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Review article

Review of Foreign Body Ingestion and Esophageal Food Impaction Management in Adolescents

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A B S T R A C T

Foreign body ingestion is a common clinical scenario among patients of all ages. The immediate risk to the patient ranges from negligible to life threatening. Initial and follow-up management strategies depend on multiple patient and ingested object-related factors. Available literature on this topic tends to focus on the small child or adult, leaving the clinician caring for adolescents to extrapolate this information to guide decision making for individual patients. This article reviews foreign body ingestion literature with important implications to the adolescent patient and raises awareness of some highly dangerous objects such as large button batteries, high-powered magnets, long sharps, narcotic packages, and super absorbent objects. An additional focus includes the management of esophageal food impaction. We highlight the unique aspects to the care of the adolescent with intentional ingestion and co-morbid psychiatric illness. The article concludes by discussing the challenges to prevention of ingestion in the at-risk patient.

IMPLICATIONS AND CONTRIBUTION

Clinicians who provide adolescent healthcare need to be aware of current issues and recommendations regarding the management of foreign body ingestions (FBI) among adolescents, including areas of ongoing controversy and risks associated with ingestion of new types of objects, such as high-powered magnets and super-absorbent materials.

FBI refers to nonfood impaction-related ingestions. The majority of pediatric FBI encounters are accidental, occurring in toddlers and young children, with an important minority occurring in adolescents. According to the American Association of Poison Control Centers' annual report for 2011, over 95,000 FBIs were reported in children, with >3,000 of those in patients 13–19 years of age [1]. Regardless of the patient age, the key diagnostic and therapeutic decisions are based on common factors: the ingested object, the number of objects, timing between ingestion and presentation, anatomic location of the object, and presence or absence of symptoms. The age and size of the patient will have some impact as well. There are no large case series or meta-analyses specifically on FBI in the adolescents; therefore much of the management practice in this population combines available data and expertise with FBIs in younger children and adults.

Esophageal food impaction (EFI) accounts for most accidental encounters in adolescents, with the occasional misadventure of an object being in or near one's mouth during a sudden trauma such as a motor vehicle accident, causing ingestion. Much more common in the adolescent is intentional FBI, which may present unique challenges compared with accidental ones. In a recent review of 262 adult FBI cases, 92% were intentional and 85% of patients had underlying psychiatric illness [2]. A majority of these cases had a delay >48 hours from ingestion to medical presentation and

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ingested long objects. In this report, 11% required surgical removal and 6% suffered perforation. One might conclude that delay in presentation and ingestion of larger or more dangerous objects lead to increase potential for endoscopic technical difficulties and complication risk. However, other studies reporting on a similar patient population have not demonstrated increased endoscopy complications or surgical rates [3,4].

High medical costs have been associated with the care of patients with intentional FBI, in both human and monetary resources. In a retrospective review of 33 adults who accounted for 305 separate FBI encounters over 8 years, the total cost of care was >2 million dollars; costs were significantly higher for patients requiring inpatient admission [3]. The major indication for admission in this series was management of the psychiatric disorder. Poynter et al. [5] published a systematic review on deliberate FBI in adults with psychiatric illness and found four predominant underlying conditions: psychosis, borderline personality disorder, obsessive–compulsive disorder, and malingering (while incarcerated). It is unknown if these co-morbid conditions mirror the adolescent population with intentional ingestions.

In combination with psychiatric illness, some adolescents may obtain secondary gain by an inpatient admission after FBI, which may unintentionally result in reinforcement of FBI, making the decision to admit even more complicated. Our experience has revealed that some psychiatric care facilities are resistant to accepting patients until the object is removed or passed, further prolonging the hospital stay and cost of care for those with nonretrievable foreign bodies.

Many more services are frequently utilized for the adolescent with intentional FBI compared with the younger child, and a multidisciplinary treatment approach has been advocated [6]. In our hospital, management of an adolescent with intentional FBI may utilize clinical resources from emergency medicine, gastroenterology (and/or general surgery or otolaryngology), anesthesia, radiology, adolescent medicine, nursing, and psychiatry. Supporting resources include security staff, social work, child life specialists, and 1:1 staff. Such support staff may not be readily available at many medical centers, further adding to the time devoted by the clinical team. Additionally, many hospitals do not have pediatric specialists on staff or adult providers willing to perform procedures on a minor. Medical transport is then required to bring the patient to a referral center with 24-hour pediatric procedural ability. Regarding those patients who reside at inpatient psychiatric facilities, liaisons at the home institution may need to be contacted to provide additional history or provide procedure consent.

Regardless of the patient's intentions or presence of an underlying psychiatric disorder, the common factors that guide management of all patients still remain the most important. In this review, we summarize management of EFI and highlight important elements to FBI management based on the type of object introduced to the gastrointestinal tract. These include button and cylindrical batteries, magnets, sharp objects, long and large objects, coins and blunt objects, narcotic packets, and super absorbent objects (Table 1).

Esophageal Food Impaction

Any patient who develops acute symptoms at the time of eating, including chest pain, dysphagia, odynophagia, respiratory distress, coughing with further oral intake, or drooling, should be suspected of having an EFI. This scenario is invariably unintentional and typically occurs in the setting of underlying esophageal pathology. In the adolescent without a history of esophageal surgery, the primary underlying condition to consider is eosinophilic esophagitis, an inflammatory disorder of the esophagus due to food allergy [7]. If the first presentation to medical attention is at the time of food impaction, these patients often report, in retrospect, chronic symptoms of dysphagia, needing to cut food into small pieces or drink a large amount of fluids with meals to facilitate food passage after swallowing. Peptic esophagitis or stricture is important for other diagnostic considerations. When a patient presents with EFI, removal of the food bolus within 24 hours is indicated for all patients, with more urgent removal performed if acute symptoms are present. The clinician following up a patient after EFI removal should ensure referral to a pediatric gastroenterologist for evaluation because a majority of these events are secondary to a treatable underlying condition [7]. General surgeons or otolaryngologists often remove food impactions by performing rigid endoscopy, and the patient may not be referred to a gastroenterologist at the time. Additionally, the patient may incorrectly excuse the event from eating too quickly and not seek a gastroenterology follow-up appointment independently. If the diagnosis of eosinophilic esophagitis is made by esophageal mucosal biopsy at the time of EFI removal or at a subsequent date, referral to an allergist is also indicated, as the mainstay therapy at this time is elimination of the identified food allergen from the diet [8].

Table 1
Tips and caveats for management of the adolescent after foreign body ingestion

	BBs[a]	Magnets	Sharp object	Blunt objects	Narcotic package
Endoscopic or surgical removal	- Esophageal: emergent removal - Stomach + symptoms: Urgent removal	Emergent removal for multiple magnets within endoscopic reach	- Esophageal location - Symptomatic + within reach - Long ± symptoms	Esophageal location: within 12–24 hours	Never endoscopic removal
Consider hospital admission	Beyond endoscopic reach + symptoms or magnet co-ingestion	Multiple magnets and beyond endoscopic reach	Beyond endoscopic reach and large - Long OR - Symptomatic	Symptomatic and unsure of object identity	Presence of toxidrome symptoms or high suspicion for package ingestion
Consider discharge and follow-up x-ray	Beyond esophagus and asymptomatic BB ≥15 mm; x-ray 2–4 days BB < 15 mm; x-ray 10 days	Single magnet: serial x-rays to ensure passage and no further magnet ingestion	Asymptomatic, short object, reliable follow-up. X-ray 2–3 days	Stomach location: - X-ray in 2–3 weeks	

BB = button battery.
[a] See algorithm from Litovitz et al. [9] for more detailed management recommendations of BB ingestion in children and adolescents.