Original Article

Management and treatment of foreign bodies ingestion in childhood

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Abstract. Ingestion of foreign bodies (FBs) is a significant problem that causes morbidity and mortality in childhood. The aim of this retrospective study was to report our experience of foreign body ingestion in pediatric patients. The medical records of 165 patients who were hospitalized for foreign body (FB) ingestion in pediatric and chest surgery departments between 2005 and January 2010 were evaluated retrospectively. X-ray films and abdominal ultrasound scan were used for the diagnostic approach of the patients. The common complaints were odynophagia-dysphagia (n=107), hypersalivation (n=81), cough (n=21), vomitting (n=20) and asymptomatic in 34 patients. Radiological examinations showed that FB was located in the esophagus in 81.2% (n=134) of the patients, in the stomach of 6.74% (n=11) patients, in the intestinal segments in 10.4% (n=17), in the rectum in 1.21% (n=2) and in the liver parenchyma 0.6% (n=1) patients. Endoscopic examination performed in 134 (81.2%), FB proceeded uneventfully in 23 (13.9%) in follow up period and 8 (4.8%) patients underwent surgery. The type of ingested FB varied widely. The coins (n=54, 32.7%) and pieces of plastic toys (n=29, 17.5%) were the most frequently ingested FBs. Foreign body ingestion is a major problem in childhood**.** Management depends on carefully and close follow up for complications and favorable treatment choice.

Key words: Foreign body, childhood, esophagus, dysphagia

1. Introduction

Ingestion of foreign bodies (FBs) is a significant problem that causes morbidity and mortality in childhood (1,2). Children who after the age of 6 months can put objects into their mouth due to oral orientation and the type of ingested FBs varies between communities according to feeding habits and sociocultural features (3). The aim of this retrospective study was to report our experience of foreign body (FB) ingestion in pediatric patients.

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2. Materials and methods

The medical records of 165 patients who were hospitalized for FB ingestion in pediatric and chest surgery departments between 2005 and January 2010 were evaluated retrospectively.

All of the children who admitted to our hospital with a history of FB ingestion are hospitalized. FB extraction procedures using Magill pens and rigid endoscopy were performed by general anesthesia. The age and sex, clinical findings, diagnostic methods, modalities of treatment as well as outcome of all patients were noted.

The imaging techniques that included plain neck, abdominal and chest X-ray films and abdominal ultrasound scan were used for the diagnostic approach of the patients. The statistical analysis of distrubition of ingested FB types according to age and gender, was performed

by Z-test using Minitab 14 program. A $p<0.05$ value was considered statistically significant.

3. Results

The average number of patients admitted to our hospital was 186.284/year for last five years. Average 28110 children are admitted in a year.

The study group consisted of 93 male and 72 female patients with a mean age of 5.14 ± 3.55 years (range 3 months–16 years). The number of male patients were higher than females and difference between them was statistically significant ($p=0.02$). Regarding ingested FB types by gender; the number of male children who ingested a piece of toy were statistically siginificant than females ($p=0.044$), on the other hand female patients's number who ingested pins were higher than males ($p=0.017$).

Comparison of three age groups (3 months-3 years, 4-6 years and above 7 years) revealed statistically siginificant differences ($p<0.01$). 4-6 years age group was the most crowdest, it was followed by 3 months-3 years group.

Statistical analysis revealed that the number of children above 7 years who ingested coins was lower than other groups ($p<0.01$). Ingestion of a pin was more frequent in -above 7 years- group compared to other age groups ($p<0.001$). There was no other significant difference between age groups according to ingested FB types. Also no significant difference was found between ingestion time and season.

The common complaints were odynophagia-dysphagia (n=107), hypersalivation (n=81), cough (n=21), vomitting (n=20) and asymptomatic in 34 patients. The time elapsed between the ingestion and admission to the hospital varied from 1 h to 72 hours. Most of the patients were admitted to the hospital within the first 24 h (46.6%). The demographic and clinic features of cases were demonstrated in table 1. Physical examination did not reveal any abnormality in most patients (n=99, 60%), rough cracks (n=6) and hypersalivation (n=81) were encountered in the patients.

Table 1. Demographic and clinical features of the cases.

		n	(%)
Sex	Male	93	56.36
	Female	72	43.64
Complaints	Odynophagia - Dysphagia	107	64.85
	Hypersalivation	81	49.10
	Cough	21	12.70
	Vomitting	20	12.12
	Asymptomatic	34	20.61
Localization	Esophagus	134	81.71
	Stomach	11	6.67
	Intestinum	17	10.30
	Rectum	2	1.21
	Liver parenchyma	1	0.61
Treatment	Endoscopy	134*	81.71
	Surgery	8	4.85
	Spontaneously discharge	23	13.94

*Magill (29), Esophagoscopic forceps (105)

Radiological examinations showed that FB was located in the esophagus [(81.2% (n=134)] (Figure 1), in the stomach [(6.74% (n=11)], in the small intestinal segments [10.4% (n=17)], in the rectum [(%1.21 (n=2)] and in the liver parenchyma [(%0.6 (n=1)] (Table 2).

Endoscopic examination performed in 134 (81.2%), FB proceeded uneventfully in 23 (13.9%) in follow up period and 8 (4.9%) patients underwent surgery. All of the patients were followed in hospital for 24 hours to a week. 98 of 165 patients were discharged within 24 hours.

Fig. 1. A hook detected by anteroposterior and lateral chest X-Ray in esophagus.

Endoscopic examination and removal was attempted in most patients (n=134, 81.2%), and FB was extracted successfully in 100% of patients by using Magill forceps (n=29, 21.6%), and rigid esophagoscope with FB forceps (n=105, 78.4%) (Table 2, Figure 2). The FBs were in proximal part of esophagus in 80 (59.7%).

Table 2. Foreign body localization and removal methods

Localization	Type of management	*n*	%
Esophagus	Endoscopic forceps	105	63.64
	Magill	29	17.58
	Spontaneously discharge	-	-
Stomach	Endoscopic removal	-	-
	Spontaneously discharge	8	4.85
Smal intestine	Open surgery	3	1.82
	Spontaneously discharge	13	7.88
Rectum	Open surgery	4	2.42
	Spontaneously discharge	2	1.21

Surgery was performed in eight patients (4.8%). 3 of these 8 patients were ingested pins. The remaining five cases had ingested battery, magnet and hairgrip. The FB was found in the stomach (four patients) and in jejunum (two patients).

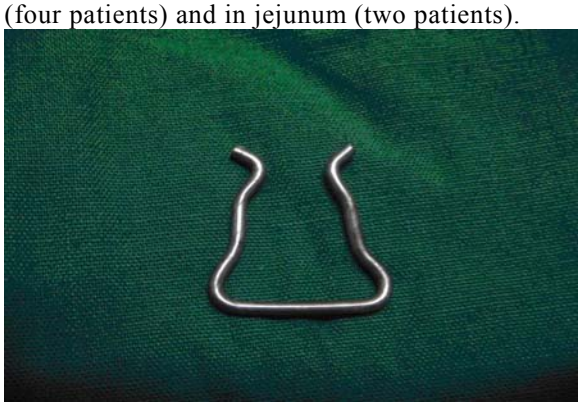

Fig. 2. The foreign body (hook) extracted from esophagus by rigid esophagoscope in the same case at figure 1.

After two weeks of follow up period, both FBs were still in the stomach and jejunum. So laparotomy was performed. A patient with a pin in liver parenchyma underwent surgical intervention and the FB was removed successfully. A 16 years old female had ingested nearly thirty safety pins and all of the pins were dispersed in stomach and intestine (Figure 3, 4).

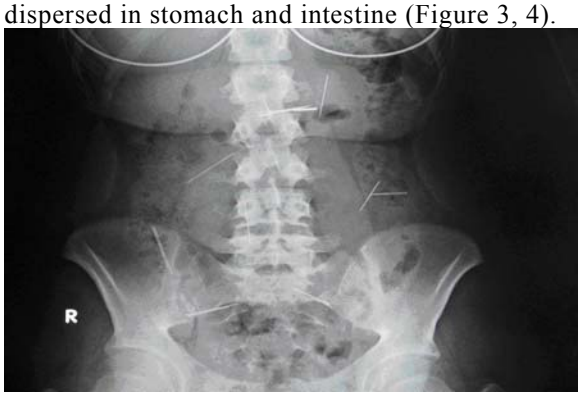

Fig. 3. Foreign bodies (pins) in abdomen.

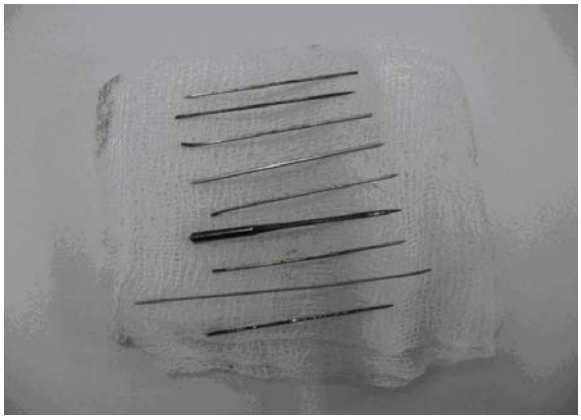

Fig. 4. Intraabdominal pins (stomach, intestinum and liver parenchyma) extracted by surgery.

We decided to follow up the patient in a particular time period to avoid a surgical trauma due to widely dispersed pins in gastrointestinal tract. In the follow up period four pins spontaneously excluded by defecation**.** After one week abdominal tenderness occurred, so laparoscopy was performed. But exploration revealed that one of the pins was pierced the wall of second part of duodenum and outstretched to liver. To avoid from a potential hepatobilier injury laparotomy was performed and all of the pins were removed. The patient was discharged after six days.

Laparoscopy failed to detect the FB in remaining two patients. On the other hand there was no flexible endoscopy device appropriate for children in our hospital to date, so endoscopic approach could not be used in gastric or distal localized FBs.

Localizations and removal methods of FBs are presented in table 2.

The type of ingested FB varied widely. The coins (n=54, 32.7%) and pieces of plastic toys (n = 29, 17.5%) were the most frequently ingested FBs. Other ingested objects were pins (n=24), battery(n=14), beer nuts (n=13), bone (n=5), marble (n=4), buton (n=6), meat piece (n=3), pen cover (n=3), ring (n=1), earring (n=1), piece of prayer beads (n=2), drug ampul (n=1), magnet (n=2), stone (n=1), hairclip (n=1), hook (n=1). There was no mortality among our series.

4. Discussion

Ingestion of foreign body is a major problem, as it is reported to be associated with high morbidity rates (4). Most of the ingested FB proceeds through the gastrointestinal (GI) tract and get discharged with the faeces. Recommended modality is daily observation with abdominal X-Ray and control of faeces. But sharp foreign bodies which can infiltrate or perforate the bowel wall; must be removed before passing the stomach, as it is reported that 15–35% of them will perforate the bowel, usually around the ileocaecal valve (2).

Different factors can be enrolled in ingestion of FBs. In most cases, the accident could be a result of tendency to oral exploration and to play as they eat due to natural propensity in young children (5). In our study, large number of accidents occurred in children younger than six. Also in literature, it has been reported that this age group indicates a specific risk pattern (2,5). Special conditions in childhood such as verbal cooperation difficulties and mental retardation are important handicaps in diagnosis. To take a detailed history from parents and careful evaluation of clinical signs are critical issues. There was no significant clinical sign in 60% of our cases. So it can be suggested that hospitalization and close follow up of a suspicious case is a good approach method to avoid from complications.

In literature, it has been reported that the esophagus is the commonest ingestion site (2,6). In our study the common site was esophagus in hospitalized cases (134/165). In esophageal FBs the most common complaints were odynophagia-dysphagia and hypersalivation (7). 50% of patients were admitted with odynophagia-dysphagia and 34% were with hypersalivation. The foreign bodies ingested varies widely in size and type. As in our study, it has been reported that coins were the commonest FB in esophagus in childhood (8). The swallowed site is the main factor that determined the treatment modality in management of FBs (9). As in our study, the invasive methods such as rigide endoscopy was used for distal esophagus and Magill pens was used for proximal esophagus FBs. On the other hand, in FBs that not proceeded with faeces after follow up period, there is a surgery indication. The bowel wall can be infiltrated or perforated by sharp objects (e.g. pins, needles). Therefore, all sharp foreign bodies must be removed before passing the stomach, as it is reported that 15–35% of them will perforate the bowel, usually around the ileocaecal valve (9,10). The overall mortality in FB ingestion was reported under 1% in literature (8,11). In the present study there was no mortality.

Batteries are special and dangerous FBs in GI tract because they can lead to life threatening complications by mucosal injury (12). Some authors suggested earlier removal as soon as possible by an experienced surgeon but the others proposed conservative methods. In our study, 2 of 12 patients who ingested batteries underwent surgery. The remaining proceeded FBs by faeces without any complication on follow up period.

5. Conclusions

Magill forceps is a appropriate device to remove FBs from upper esophagus part. But endoscopic approach must be used to reach middle or inferior parts of esophagus. Sharp FBs in any localization of gastrointestinal tract can be removed by surgical exploration. On the other hand blunt FBs can be spontaneously leave the body. But stay of some FBs (magnets or batteries) for a long time can be dangerous so surgery may be indicated.

In conclusion foreign body ingestion is a major problem in childhood. Management depends on

careful and close follow up for complications and favorable treatment choice.

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