measured:

1. History of witnessed aspiration by attendant.
2. Examination results.
3. Bronchoscopic findings.
4. Outcomes of the procedure, defined as:
 - Finding foreign body.
 - Retrieval of foreign body.

Statistical Analysis:

Data first entered on a Microsoft excel 2007 data sheet. Statistical package for social science (SPSS), version 23.0 was used in analysis.

RESULTS:

History of witnessed aspiration by attendant.

Figure (1) demonstrate that, three quarters of cases had history of witnessed aspiration by attendant.

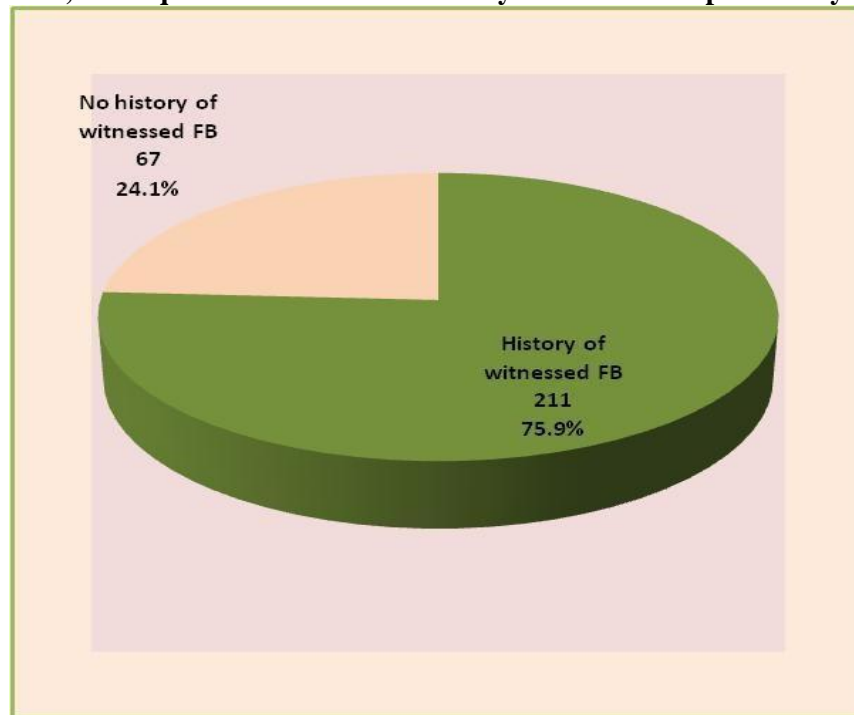


Figure (1): Distribution of the study population according to witnessed aspiration

Clinical features on Presentation:

Figure (2) demonstrate that 87% of cases there were physical findings on clinical examination.

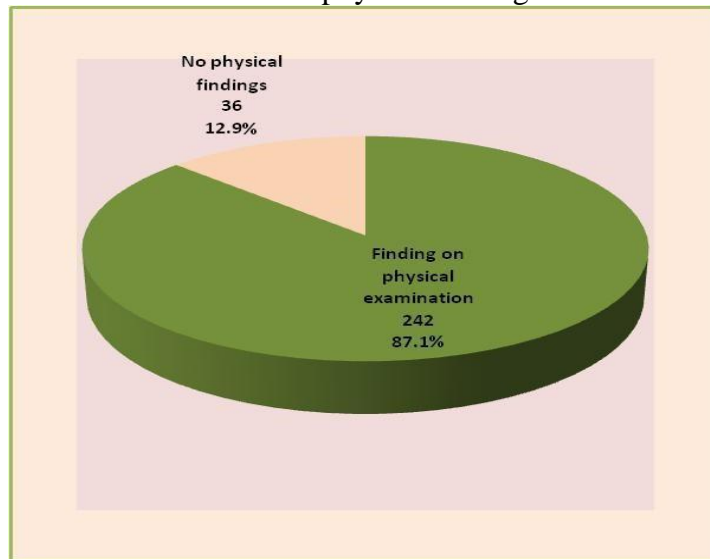


Figure (2): Distribution of study population according to presence of physical findings

Bronchoscopic findings:

Figure (3) demonstrate FB was found in 87% of patients on bronchoscopy.

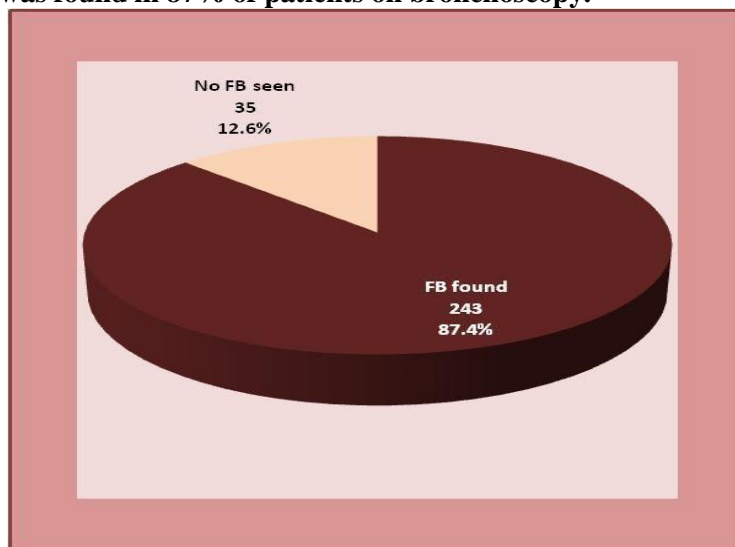


Figure (3): Distribution of study population according to presence of FB on bronchoscopy

Table (1) demonstrates multivariate analysis for selected factors to identify independent predictor for finding FB on RB in patients with FB aspiration.

Table (1): Multivariate analysis of factors related to finding foreign body on bronchoscopy

Factor	B	Wald X ²	P	OR	95% C.I. for OR	
					Lower	Upper
Witnessed aspiration	-0.707	2.595	0.107	0.493	0.209	1.166
Physical finding *	2.799	41.085	<0.001	16.428	6.980	38.661
Constant	-2.195	30.114	<0.001	0.111		

B Beta coefficient of regression, X² Chi square statistic, OR Odds ratio,

Factors associated with successful retrieval of FB with RB:

Figure (4), table (2, 3) demonstrate associations of witnessed aspiration, physical examination findings with retrieval of FB with RB.

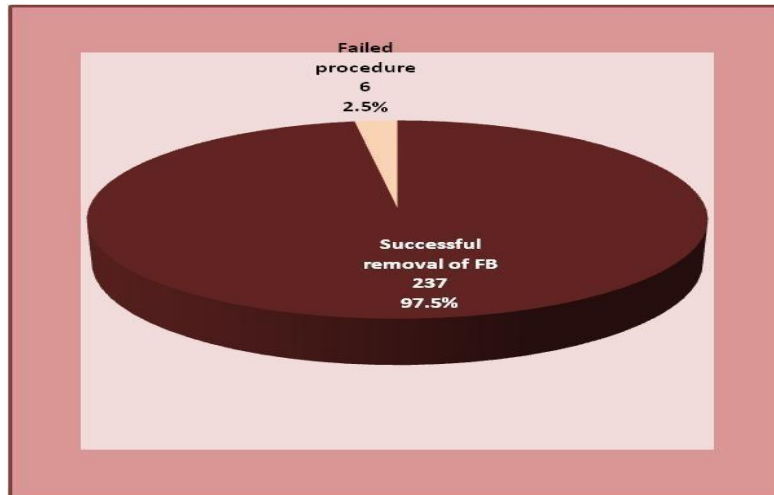


Figure (4): Distribution of study population with discovered FB according to successful removal

Table (2): History of witnessed aspiration and Successful removal of FB

History of witnessed aspiration	Successful removal of FB		Total
	FB successfully removed	FB found but not removed	
Yes	186	6	192
	96.9%	3.1%	100.0%
No	51	0	51
	100.0%	0.0%	100.0%
Total	237	6	243
	97.5%	2.5%	100.0%

Pearson Chi-Square 1.634 P = 0.201 (Insignificant)
FB Foreign body

Table (3): Physical exam and Successful removal of FB

Physical exam finding	Successful removal of FB		Total
	FB successfully removed	FB found but not removed	
Yes	221	6	227
	97.4%	2.6%	100.0%
No	16	0	16
	100.0%	0.0%	100.0%
Total	237	6	243
	97.5%	2.5%	100.0%

Pearson Chi-Square 0.434 P = 0.510 (Insignificant) FB Foreign body

DISCUSSION:

The present study included 278 children with FB aspiration. In the study population 75.9% of cases had history of witnessed aspiration by attendant. Anyhow, this figure seems lower than described by R Al-Hilau [12]. as history was predictive of foreign body in 94% of cases and by Wang Y et al [13]. the history of foreign body inhalation was positive among 98.6% of cases. Nevertheless, this finding was comparable to both results of Sinha V et al [14]. patient history was predictive for FB in only 70% and Mohsen F et al [15]. who stated that most patients presented with an explicit history of inhalation 453 (80.9%).

Kiyan G et al [16]. found history of FB aspirated was statistically significant. as well as to Reyad HM et al [17]. who identified the symptoms as independent predictors of FB on rigid bronchoscopy.

All of cases underwent bronchoscopy using RB. Regarding outcomes of in 243/278 (87.4%) of cases, FB was detected on bronchoscopy, this figure is quiet better than Acharya K [18]. as in 80% of cases, foreign bodies found and also than Reyad HM et al [17]. as an 80.8% of patients were positive for the presence of a foreign body. Anyhow, Wang Y et al [13]. 97.0% had confirmed FB by rigid bronchoscopy. Those differences may be related to differences in describing presentations and previous history of witnessed FB aspiration.

Rates of finding FB on bronchoscopy as expected; statistically significant higher rate with history of witnessed aspiration (91.0% for 76.1; $P = 0.001$) and with positive physical finding (93.8% for 44.4%; $P < 0.001$). This result confirms those of Acharya K [18] and Kiyan G et al [16].

Among those with detected FB; 237/243 (97.5%) had the FB successfully retrieved and this was also higher than the rate presented by Ganie FA et al [19]. who mentioned that RB was successful in removing foreign body from 94.5% patients. RB practice seems to be effective tool in finding and retrieving aspirated FB in children.

In 87% of cases there were physical findings on clinical examination that included decrease in air entry and / or rhonchi. Positive physical finding on clinical examination was the only independent predictor to find FB with RB (OR = 6.98, 95%CI: 6.428 - 38.661). this was comparable to the study of Acharya K [18]. decreased air entry was present in 77% of the patients, Righini CA et al [20]. who stated that unilateral decreased air entry was statistically significant to the presence of FB in the airway. Kiyan G et al [16]. decreased air entry was statistically significant. as well as to Reyad HM et al [17]. who identified the presence of suggestive signs or symptoms as independent predictors of FB on rigid bronchoscopy.

CONCLUSION:

Rigid bronchoscopy is a safe and effective procedure in diagnosis and treatment of aspirated foreign body in children. History of witnessed aspiration and physical findings are important predictors for finding the foreign body. Younger children and infants are more vulnerable to aspiration and complications.

Recommendations:

Early procedure and intervention is recommended especially for younger children.

Guidance of history and clinical examination should be considered in cases with suspect foreign body aspiration. Further research of stronger prospective design is recommended.

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