Medical Science

pISSN 2321–7359; eISSN 2321–7367

An unusual case of multiple magnets ingestion: A case reports and review of the literature

Mohammed AL Khalaf[1], **Mohammed Alsheikh**[1*], **Saud K Al Khaldi**[2], **Khalid Al Dhafeeri**[3], **Dana Al Mishri**[4], **Fawzia Kilany**[5]

To Cite:
AL-Khalaf M, Alsheikh M, Al-Khaldi SK, Al-Dhafeeri K, Al-Mishri D, Kilany F. An unusual case of multiple magnets ingestion: A case reports and review of the literature. Medical Science 2022; 26:ms309e1673. doi: https://doi.org/10.54905/disssi/v26i125/ms309e1673

Authors' Affiliation:
[1]Consultant Otolaryngologist, Royal commission hospital, Jubail IC, Saudi Arabia
[2]College of Medicine, Imam Abdulrahman Bin Faisal University, Dammam, Saudi Arabia
[3]Otolaryngology resident, Royal commission hospital, Jubail IC, Saudi Arabia
4Family medicine resident, Royal commission hospital, Jubail IC, Saudi Arabia
[5]Otolaryngology Senior Registrar, Royal commission hospital, Jubail IC, Saudi Arabia

[*]**Corresponding author**
Consultant Otologist, Neurotologist & Cochlear Implant Surgeon, Royal commission hospital, Jubail IC,
Kingdom of Saudi Arabia,
Email: dr.malshaikh@hotmail.com

Peer-Review History
Received: 09 May 2022
Reviewed & Revised: 14/May/2022 to 14/July/2022
Accepted: 15 July 2022
Published: 26 July 2022

Peer-review Method
External peer-review was done through double-blind method.

URL: https://www.discoveryjournals.org/medicalscience

ABSTRACT

Foreign body ingestion is common, but magnet foreign is less commonly encountered and rarely reported. An extensive PubMed and Google scholar research has been done to search for similar cases, to the best of our knowledge; it is the first case to be reported with this large number of small magnets, reaching more than 35 magnets, and this way of management. A literature review was performed, and the results were discussed.

Keywords: magnet, neodymium, rare earth, foreign body ingestion, esophagus.

1. INTRODUCTION

Foreign body ingestion has been increasing significantly in pediatric population during the recent few years (Zhang & Li, 2018). Moreover, foreign body in general could be classified into three categories according to the location and the nature of the body being ingested; foreign body of the esophagus, foreign body of the airway, and Caustic agents. The most prevalent foreign body of the esophagus is coins, whereas on the other hand, the most prevalent foreign body of the airway is food. However, the two most common location are the Cricopharyngeus and the right mainstay bronchus; depending on the type (Pasha & Golub, 2018). Ingestion of foreign body usually occurs in the pediatric population, but also could be encountered in the adult population when accidently ingesting fish bone for instance. The patient could present with certain non-specific signs and symptoms which all together raise the doubt of foreign body ingestion; which are respiratory symptoms, stridor, cough, choking episodes, dysphagia, drooling, chest pain, fever and wheezing. Yet, it could be easily diagnosed with a plain chest/neck/abdominal x-ray to evaluate the object and treated with general observation and description of the object, then the use of rigid esophagoscopy or rigid bronchoscopy depending on the case. However, the complications of the foreign body ingestion, such as esophageal perforation, aspiration,

mediastinitis, pneumonitis, pneumothorax, are very serious and could possibly be fatal; so good education and care from the parents is the cornerstone in preventing such a complication in the first place (Pasha & Golub, 2018; Čuchráč, 2021).

2. CASE PRESENTATION

A 2 years old boy presented to emergency department with history of swallowing of multiple super magnetic balls, more than 35 balls, after the foreign body being swallowed the mother tried to induce vomiting and the patient vomited two balls then became stable, the next day he complained of abdominal pain and vomited twice so the mother brought him to the ER. Chest and abdomen x ray showed multiple metal balls attached as a bulk in the stomach (Figure 1). The patient then shifted to the operation room and the pediatric gastroenterologist tried to remove the foreign body by flexible endoscopy, after several trials he pulled the balls as a bulk which got stuck at the upper esophagus, at that moment the patient was accidentally extubated, and the anesthetist was struggled to reintubate the patient because of laryngeal edema and shift of the larynx due to huge bulky super magnetic balls, and at this point the ENT team was called urgently to do emergency tracheostomy in case of failed intubation, fortunately the moment the ENT team had arrived to the OR the anesthetist was managed to intubate the patient and the procedure turned from doing emergency tracheostomy for removing of foreign body from upper esophagus (Figure 2). Direct esophagoscopy was done by ENT team and magnetic balls were removed separately it was 35 magnetic balls, which were found strongly attached to each other by a super magnetic power (Figure 3). Post-operative chest and abdomen x ray showed no pneumomediastinal emphysema or residual foreign body (Figure 4). The patient then shifted intubated to PICU, then discharged home two days later in good and stable condition.

Figure 1 Chest and abdomen x ray showed multiple metal balls attached as a bulk in the stomach.

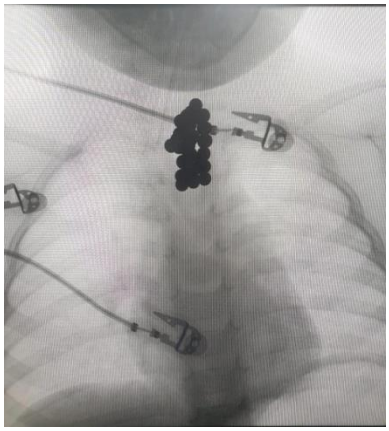

Figure 2 The time of extubation, when the bulk of Magnets got stuck in the upper esophagus.

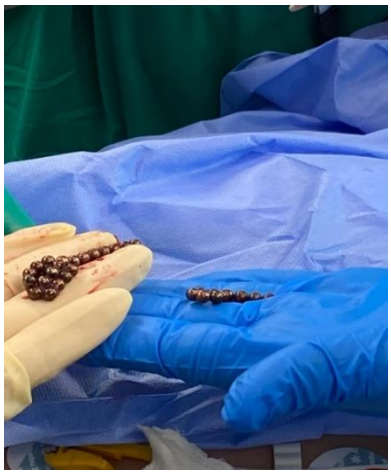

Figure 3 Direct esophagoscopy was done by ENT team and magnetic balls were removed separately it was 35 magnetic balls, which were found strongly attached to each other by a super magnetic power.

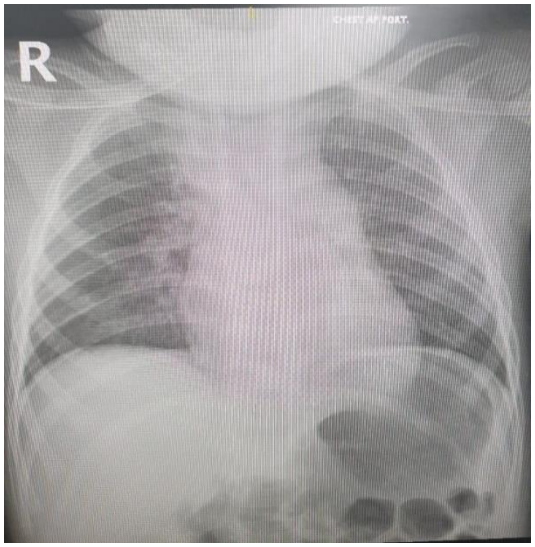

Figure 4 Post-operative chest and abdomen x ray showed no pneumomediastinal emphysema or residual foreign body

3. DISCUSSION

Foreign body ingestion has been significantly increasing in pediatric population, as in a trend analysis study that has been done in the US, with an estimate of 16,386 children younger than 18 who represented to ED in the US during a 10-year period with possible magnet ingestion. The incidence of visits increased 8.5-folds from 2002-2011, with 75% average annual increase per year (Abbas et al., 2013). Moreover, the most common esophageal foreign body are coins, while in adults it is fish bone, and Cricopharyngeus being the most frequent site of the esophagus (Pasha & Golub, 2018).

A retrospective study was conducted from a total of 194 foreign body ingestion cases. It included 53.6% males and 46.4% females, with a median age of 43.5 months. Foreign body ingestion complaint occurred in 77.8% of the cases. The presentation was divided into asymptomatic 44.3%, and symptomatic 55.7%; with vomiting being the most common symptoms encountered 23.2%. Moreover, in most cases, the foreign body was located in the esophagus, most commonly due to coins ingestion. However, management included spontaneous passing in 60.3% of the cases, endoscopy in 35.6% of the cases, and others in 3.1% of the cases. Yet, complications before management were recorded in 9.1% of the cases and 2.1% after management (Khorana et al., 2019).

The presentation of foreign body in the esophagus may vary between patients. However, vomiting, fever, abdominal pain, respiratory complaints in young children, dysphagia, drooling, weight loss, and chest pain being the most common manifestations. Yet, the diagnosis is made by simple chest/neck/abdominal x-ray, CXR with inspiratory/expiratory phases in case of airway foreign body (Pasha & Golub, 2018). A novel algorithm has been made in approaching and managing magnet ingestion in the GI tract in which it is detailed and specific to magnets ingestion. The first step is to confirm the diagnosis. Magnet ingestion usually confirmed by x-ray, where you determine whether it's single, multiple magnet or magnet associated with other metallic object. A series of

radiological views are necessary to confirm whether single or multiple magnets were ingested, because magnets usually stick together.

Ingestion of single magnet is usually treated conservatively with adequate education of the child and his parents. However, multiple magnets ingestion should be managed urgently depending on the location of magnet along with patient presentation and time interval between ingestion and presentation (Hussain & Bousvaros, 2012). Magnets are naturally attractive to young children and toddlers but present a serious risk when ingested. If ingested as a single magnet, it is likely to pass without significant event. However, multiple magnets ingestion may have devastating consequences, including obstruction, bowel perforation, peritonitis, and death (Alfonzo et al., 2016). Moreover, other complications include mediastinitis, pneumomediastinum, pneumothorax, and aspiration (Pasha & Golub, 2018).

Increasing reports of mortality and morbidity in recent years regarding magnet ingestion raised the need solve this disaster. Yet, it requires the participation of many aspects together for the goal of preventing such an issue. Starting from the education of parents and caregivers about the type of foreign bodies and choking hazards to improving warning labels, and more secure packages. The pediatrician also plays an important role in the prevention (Rodríguez et al., 2019).

4. CONCLUSION

In terms of safety, the cooperation with consumer product safety commission, trade and economy authorities to completely ban the import and sale of the neodymium magnet buckets will save much more lives; like has been done in some countries like Australia and New Zealand. However, all cases of magnet ingestion which will be managed by gastroenterology endoscopic removal, should imperatively have the presence of an ENT on the scene of procedure to avoid serious complications such as incidental airway loss, possibility of inhalation of foreign body into the lower airway, and possible stuck of foreign body in the esophagus, which will require rigid esophagoscopy removal.

Acknowledgement

We thank the participants who were all contributed samples to the study.

Informed consent

Written & Oral informed consent was obtained from all individual participants included in the study. Additional informed consent was obtained from all individual participants for whom identifying information is included in this manuscript.

Funding

This study has not received any external funding.

Conflicts of interest

The authors declare that there are no conflicts of interests.

Data and materials availability

All data associated with this study are present in the paper.

REFERENCES AND NOTES

1. Abbas, Mazen I. Magnet Ingestions in Children Presenting to US Emergency Departments. J Pediatr Gastroenterol Nutr 2013; 07(57):18-22.
2. Alfonzo MJ, Baum CR. Magnetic Foreign Body Ingestions. Pediatr Emerg Care 2016; 32(10):698-702.
3. Čuchrač L, Šimonova J, Firment J, Šimon R, Vaškova J. Corpus alienum - A rare case of tablespoon in the rectovesical pouch. Medical Science 2021; 25(114):1931-1937
4. Hussain SZ, Bousvaros A. Management of ingested magnets in children. J Pediatr Gastroenterol Nutr 2012; 55(3):239-42.
5. Khorana, Tantivit, Phiuphong. Foreign Body Ingestion in Pediatrics: Distribution, Management and Complications. J Medicina 2019; 55(10).
6. LorenzoniG, Azzolina D, Baldas S. Increasing awareness of food-choking and nutrition in children through education of caregivers: the CHOP community intervention trial study protocol. BMC Public Health 2019; 56(19).
7. Pasha, Golub. Otolaryngology: head & neck surgery: clinical reference guide. San Diego, CA: Plural Publishing Inc. 2014; 576-577

8. Rodríguez H, Cuestas G, Gregori D, Lorenzoni G, Tortosa S, Rodríguez D'Aquila M, Rodríguez D'Aquila JA, Carrera S, Passali D. Recommendations for the prevention of organic foreign bodies aspiration. Arch Argent Pediatr 2017; 115(5):512-516.
9. Zhang XR, Li Q. A case of magnetic pharyngeal foreign body in children. J Clin Otorhinolaryngol Head Neck Surg 2018; 32(18).