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Original Research Article

Assessing the Clinical and Radiological Signs in Airway Foreign Bodies

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Abstract:

Background and Objectives: Foreign Body Aspiration (FBA) is a grave problem in children and delays in diagnosis and management can be devastating. The history is very often vague, with subtle physical and chest radiograph abnormalities. To assess the diagnostic accuracy of the triad: history. chocking, unilateral reduction in air entry to lungs, unilateral hyperinflation or collapse on chest X-ray.

Results: In our study sensitivity of history of chocking in detection of FB was 80.47%, specificity was 20.45%. Sensitivity of examination finding of unilateral decrease in air entry to lungs in detection of FB was 71.59%%, specificity was 4.545%. Sensitivity and specificity of chest radiograph in detection of FB was 54.43% and 47.72% respectively. When the triad of history of chocking, decreased air entry on examination and chest radiograph finding of hyperinflation or collapse was considered in detection of FB in airway sensitivity was 59.76% while specificity was 79.54%.

Conclusion: Bronchoscopy is a gold standard in diagnosis of FBA. History, physical examination and radiologic studies have a very low specificity in detection of FBA. The triad of history of chocking, decreased air entry on examination and chest radiograph finding of hyperinflation or collapse has a better specificity in detection of FBA than individual parameters.

Keywords: FBA, Bronchoscopy, Hyperinflation.

Introduction

Foreign Body Aspiration (FBA) is a grave problem in children and delays in diagnosis and management can be devastating. The history is very often vague, with subtle physical and chest radiograph abnormalities. The mortality from foreign body inhalation is around 1% and the commonest cause of accidental death in children under 3 years of age. [1] FBA in children may be suspected on the basis of a choking episode if such an episode is witnessed by an adult or remembered by the child. In contrast, the clinical presentation if not witnessed, FBA may be subtle, and diagnosis requires careful review of the history, clinical assessment, and the judicious use of radiography and bronchoscopy. In this study we assessed the diagnostic value of history, physical examination and chest radiograph in diagnosis of FBA.

Objectives

To assess the diagnostic accuracy of the triad: history of chocking, unilateral reduction in air entry to lungs, unilateral hyperinflation or collapse on chest X-ray.

Materials and Methods

This is a retrospective study done on 213 children who underwent diagnostic bronchoscopy under general anesthesia for suspected FBA. Study duration is Fifteen Months. Department of ENT Darbhanga medical college and Hospital, Laheriasarai, Darbhanga. Retrospective review of clinical data was done. Data was collected in a prestructured, pretested proforma.

Results

In our study on 213 patients with suspected foreign body inhalation 59.01% belonged to the age group 1 through 5 years of age while 16.6% belonged to age less than 1 year. 63.38% of patients included in our study were males and 36.62% of patients were females. 80.28% of the children presented with a history of chocking or inhalation of foreign bodies. Most common presenting symptom documented was cough (62.97%) other symptoms where chokingepisode (80.28%), breathlessness (42.7%) fever (5.23%). On examination 76.52% had

decreased air entry 75.24 % had tachypnea. Other symptoms seen were cyanosis, fever, stridor and subcutaneous emphysema. In our study on 213 patients 43% of patients showed unilateral hyperinflation of chest X- ray, 11% showed collapse, 3 patients had subcutaneous emphysema while 24% had normal chest X-ray. All 213 patients underwent diagnostic bronchoscopy under general anesthesia. Foreign body was obtained from 169 patients. 99.2% of the foreign bodies were vegetative in nature with peanut being the most common (39%) FB seen. Most common site of lodgment was right main bronchus (53.2%) followed by left bronchus (39.2%).

Table 1:

Gender	**No.**	**%**
Males	135	63.38%
Females	78	36.62%
Total	213	100%

Table 2:

History of chocking	**No.**	**%**
Present	171	80.28%
Absent	42	19.72%
Total	213	100%

Table 3:

	FB present	**FB Absent**	
Chocking	136	35	171
No Chocking	33	9	42
	169	44	213

Table 4:

Sensitivity	136/169*100	80.47%
Specificity	9/44*100	20.45%
PPV	136/171*100	79.53%
NPV	9/42*100	21.45%

Table 5:

Air entry		
Decreased U/L	163	76.52%
No	50	23.48%
Total	213	100%

Table 6:

Hyperinflation/collapse		
Present	115	54%
Absent	98	46
Total	213	100%

Table 7:

	FB present	**FB Absent**	
Air entry decreased	121	42	163
No	48	2	50
	169	44	100

Table 8:

Sensitivity	121/169*100	71.59%
Specificity	2/44*100	4.54%
PPV	121/163*100	74.23%
NPV	2/50*100	4%

Table 9:

	FB Present	FB Absent	
Hyperinflation/collapse	92	23	115
No Hyperinflation/collapse	77	21	98
	169	44	100

Table 10:

Sensitivity	92/169*100	54.43%
Specificity	21/44*100	47.72%
PPV	92/115*100	80%
NPV	21/98*100	21.42%

Table 11:

	FB present	FB Absent	
Triad present	101	9	110
Absent	68	35	103
Total	169	44	213

Table 12

Sensitivity	101/169*100	59.76%
Specificity	35/44*100	79.54%
PPV	101/110*100	91.81%
NPV	35/103*100	33.98%

In our study sensitivity of history of chocking in detection of FB was 80.47%, specificity was 20.45%. Sensitivity of examination finding of unilateral decrease in air entry to lungs in detection of FB was 71.59%%, specificity was 4.545%. Sensitivity and specificity of chest radiograph in detection of FB was 54.43% and 47.72% respectively. When the triad of history of chocking, decreased air entry on examination and chest radiograph finding of hyperinflation or collapse was considered in detection of FB in airway sensitivity was 59.76% while specificity was 79.54%. Hence the specificity of detection of FB increases when all the three features are seen in patient.

Discussion

Airway foreign bodies are potentially fatal since they could obstruct the airway, there by impairing ventilation and oxygenation. Hence timely recognition is important. Similar to our study most studies document that most inhaled foreign bodies occur in less than 3 years age group.[2.3.4] In our study FB was more common in male children. The same result is documented by Pasaoglu I in his study [5].

In our study sensitivity of history of chocking in detection of FB was 80.47%, specificity was 20.45% while Acharya K [6] in his/her study has documented sensitivity and specificity as 75% and 62.5% respectively. In our study sensitivity of examination finding of unilateral decrease in air entry to lungs in detection of FB was 71.59%%, specificity was 4.545%while Acharys K [6] documented a sensitivity and specificity of 81.25% and 37.50% respectively. Both our study and that of Acharya K show a very low specificity of history and examination in detection of FB, examination more so than history. Sensitivity and specificity of chest radiograph in our study indetection of FB was 54.43% and 47.72% respectively.

The sensitivity and specificity of radiographs as documented by Silva AB.[7] for airway foreign bodies have been calculated to be 73% and 45% respectively. When the triad of history of chocking, decreased air entry on examination and chest radiograph finding of hyperinflation or collapse was considered in detection of FB in airway sensitivity was 59.76% while specificity was 79.54%. Hence the specificity of detection of FB increases when all the three features are seen in patient.

Conclusion

Bronchoscopy is a gold standard in diagnosis of FBA. History, physical examination and radiologic studies have a very low specificity in detection of FBA. The triad of history of chocking, decreased air entry on examination and chest radiograph finding of hyperinflation or collapse has a better specificity in detection of FBA than individual parameters.

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