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Managing Aspirated Foreign Body and Use of Dormia Basket in Paediatric Population - Single Tertiary Care Center Experience

Pranay Panigrahi[1], Manas R Dash[2], Parida P[3], Mohanty PK[4], Jena PK[4]

[1]Senior Resident, [2]Assistant Professor,
Dept. of Paediatric Surgery, MKCG MCH, Brahmapur, Odisha-760004
[3]Consultant, [4]Professor,
Dept. of Paediatric Surgery, SVPPGIP, Cuttack, Odisha- 753002

Corresponding Author: Manas R Dash

ABSTRACT

Aim: Foreign body (FB) in respiratory tract is an emergency and require more urgent intervention in paediatric population. At some instances, bronchoscopic removal of FB with optical forceps gets cumbersome. These conditions create a life-threatening & point of no return scenario. We present some of difficult scenario and peculiar type of FBs with alternative methods of extraction.

Patients and Methods: This is a retrospective case review of patients presenting to paediatric emergency with airway FB. All patients had a chest X-ray done before the procedure. Rigid bronchoscopy under general anaesthesia was performed in all patients for retrieval. Dormia basket was used in some cases.

Results: A total of 28 patients (nine girls) were successfully intervened and FB removed. The age ranged from 2.5 to 8 years (mean 4 years). Bronchoscopic removal was aided by dormia basket. FB in 21 cases out of 28 cases were organic or vegetative matter. Complete removal was achieved in all patients including tracheostomy in three of them.

Conclusions: We recommend that dormia basket should be considered as a partner gadget to optical forceps in a bronchoscopy set. The use of this alternative method was successful and allowed ventilation during the removal of FB in contrast to removal by forceps. This should be kept as an option if retrieval is difficult.

Keywords: Airway, foreign body, bronchoscopy, endoscopic, pediatric, dormia

INTRODUCTION

Foreign bodies (FB) in respiratory tract are one of the most common emergencies, more so in paediatric population. Time is of paramount importance for intervening in these cases.[1] FB aspiration is usually a sudden and dramatic event when the child feels that he/she is choking. After the acute event, the clinical scenario widely ranges from severe respiratory distress to the most subtle symptoms. Rigid bronchoscopy remains pivotal & this procedure is to be done in every case. Classically, optical forceps were used to retrieve successfully the FB in the majority of cases. But in certain situations, retrieval by forceps become difficult i.e. impacted FB, spherical round bodied FB, whether organic or inorganic, FBs difficult to grasp such as LED bulbs, aspirated loose tooth and distally migrated FB. These turn of events pose a very distressed lethal situation for the baby, and the endosurgeon has to take decision on table to resolve the situation successfully. We present a proxy method of FB retrieval when optical forceps removal fails. This case series explain age group commonly presenting to emergency room and also removal of airway foreign body by dormia basket either due to failure or as quicker alternative to forceps.

PATIENTS AND METHODS

This article was a retrospective case review done for all patients who were admitted for FB in trachea/bronchus from 2013 to 2019. During this 6-year period, a total of 28 patients were diagnosed with foreign body (FB) aspiration and underwent rigid bronchoscopy under anaesthesia. These patients were admitted at emergency hours usually, and a chest X-ray was the only investigation that could be done. High-resolution computed tomography (HRCT) with virtual bronchogram was done if indicated for long-standing FB (two cases) or equivocal clinical features. (Figure 1)The timing of intervention depended on the clinical situation of the child and varied from Six hours to the next morning. The alternate gadget used was dormia basket as routinely used by urology colleagues. The dormia basket used was a 3 fr, 4 loop/prong basket of length 100-120 cm. The basket was passed beyond the FB and opened then gently withdrawn to trap the FB. Once the FB was inside the basket it was closed to have a soft but snug grip [Figure 2]. The entire scope with the basket was then removed to retrieve the foreign body. This choice of method of removal was based on the difficulty in the removal by optical forceps and was decided by the surgeon on operation table. Forceps were used occasionally to dislodge foreign body first and then delivered using dormia basket. Dry nuts like betel nut, chikoo/sapota seeds were taken out via tracheostomy. These nuts imbibed moisture and were swollen grossly making difficulty in delivering them through edematous subglottis. (Figure-3) So they were slowly brought to trachea by dormia or forceps and removed by open tracheostomy. Tracheostomy even helped for mechanical ventilation of same patients as they needed respiratory support. Later, tracheostomy was closed on 3rd day postoperatively. All patients were discharged on 3rd day postoperatively except tracheostomy patients on 5th post operative day. Postoperative period was uneventful with good follow-up results.

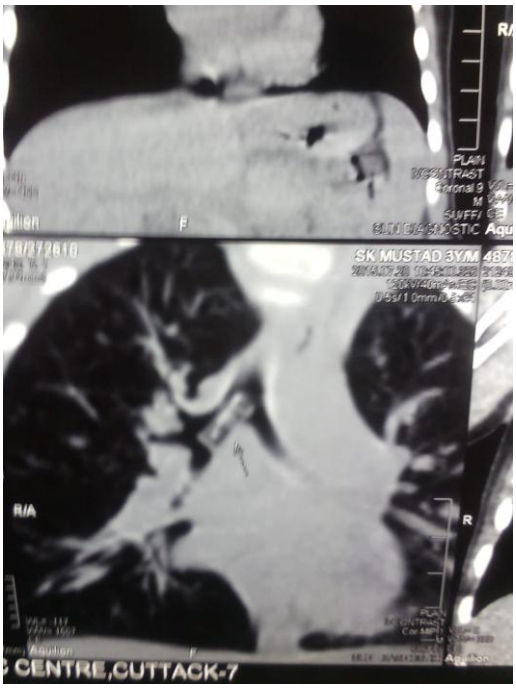

FIGURE 1: VIRTUAL BRONCHOGRAM SHOWING FB IN PRIMARY BRONCHUS

FIGURE 2: FOREIGN BODY TRAPPED IN DORMIA AND READY TO BE PULLED OUT

Figure 3: Foreign Bodies retrieved during Bronchoscopy (Peanut, Tooth, Stone, Whistle)

Figure 4: GADGETS USED IN BRONCHOSCOPY & RETRIEVED LED BULB AS FOREIGN BODY

RESULTS

Total of 28 patients (9 females) were successfully intervened by either optical forceps or dormia basket or both. The age ranged from 2.5 years to 8 years (mean 4 years). (Table 1)

(Figure-5) Two patients underwent HRCT with virtual bronchogram for diagnosis of longstanding airway FB having history of 1 month of aspiration.

The removal was aided by dormia basket in 16 cases, FB being rounded in shape or vegetative matter whose intact removal was doubtful. Optical universal forceps were used in metallic or tough FB. 12 cases were removed with optical forceps. Tracheostomy was essential in three cases.

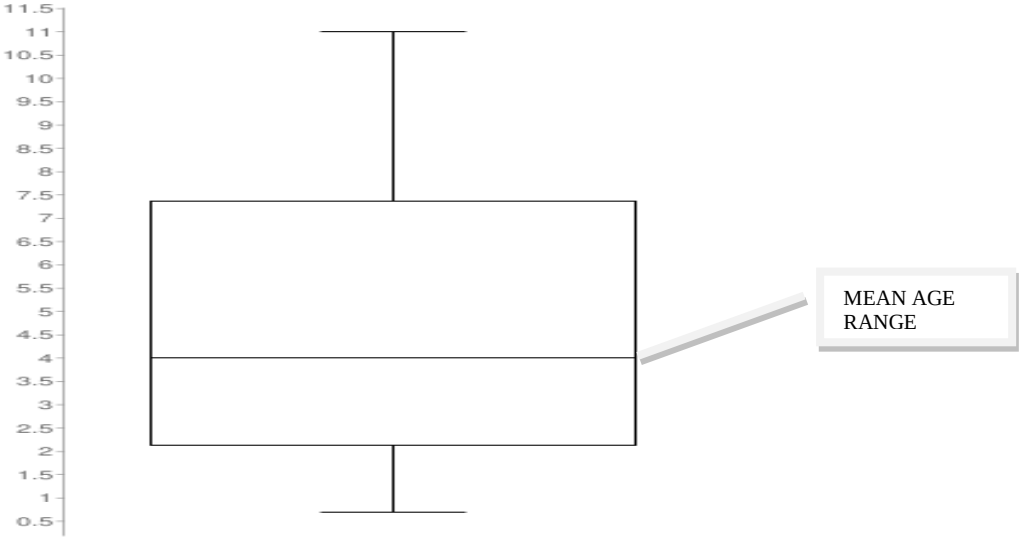

FIGURE 5- BOX DIAGRAM SHOWING AGE DISTRIBUTION

TABLE 1 – CLINICAL AND DEMOGRAPHICAL DETAILS OF ASPIRATED FOREIGN BODY PATIENTS.

SN	Age	Sex	History of Ingestion	Duration	Pneumonia	Respiratory distress	Foreign body	Procedure	Outcome
1	1.5yr	M	Yes	2days	-	+	Whistle	Bronchoscopy	Recovered
2	8yr	M	yes	7days	+	+	Bengal Gram	Bronchoscopy	Recovered
3	8m	M	Yes	1day	-	+	Metalic Electrical Pin	Bronchoscopy	Recovered
4	7yr	M	Yes	3day	-	-	Indian Blueberry (Jamun)	Bronchoscopy	Recovered
5	4yr	F	Yes	2days	-	+	Chikoo(Sapota)seed	Tracheostomy+ Bronchscopy	Recovered
6	6yr	M	Yes	3days	+	+	Betel Nut Piece	Tracheostomy+ Bronchscopy	Recovered
7	1yr	F	Yes	17days	+	-	Micro Led Bulb	Bronchoscopy	Recovered
8	3.5yr	F	?	7days	-	-	Tamrin seed	Bronchoscopy	Recovered
9	9yr	M	Yes	3days	-	-	Tooth	Bronchoscopy	Recovered
10	5yr	F	?	7days	-	+	Stone Piece	Bronchoscopy	Recovered
11	11yr	M	Yes	4days	-	+	Papaya Fruit Piece	Bronchoscopy	Recovered
12	8yr	M	Yes	1day	-	-	Custard apple seed	Bronchoscopy	Recovered
13	6yr	F	?	15days	+	-	Peanut	Bronchoscopy	Recovered
14	7yr	M	Yes	8days	-	-	Whistle	Bronchoscopy	Recovered
15	3yr	F	Yes	2days	-	-	Ear pendent	Bronchoscopy	Recovered
16	1.5yr	F	?	30days	+	+	Peanut	Bronchoscopy	Recovered
17	4.5yr	M	Yes	2days	-	+	Indian Jujube(Bar)	Bronchoscopy+ Tracheostomy	Recovered
18	1yr	M	?	5days	+	+	grass	Bronchoscopy	Recovered
19	2.5yr	M	Yes	3day	-	+	Blackgram	Bronchoscopy	Recovered
20	7.5yr	M	Yes	3day	-	+	Peanut	Bronchoscopy	Recovered
21	3yr	F	?	5days	+	+	Bengalgram	Bronchoscopy	Recovered
22	4yr	M	yes	2days	+	+	Coconut pulp	Bronchoscopy	Recovered
23	2.5yr	F	?	8days	+	+	Bengal Gram	Bronchoscopy	Recovered
24	.9yr	M	?	16days	+	+	Peanut	Bronchoscopy	Recovered
25	7month	M	?	1day	-	+	Food particle	Bronchoscopy	Recovered
26	8yr	M	Yes	15days	-	-	Peanut	Bronchoscopy	Recovered
27	2yr	M	?	30 days	+	-	Bengal Gram	Bronchoscopy	Recovered
28	2.5yr	M	yes	2days	-	+	Peanut	Brnchoscopy	Recovered

DISCUSSION

The patient of age range of 4-8 years (toddlers & school going children) who tends to pick and chew on small objects while playing or even exploring discarded electrical good if accessible. Most common FB inhaled were organic materials such as peanuts, seeds, and nuts which were 21 of 28 cases in our study. [1]

It has been reported that 75.4% of aspiration cases occur in children less than 3 years old with a predilection to males. [2] Presentation as persistent cough, pneumonia, and bronchiectasis are more common if the diagnosis is made a month after aspiration. [3] Mortality was also reported due to FB aspiration. [4]

Rigid bronchoscopy is mandatory for the removal of FB from the tracheobronchial tree under direct vision. [5-6] The confidence of anaesthesia team to intervene and maintain muscle paralysis added with good skill of surgeon has increased the success in bronchoscopic retrieval. Inability to ventilate during the passage of the instrument and reduced vision in terms of optical quality are some limitations. [11] Sometime, distal migration of foreign body or dense granulation tissue surrounding FB hamper success rate. Vegetative FB is difficult to be removed without breaching its integrity and shape. This remains as a tricky component which sometime traps endosurgeon to successfully remove the foreign body. Surgeon needs some other resource for emergency rescue.

This study outlines the use of dormia basket as an alternative method of FB retrieval when Optical forceps fail to do so and created a havoc situation. There have been less published reports and mostly limited to isolated cases, the earliest being in 1971. [7-11] 16 of our patients were successfully treated using a dormia basket which is one of the largest series of patients in the pediatric population. In our patients, there was no untoward event intraoperatively or postoperatively. Complications might include mucosal trauma and pneumothorax due to forceful insertion of basket. Sometime due to imbibition of moisture over dry seeds or nuts like Indian Jujube (Bar), betel nut caused swollen FB causing hindrance at subglottic region which was removed by temporary tracheostomy and bronchoscopic guidance. [12]

With the given experience we recommend that the dormia basket should form an important part of rigid bronchoscopy set. The use of this alternative gadget was successful and allowed ventilation during the removal of FB in contrast to removal by forceps. Dormia basket should be kept as an option if retrieval is difficult.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Conflicts of interest:
There are no conflicts of interest.

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