ORIGINAL ARTICLE

Foreign body ingestion in children: Clinical features and complications

Ingestion de corps étranger chez l'enfant: Aspects cliniques et évolutifs

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Abstract

Introduction: The ingestion of foreign body (FB) is a common problem in paediatrics. Children are curious by nature and tend to explore environment by inserting objects into their mouths.
Aim: To update our epidemiological and clinical data and adapt clinical management in order to limit morbidity associated with this fairly frequent accidental pathology.
Methods: Retrospective descriptive study including children aged less than 15 years, hospitalized in the Children's Medicine Department B of the Tunis Children's Hospital from 1 January 2016 to 31 December 2021 having ingested a FB.
Results: Forty-four children were included and admitted for foreign body ingestion, with a sex ratio of 1.4. The mean age was 4 years 4 months. Most children were asymptomatic on admission. In the others, digestive forms predominated (n=19). The average consultation time was 10.8 hours. The FBs were mainly foams and corrosives (75%), represented by batteries in 52% of cases and coins in 22% of cases. Thoraco-abdominal X-rays carried out on all patients revealed a radio-opaque foreign body in 95% of cases. The most frequent location was the colon (n=17). Endoscopy was chosen in 14 patients and was extractive in five. The mean time from admission to endoscopic extraction was 10.6 hours. The mean time to expulsion by natural route was 49 hours. Complications were noted in two patients: ulceration of the oesophageal mucosa and dyspnoea following rigid endoscopy in one case.
Conclusion: This study has shown that the ingestion of foreign body in children is a frequent and potentially serious accident.

Key words: foreign body, ingestion, endoscopy, children

Résumé

Introduction: L'ingestion de corps étranger (CE) est un problème courant en pédiatrie. Les enfants sont curieux de nature et ont tendance à explorer l'environnement en insérant des objets dans leur bouche.
Objectif: Actualiser les données épidémiologiques et cliniques et adapter la gestion clinique afin de limiter la morbidité liée à cette pathologie accidentelle.
Méthodes: Etude descriptive rétrospective incluant les enfants âgés de moins de 15 ans, hospitalisés au service de Médecine Infantile B de l'hôpital d'enfants de Tunis du 1er Janvier 2016 au 31 Décembre 2021 ayant ingéré un CE.
Résultats: Quarante-quatre enfants ont été inclus avec un sexe ratio de 1.4. L'âge moyen était de 4ans 4 mois. La moitié des enfants étaient asymptomatiques à l'admission. Chez les autres, la symptomatologie digestive était prédominante (n=19). Le délai moyen de consultation était de 10.8 heures. Les CE étaient majoritairement mousses et corrosifs (75%) représentés par des piles dans 52% des cas et des pièces de monnaie dans 22%. La radiographie thoraco-abdominale a objectivé un CE radio-opaque dans 95 % des cas. La localisation la plus fréquente était colique (n=17). L'endoscopie a été décidée chez 14 patients et était extractive chez cinq. Le délai moyen entre l'admission et l'extraction endoscopique était de 10.6 heures. Le délai moyen d'expulsion par voie naturelle était de 49 heures.
Conclusion: l'ingestion de CE chez l'enfant est un accident fréquent qui peut être grave. La diminution du risque des séquelles passe surtout par la prévention.

Mots clés: corps étranger, endoscopie, ingestion, enfant

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Introduction

Ingestion of foreign bodies (FB) is a common pediatric problem. The vast majority of pediatric ingestions are accidental, and most children are observed to be between 6 months and 3 years of age. The incidence of foreign body ingestion in children is not well known. Data from U.S. poison control centers indicate over 107,000 cases of foreign body ingestions in 2000 (1).

The types of foreign bodies are very varied. Coins are the most accidentally ingested objects. The other objects often ingested vary according to cultural and dietary cultural and dietary habits (2). The most frequently reported are toys, sharp or pointed objects (pins or nails), batteries and, more rarely, foreign food bodies.

Although most FBs in the gastrointestinal tract pass spontaneously without complications, endoscopic or surgical removal may be required in a few children. Appropriate management depends on the nature of the ingested object, its location, the child's age and his medical history. Despite today's consensual therapeutic approach (3), the therapeutic decision depends on the expertise of the physician. Prevention remains the best treatment for children. Recent data from Tunisia are still limited.

Our study will enable us to update our epidemiological and clinical data and adapt clinical management in order to limit the morbidity associated with this accidental pathology.

The aims of the study was to describe the epidemiological, clinical and paraclinical characteristics of foreign body ingestion in children and to study the main complications of foreign body ingestion in children.

Methods

This is a retrospective and descriptive study conducted on a population of pediatric patients (0-15 years) evaluated at the pediatric emergency room and admitted to children's medicine department B of the Children's Hospital in Tunis, for foreign body ingestion, during the period from January 1, 2016 to December 31, 2021. We have excluded children hospitalised for ingestion of caustic products. we did not include children whose files could not be used due to lack of data.

Data were collected from hospital records. Clinical and demographic data collected on a form developed specifically for the study. We have recorded age and gender, underlying diseases, type and number of foreign body, time between ingestion and consultation, symptoms and signs, physical examination findings, the results of chest x-ray and endoscopic procedures, management and outcomes.

The location of the foreign body was identified according to the International Classification of Diseases, Tenth Edition, for the ingestion of foreign body (code numbers: T17.2, T17.3 and T18.1-9), which include a foreign body in the pharynx, larynx, mouth, esophagus, stomach, small intestine, colon, anus and rectum, and other parts of the alimentary tract (4). Foreign objects were classified according to the classification proposed by Arana and al (5): Foamy and corrosive objects, sharp points and sharp objects. We have created a categorical variable for the "consultation delay". The delay is said to be: Early: [0-12 hours [; Delayed: [12h -24hours [; Late: > 24 hours.

Data were recorded in Excel and analyzed using SPSS (Statistical Package for the Social Sciences) version 22. Data concerning categorical variables are expressed in numbers and percentages. Continuous variables are expressed as mean ± standard deviation.

Results

During the study period, we are included 44 children admitted for ingestion of foreign body. The mean age was 4 years and 4 months ± 3 years; [6 months, 12 years]. The majority of children (n=38) were under six years of age (86%). The sex ratio was 1.4. Pathological history was found in two patients. Ingestion of FB was unknown in one case, while all other accidents took place at home, assisted by a third party in 32 cases. The foreign bodies in our study were mainly foams and corrosives (75% or n=33). Batteries were found in 52% of cases (n=23) and coins in 22% of cases (n=23). Table 1 illustrates the different foreign bodies found in our series. Regarding the number of foreign bodies ingested, a single foreign body was ingested in 42 cases, i.e. 95%. In two patients, two foreign bodies were found: a metal foreign body (jewellery) with a pin in a 6-month-old boy, and two button batteries in a 13-month-old girl. The average time between ingestion of the foreign body and consultation of the emergency department was 10.8 hours [1 hour, 120 hours]. In most cases (77.3%), patients consulted rapidly (< 12 hours) after ingestion of the foreign body. Analyzing signs and symptoms, 25 patients (57%) were asymptomatic. Between the 19 (43%) patients with symptoms. Digestive symptoms observed ranging from simple abdominal pain to digestive haemorrhage in one case. Respiratory symptoms were noted in 18% of cases, with cough in 11% of cases followed by retrosternal pain in 7% of cases. X-rays were performed in all our patients, identifying the radiopaque foreign body in 95% of cases (n=42).

Table 1. Different foreign bodies found in our series

Type of the foreign body	Number	Percent (%)
Ponited	**10**	**22**
nail/metal/jewelry	4	9
Toy	2	4.5
Pin	4	9
Foamy and corrosive	**33**	**75**
Coins	10	22
batteries	23	52
Sharp Glass	**1**	**2**
Total	**44**	**100**

Table 2 shows the location of foreign bodies. Most objects were found in the colon (38.6%), esophagus (29.5%) and stomach (18.2%).

Table 2. Location of different foreign bodies

Location of the foreign body	N (%)
- upper third of the oesophagus	6 (13.6)
- Middle third of the oesophagus	1 (2)
- Lower third of the oesophagus	6 (13.6)
- Stomach	8 (18.2)
- Grele	4 (9.1)
- Colon	17 (38.6)

Figure 1 illustrate some of the foreign bodies on the admission X-rays. Diagnostic digestive endoscopy was i ndicated in the two patients who had ingested a radio-lucent FB. It One patient had a blank endoscopy (FB had migrated), while the other patient had no endoscopy because the FB had been expelled. Endoscopic treatment was recommended in 32% of cases (n=14). It was indicated in the case of a foreign body in the upper (n=6) or middle (n=1) third of the esophagus, whatever its nature, symptomatic or not; a foreign body in the lower third of the esophagus in a symptomatic child (n=4); a foreign body of a serious nature, embedded in the stomach (n=2): glass and button cell; a transparent foreign body causing respiratory distress. The endoscopy was extractive in five cases. The mean delay between admission and endoscopic extraction was 10.6 hours± 1.9; [8 hours, 12 hours]. The other patients (89%, n=39) underwent radio-clinical monitoring. The mean delay between admission and natural expulsion was 49 hours ± 43.5; [6 hours, 240 hours]. Figure 6 shows the endoscopy data in our population. The mean hospital stay was 35 h ± 19.6; [12hours, 96 hours]. The majority of our patients were hospitalized for less than 24 hours (63%, n=28). Complications were noted in two patients: ulceration of the esophageal mucosa along the path of the CE (coin) and one related to endoscopy: dyspnea secondary to rigid endoscopy. The outcome was favorable in all cases.

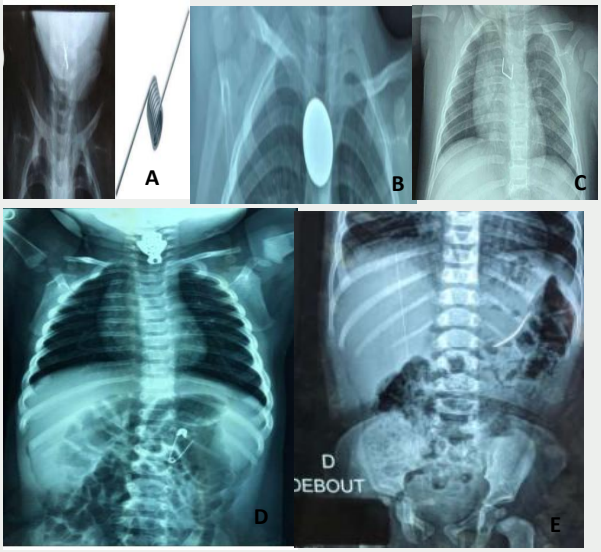

Figure 1. **A**. Frontal cervical X-ray showing a hairpiece embedded in the esophageal outlet, **B**. Front chest X-ray showing a coin embedded in the upper third of the esophagus in a 6-year-old child, **C**. Chest X-ray showing an agraph over the esophagus, **D**. Thoracoabdominal X-ray showing two foreign bodiesforeign bodies: khomsa or "Fatma's hand" at the oesophageal orifice and a safety pin in the intestine, **E**. Front thoracoabdominal radiograph showing an intraintestinal hairpin.

Discussion

Ingestions of foreign bodies are part of domestic accidents. They represent a one of the common problems among children and are the subject of several prevention campaigns. Epidemiological data vary widely from one study to another. It accounts for 2 to 11% of all domestic accidents, according to various studies (6). it is the second most common domestic accident after poisoning. It occurs 10% more frequently in infants under the age of two (2). In Tunisia, in a study carried out throughout the southern region of the country, the prevalence of domestic accidents was 9%. The second most common accident was an aerodigestive foreign body (7). Ingestions occur in almost all cases as accidental events in children without underlying pathologies. In our series, only two patients were followed for autism and trisomy 21.

The symptoms associated with ingestion of the foreign body depend on the patient's age, medical and surgical history, the size, nature and location of the foreign body and the occurrence of complications secondary to ingestion (8). Most ingested objects pass through the gastrointestinal tract without incident. However, they can become lodged in any part of the gastrointestinal tract, leading to mucosal damage, obstruction and even perforation. Esophageal foreign bodies are more frequently associated with symptoms, while patients with gastric or intestinal foreign bodies are more frequently asymptomatic.

Coins are the most common cause of foreign body ingestion in children (5,8,9,10). Button batteries are increasingly described in the literature, and are currently in second place after coins. In line with the literature, the majority of foreign bodies found in our study were coins and button batteries. The majority of foreign bodies are radiopaque, visible on a standard X-ray to confirm the diagnosis and identify the location, number and size of the foreign body. Radiolucent foreign bodies pose diagnostic difficulties, particularly in cases where ingestion has gone unnoticed (5). Flexible endoscopy is the reference method for both diagnosis and extraction (10,11). In our study, endoscopy for diagnostic purposes was performed in only one case. This was a three-year-old girl who presented with a penetration syndrome and a thoraco-abdominal X-ray with no abnormalities. Endoscopy did not reveal a foreign body. The diagnosis was confirmed after natural elimination of the plastic foreign body.

Eighty to 90% of ingested foreign bodies pass spontaneously, 10 to 20% require non-surgical extraction manoeuvres and less than 1% require surgery. The European Society for Pediatric Gastroenterology Hepatology and Nutrition (ESPGHAN) guidelines (6) clearly indicate the management and decision timing in cases of ingestion in a child. In our study, treatment was based on the recommendations of the ESPGHAN. Applying these recommendations prevents unnecessary interventions and avoids delays in diagnosis and treatment (table 3).

Table 3. The features of the various studies carried out on foreign body ingestion in children

	Number of patients	Age (years)	Sex-ratio	Time to care (Hours)	Percentage of radio-opaque foreign body	Number of cases having endoscopy	Number of endoscopic extraction	Acute complications	Late complications	surgery	Death
Our Study Tunis 2022	44	4,3	1.44	10.8	95%	14 (31.8%)	5	-Dyspnea -Mucosal ulceration	No	No	No
A.Arana (2001)(4)	325	2.8	1.38	36	60%	-	81	-Mucosal ulceration	No	No	No
Lakhdar idrissi (2011) (9)	105	4	1,44	- (66% within 24 h)	83.8%	104 (99%)	83	-Mucosal ulceration - pharyngeal oedema -Desaturation during extracting	No	Yes (n=1)	No
Delport (2015)(12)	146	2.6	1,22	- (81% within 24h)	68%	51	7	-Mucosal ulceration -Esophageal stricture	No	No	No
A.Lamblin (2018)(13)	37	3	-	-	100%	1 (37 cases used FOLEY catheter and stones punch-es)	35	-Bronchospasm -Local bleed	No	Yes (n=2)	No
Sidibe (2019)(14)	153	8	0,66	140 (6 days)	100%	23	8	- Ileal perforations - Esophageal perforation -Esophageal stricture -Esophageal burns	No	Yes (n=16)	Yes (n=1)
Kensasse (2020)(10)	289	4	1.2	19	96%	277	263	- Mucosal erosions - Tracheoesophageal fistula - Esophageal perforation	No	Yes (n=1)	No
Khurshid et al (2019) (15)	61	4.9	2.05	7	100%	37 (61%)	31	-Mucosal ulceration	No	Yes (n=1)	No

Conclusion

Foreign body ingestions remain common in children ,6 years of age, and their rate of ingestions has increased over time. The frequency of ingestions noted in this study underscores the need for more research to determine how best to prevent these injuries.

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