

Esophageal foreign body in neonates: How do they get it?

Abstract

Esophageal foreign body is common in pediatric age group but is rare in neonatal period. A 5-days old newborn presented to us with provisional diagnosis of Esophageal atresia (EA) with or without Tracheo-esophageal fistula (TEF). Child had drooling of saliva and inability to feed. Surprisingly X-ray showed radiopaque shadow in esophagus. Esophagoscopy revealed an impacted stone with a large ulcer. Stone was mobilized by endoscopy but could not be retrieved above cricopharynx due to proximal esophageal oedema. Stone was pushed into stomach and was retrieved by gastrotomy. Literature search from 1955-2022(67 years), identified thirty-nine neonates with wide variety of esophageal FB. Details are discussed with different modalities used for removal of FB and their outcome.

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Background

Esophageal Foreign body (FB) more commonly occur in pediatric population from 6 months to 3 years of age due to curiosity and tendency for oral exploration. Although coins are more commonly found esophageal FBs but button batteries, marble stone, pins, nails have also been reported.¹ Delay in treatment can lead to complications like perforation, stricture, abscess or death. Early treatment can prevent morbidity and mortality. Respiratory distress with drooling of saliva in newborn is usually considered as esophageal atresia with/without trachea-esophageal fistula (EA/TEF). In a neonate, occurrence of esophageal FB is rare as newborn is on milk-feed and is not picking up, or exploring objects. Diagnosis is difficult to make because of fallacious negative history. Neonatal FBs are usually incidental, due to negligence, sibling curiosity or homicidal.

We discuss here a case of a female neonate who had a large stone impacted in the upper one-third of esophagus along with review of 39 cases of neonates with variety of interesting and unusual esophageal FB found in literature over last 67 years from 1955-2022.

Case presentation

A 3.62 kg, 5 days-old-newborn girl was referred to our tertiary care hospital with complaints of respiratory distress and frothing from mouth for 2 days. The child was apparently well for 3 days after birth. She had respiratory distress, tachypnoea, and chest retraction.

She was managed at local hospital, where feeding tube could not be negotiated into stomach and was referred to us for suspected EA/TEF.

On examination, heart rate was 147/min, blood pressure was 75/50 mmHg, and respiratory rate was 52/min, SPO₂ was 97% with oxygen and capillary refilling time was <3 sec. with chest retraction. She had moderately increased secretions from mouth with bilateral conducted sounds. Feeding tube could not be negotiated into stomach. X ray showed coiling of infant feeding tube and large radiopaque shadow in the upper esophagus (Figure 1). Fact that child had accepted feeds well for initially 3 days without any discomfort, raised doubt in it being esophageal atresia. Contrast study was done which revealed large opacity from T2-4 and trickling of contrast in stomach ruling out EA and esophageal perforation (Figure 2).

Upper GI endoscopy revealed large impacted stone in upper esophagus with ulcerated mucosa, and surrounding oedema. Stone could not be extracted by flexible endoscope. Under general anesthesia rigid endoscopy was done and impacted FB was mobilized with difficulty but could not be pulled up above the cricopharynx. FB slipped into stomach and was retrieved by gastrotomy. In view of large esophageal ulcer, this gastrotomy was used for tube gastrostomy to feed. Child was fed through gastrostomy tube and was allowed orally on 9th postoperative day after contrast study. Child tolerated feeds well and subsequently gastrostomy was removed. Endoscopy at 2 month showed healed ulcer, mild scars and no stricture. Parents were not aware of FB but had suspicion on 3 year old sibling who had tendency to play with toys and mimic feeding them stone.



Figure 1 X ray showed coiling of infant feeding tube and large radiopaque shadow in the upper esophagus.

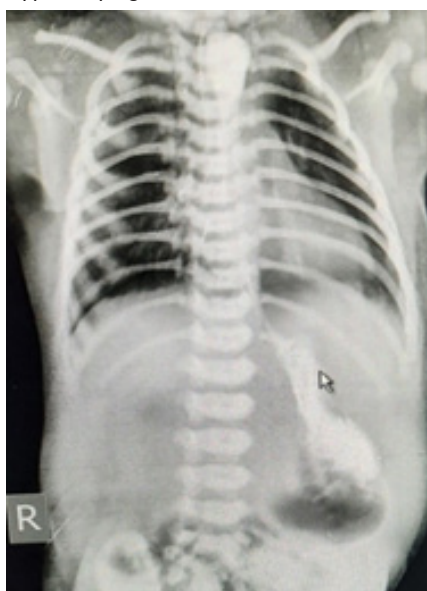


Figure 2 Contrast study showing radiopaque shadow from T2-4and trickling of contrast in stomach ruling out EA and esophageal perforation.

Discussion

Eder-Hufford rigid esophagoscope was introduced in 1949. Rigid endoscopy and removal of FB was done by Chevalier Jackson in 1937.² Rigid esophagoscopy has been primary tool upto 1957 when Hirchowitz constructed first flexible fiberoptic endoscope.³ Removal of FB by flexible esophagoscope was reported by Mckenhnie in 1972.⁴ With advent of flexible esophagoscopy, use of rigid endoscopy is significantly less common, but rigid esophagoscopy still plays a role in case of impacted FB not mobilized by flexible endoscopy.

Children are prone to esophageal FB, as they have curiosity and tendency for oral exploration of objects and swallowing almost anything. Most of the FBs pass through the gastrointestinal tract without difficulty but 10-20% require endoscopic removal and about 1% require surgical procedure.¹ In neonates usually FB is not expected as the child is neither moving nor picks up the objects. It is either accidental or homicidal. Usual presentation of esophageal FB is difficulty in swallowing, or respiratory discomfort in pediatric age group (6 months to 3 years) but in neonates drooling of saliva with respiratory discomfort is more common presentation that usually leads to misdiagnosis of TEF/EA.

Chest radiograph is the commonest investigation for respiratory discomfort which can reveal FB if it is radiopaque. Radiolucent FB are missed on plain radiograph. Contrast study or CT scan may be helpful in making diagnosis in such cases.

A through literature search from 1955-2022 (67years), with MeSH terms like neonatal, esophageal Children, foreign body, pediatric, oesophageal perforation, was done. Thirty nine neonates with esophageal FB were identified in literature (Table 1).⁵⁻²⁸ Diagnosis becomes easier when there is history of FB aspiration but in neonates usually history of FB is not available either because the incident is not witnessed, or it is intentional (homicidal case no 1,2) or accidental (case no 3,4). Definite history of FB was present in two cases only (case no. 5, 6) while allegation was on sibling in three cases (case no. 7, 33 and present case). Parents were unaware of FB's like dropper caps, pendent, finger ring, ear ring that slipped into child's mouth and esophagus and came to notice only after the xray (case 3, 4, 6, 16).

Youngest newborn required rigid endoscopy and Portsmouth ET removal from esophagus that had slipped into esophagus and lost while resuscitation immediately after birth (case no. 8-12). Eldest neonate was 28 days of age (case no 13). First case of reported esophageal FB was found in 1960, since then 39 neonates have been reported. Interestingly endotracheal tube (ET) was more common FB in neonates (7cases no. 8-12, 15, 17) (Table 1).

Table 1 cases of Neonatal esophageal foreign body

Sl.No.	Author (ref)	Year	Age/sex	Foreign body	Procedure	Outcome
1	Pujar V ⁵	2013	6days/f	Bettlenut (Homicidal)	thoracotomy,	Recovered
2	Medatwal A ⁶	2008	12days/f	Multiple FB (total 9)	FE	Expired
3	Chioukh FZ ⁷	2017	7days/m	eyedrop cap	FE	Recovered
4	Patil ⁸	2016	5days/m	Finger ring	RE, slipped in stomach	**Recovered
5	Nassir GA ⁹	2002	24days/m	safety pin	Magnet/gastrostomy	Recovered
6	Srikant KP ¹⁰	2016	4days/m	dropper cap	FE	Recovered
7	Entesham HN ¹¹	2015	21days/f	Marble	RE	Recovered
8-12	Dickson ¹²	1967	at birth/m	Endotracheal tube	RE	Recovered
13	Syahputra DA ¹³	2021	28days/m	Pendent	FE	Recovered
14	Zlotnikov SA ¹⁴	1960	Newborn	No details	RE	Recovered
15	Banerjee A ¹⁵	1983	Neonate/m	Endotracheal tube	RE	Recovered
16	Tasneem Z ¹⁶	2004	3days/m	Finger ring	RE	Recovered

Table 1 Continued...

Sl.No.	Author (ref)	Year	Age/sex	Foreign body	Procedure	Outcome
17	Tasneem Z ¹⁶	2004	2days/m	Endotracheal tube	RE	Recovered
18	Zunzunegui ¹⁷	1997	3days/m	button for glossoptysis	Thoracotomy for BEF	Expired
19	Gupta R ¹⁸	2016	2days/f	Broken red rubber	Retrieved while intubation	Recovered
20	Mohammed Z ¹⁹	2010	25days/m	stone	FE, oesophagostomy	Recovered
21	Raboei ²⁰	2009	22days/f	Battery	RE	*Recovered
22	Singh R ²¹	2012	12days/f	Battery	FE twice	Recovered
23	Altokhais TI ²²	2017	5days/m	No details	RE	Recovered
24	Chowdhary CR ²³	1992	21 days/f	Button	FE	Recovered
25	Uba AF ²⁴	2002	23days/f	No details	FE	Recovered
26	Al Odaidan ²⁵	2000	20days/f	Thumbtack pin	FE	Recovered
27	Sharma LK ²⁶	1993	6days/f	Cotton	FE, pushed to stomach	Recovered
28	Mirza B ²⁷	2010	2days/m	Silicon Catheter tip	direct laryngoscopy	Recovered
29	Kim N ²⁸	2008	7weeks/m	button	FE	Recovered
30	Singh H ²⁹	2012	20days/f	Battery	RE	Recovered
31	Tarnowska A ³⁰	2010	8days/m	cotton bud	FE	Recovered
32	Aggarwal SK ³¹	2005	4hrs/m	cotton ball	FE	Recovered
33	Sardana P ³²	2002	20days/m	Glass piece	Laryngoscopy	Recovered
34	Pooray ³³	2008	27days/f	Stone	RE	Recovered
35	Saboo R ³⁴	2005	20days/m	button with pin	FE	Recovered
36	Thapa BR ³⁵	1993	6days/f	stone	FE	Recovered
37	Dogruyol H ³⁶	1989	4days/m	Bean	FE	Recovered
38	Trivella G ³⁷	1962	Newborn	No details	RE	Recovered
39	LI ZS ³⁸	2006	24hrs/m	ear ring	FE	Recovered
40	Ojha S (present)	2022	5days/f	stone	FE,RE, gastrostomy	Recovered

RE: Rigid Endoscopy

FE: Flexible Endoscopy

BEF: Broncho-esophageal Fistula

* developed stricture, required dilatation for 1 year

** required Chest tube for pneumothorax

Varieties of FB were found (battery, cotton buds, stone, button, catheter tip, medicine dropper cap, pendent, finger ring, safety pin) (table 1). In two case (no.1, 2) multiple FB were found as it was homicidal intent. Case 18 had slippage of glossoptysis button in bronchus leading to broncho-esophageal fistula after 18 months which ultimately lead to mortality. In an unoperated case of TEF/EA, (case 19) slipped broken end of red rubber catheter in upper pouch was present as FB. Case 1 was posted for thoracotomy considering it TEF/EA. Betel nut was found on esophagotomy as surprise on operating table. Preoperatively feeding tube was coiled up in upper esophagus due to impacted radiolucent bettlenut which was not visualized on radiograph. Out of 39 cases in literature, in 3 cases details about type of foreign body was not found.

Chart 1 depicts various procedures done for retrieval of foreign body. Flexible and/or rigid endoscopy was attempted in all cases. FB was removed by flexible endoscopy alone in 17 cases, rigid endoscopy in 15, laryngoscopy in 2 and surgery was required in 5 cases (including present case) esophagostomy, thoracotomy, broncho-esophageal fistula repair and gastrostomy (Table 1, chart 1) (Case no. 1, 5, 18, 20, present case).²⁹⁻³⁸

Out of 40 neonates (39 cases in literature and 1 present case), 38 recovered while 2 expired, one due to broncho-esophageal fistula (case 18) and one had multiple FBs (case 2, total of 9 FB including coin, safety pin, screw, polythene, glass piece). Out of 38 that recovered, one had pneumothorax that improved with chest tube insertion (case 4) while one developed stricture that required dilatation for about one year (case 21).

Various techniques like flexible endoscopy, rigid endoscopy, magnet, foley’s catheter, pushing the FB into stomach, gastrotomy, esophagotomy and thoracotomy have been done depending upon the situation (condition of child, esophagus, availability of equipments). Based on these procedures done for FB removal in neonates, suggested procedures/options are depicted in chart 2.

Parents should be warned about use of eye dropper cap, small jewelry like rings, as it can fall accidentally in neonate’s mouth. Newborn child should not be left unsupervised with a young sibling.

Incidents where history is doubtful and homicidal/intentional FB is suspected, child abuse/neglect should be thought of and should be informed to Child Right Commission or Human Right Organization.³⁹

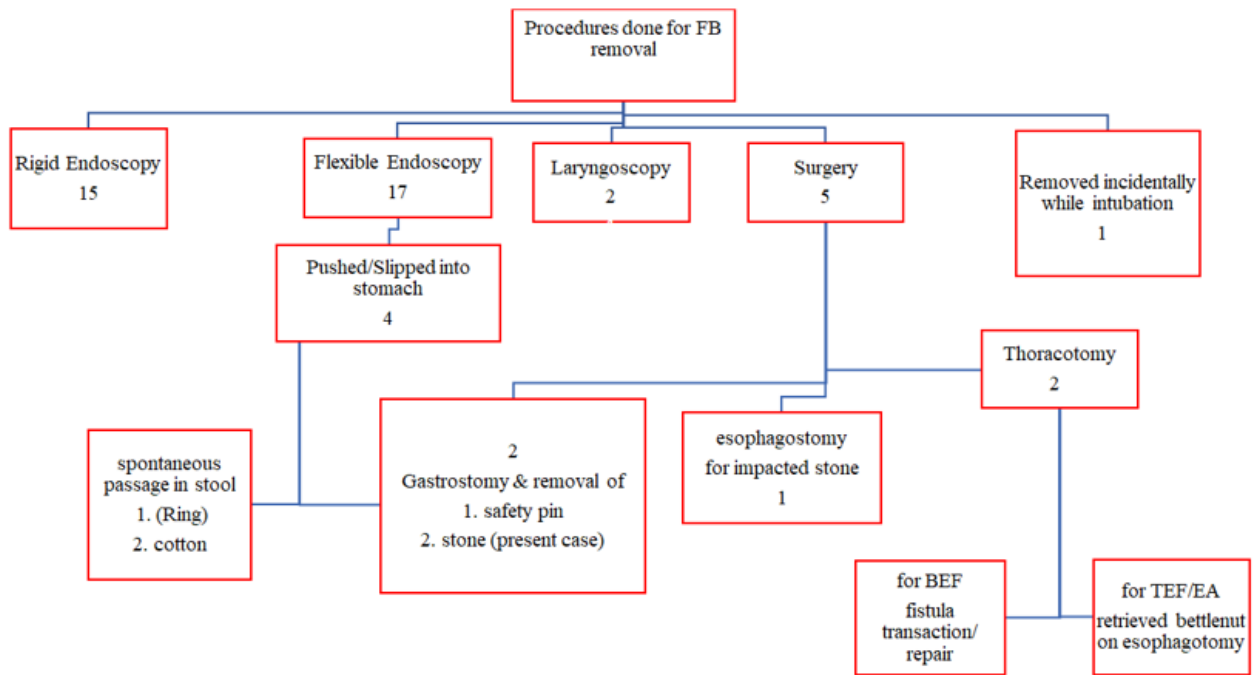


Chart 1 Procedures done for FB removal

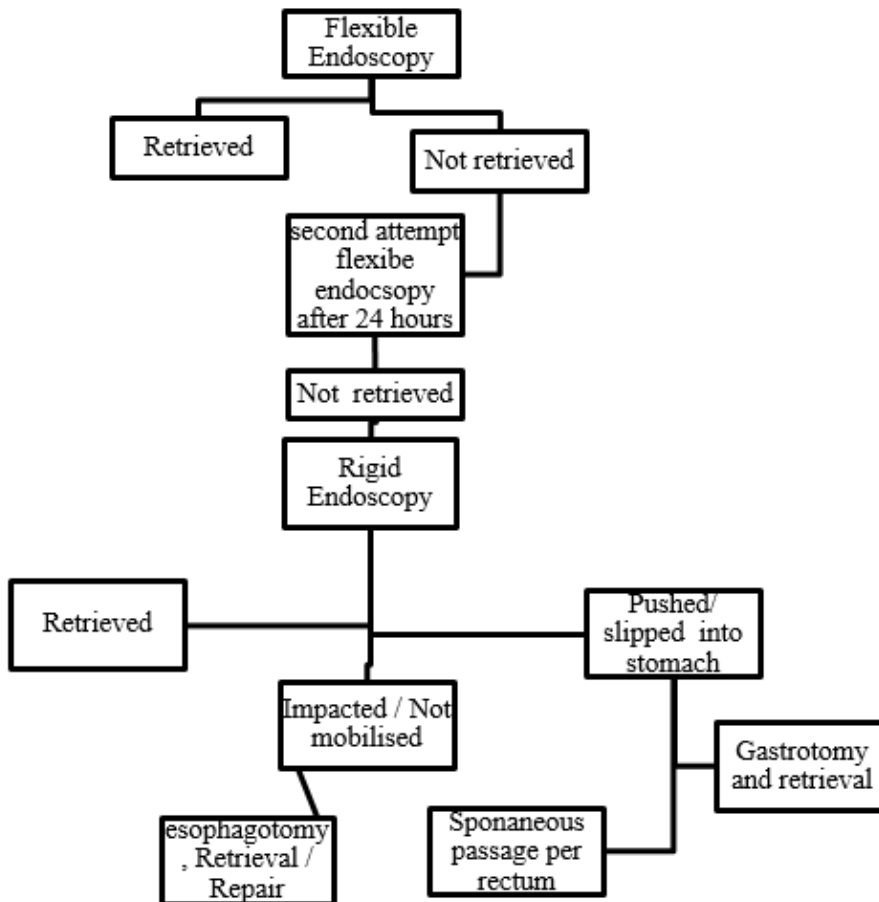


Chart 2 FB removals in neonates, suggested procedures/options

Conclusion

Esophageal FB although rare in newborn, is often missed in case of radiolucent FB due to absence of history. Usually, newborn get FB by incident, accident, siblings or intentional (homicidal). FB can be anything like slipped catheter tip, rings, pin, stone or medicine dropper cap. Parents should be cautioned about rings, dropper caps, safety pins of napkins while handling newborns.

Esophageal FB should be suspected where history is doubtful or not clear, in cases of sudden onset of drooling of saliva, or difficulty in swallowing, bleeding from oral cavity in a newborn who had been otherwise feeding well before this incident (thereby ruling out oesophageal atresia) or history of throat suctioning, or sibling playing with newborn, or newborn left unattended just before the incident.

Delay in diagnosis can lead to complications like perforation, stricture, abscess, broncho-pleural fistula and even mortality. An early diagnosis and appropriate treatment can prevent morbidity and mortality.

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Author's contribution

- (i) Dr. Sunita Ojha: Contributed in manuscript drafting and in compilation of data
- (ii) Dr. Sanket Goyal: Contributed in literature search and compilation.
- (iii) Dr. Anupam Chaturvedi: contributed in drafting
- (iv) Dr. Rajiv Kumar Bansal: Contributed in drafting and data collection
- (v) Dr. Ravi Sharma: drafting, master chart and proof reading
- (vi) Dr. Taneesha Gupta: Contributed in data collection, and drafting.

Ethics approval

Ethics committee approval and consent was taken. Approval was granted by SDMH ethics committee.

Consent for publication

Consent for publication was taken on our institution form.

Availability of data

Not applicable.

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Conflicts of interest

Author declares that there is no competing interest.

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