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Case Report

Double-coin foreign body in the oesophagus mimicking a button battery: a report of two cases with literature review

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ABSTRACT

Ingestion of foreign bodies remains a common pediatric emergency, with coins being the most frequent culprit. However, the radio graphic appearance of stacked coins can closely resemble a button battery, a dangerous foreign body that requires emergent removal due to its potential for rapid esophageal injury. Authors report two pediatric patients who presented with suspected button battery ingestion but were intra-operatively found to have ingested two stacked coins. This article reviews their presentations, radio graphic findings, surgical management, and the critical importance of maintaining a high index of suspicion. A literature review highlights the challenges of radiologic differentiation and supports emergent esophagoscopy as the diagnostic and therapeutic gold standard.

Keywords: Stacked coins, Button battery, Double-rim sign, Foreign body, Oesophagus, Pediatric otolaryngology

INTRODUCTION

Foreign body ingestion accounts for up to 85 % of pediatric endoscopic emergencies, with coins responsible for 60–85 % of events.[1] When the object is a disk battery, liquefactive necrosis may begin within 15 min and catastrophic perforation or vascular fistula can follow within hours.[2]

The radio graphic "double-rim" (halo) and "step-off" sign are considered pathognomonic for esophageal button batteries, yet in vitro studies show that these signs require batteries ≥20 mm and can be imitated by stacked metallic disks.[3]

Recent reports describe double coins masquerading as button batteries, necessitating urgent intervention despite their benign nature.[4] We contribute an additional record of two cases having performed extensive literature review and summarize diagnostic clues and management algorithms.

CASE REPORT

Case 1

A previously healthy 10-year-old girl had sudden hyper salivation, single episode of vomiting along with retrosternal discomfort and difficulty swallowing 30 min after playing with loose change. She remained hemodynamically stable; oxygen saturation was 99% on room air. Orthogonal neck/chest films showed a circular density at the thoracic inlet with a concentric lucent ring, a posterior step-off sign which is typical of a button battery (Figure 1).

Case 2

A 12-year-old girl was brought in after reportedly swallowing a coin while playing. She was asymptomatic, but radiographs again demonstrated a central lucency and double ring sign mimicking a button battery (Figure 2).

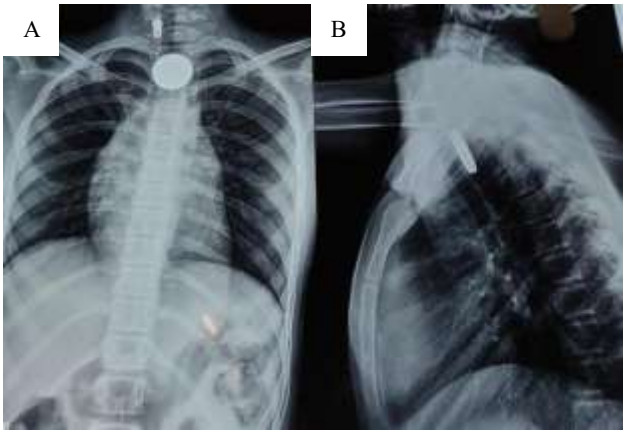

Figure 1 (A and B): Orthogonal plain films of case 1.

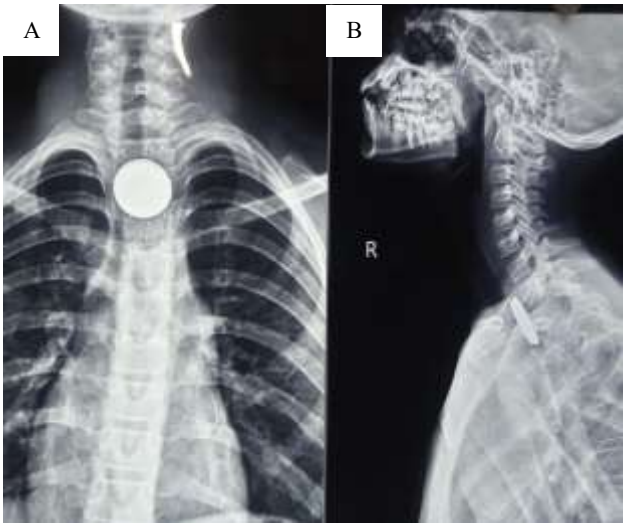

Figure 2 (A and B): Orthogonal plain films of case 2.

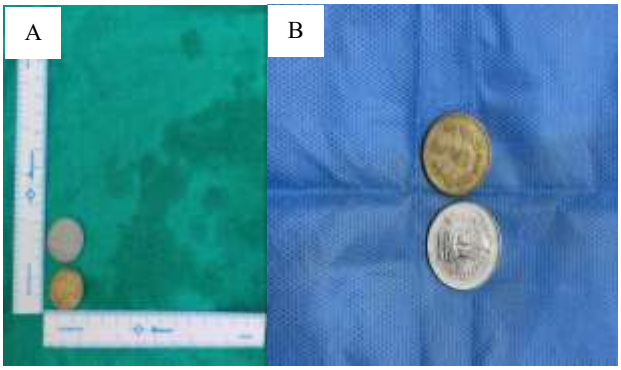

Figure 3: (A) Coin retrieved from case 1 and (B) coin retrieved from case 2.

For both the case given the potential risk of esophageal perforation due to suspected button battery, emergent rigid esophagoscopy was done under general anaesthesia which revealed two coins firmly adherent by surface tension and mucous (Figure 3). They were removed en bloc with crocodile forceps. In either of the cases, no mucosal ulceration or charring were present, mild mucosal erythema was noted. Check esophagoscopy was done till the gastro-esophageal junction. Post operative radiographs were normal. The patients resumed oral intake after 6 hours and were promptly discharged the following morning. Patients were followed up at 2-week intervals following retrieval and recovered fully.

DISCUSSION

Radiography comparing button batteries, coins and magnets confirms that only lithium cells ≥20 mm reliably display a double rim; smaller cells and most coins are homogeneous.[3] Nevertheless, perfectly aligned stacked coins recreate both halo and step off artefacts[4] and cannot be reliably distinguished by routine radiography. Computed tomography offers more detail but introduces delay and radiation without reliably altering management.[10] Foreign body ingestion (FBI) constitutes a frequent emergency presentation in pediatric otolaryngology, with coins being the most commonly implicated objects in children aged 6 months to 5 years.[1] However, the ingestion of button batteries (BBs), although less common, poses a far greater risk due to their potential to cause severe esophageal injury within hours of impaction.[2] The radio graphic resemblance between stacked metallic coins and BBs presents a diagnostic challenge with significant clinical implications.[3,4]

According to the World society of emergency surgery (WSES) guidelines, any suspected ingestion of a button battery mandates emergent endoscopic intervention, ideally within 2 hours and not later than 6 hours post-ingestion (Grade 1 evidence) to mitigate risks of mucosal injury, perforation, or fistulization to adjacent vascular or respiratory structures.[5] Plain radiographs, while frequently used in the initial assessment, exhibit a false-negative rate as high as 47% , and interpretation may be confounded by the radio graphic mimicry between button batteries and stacked or bi-metallic coins.

The classic “double ring” or “halo” sign on AP views and the “step-off” or bi-laminar density on lateral projections, often pathognomonic for BBs, can also be generated by two coins tightly apposed within the esophagus-especially if differing in diameter or metal composition.[4,6] This diagnostic conundrum has been increasingly recognized in the literature. Whelan et al highlighted multiple cases wherein stacked coins were radiographically indistinguishable from BBs, underscoring the limitations of plain radiography in isolation and the potential for overtreatment or, conversely, under-recognition of true BB cases.[7] Safavi et al further emphasized that the decision to proceed to urgent esophagoscopy should not rely solely on imaging features, as radiographic mimics could not be reliably differentiated from button batteries based on density, size, or ring characteristics alone.[8] Meyer et al conducted a systematic analysis of radiologic features of BBs, coins, and magnets, demonstrating significant overlap in

imaging appearance and suggesting that neither radiographic morphology nor central lucency is sufficient to make a definitive diagnosis.[9] Advanced imaging modalities such as CT may offer improved diagnostic confidence, particularly in adults or in cases where perforation is suspected. However, in pediatric patients with unwitnessed ingestion, CT is often impractical and may delay definitive management. Artificial intelligence (AI)-based tools have shown promise in enhancing radiographic interpretation. Rostad et al reported that AI-enhanced classification achieved improved sensitivity in distinguishing BBs from coins in pediatric esophageal radiographs, but such tools are not yet integrated into standard clinical algorithms.[10]

The WSES consensus further recommends that all foreign bodies in the esophagus that fail to progress or that carry the risk of pressure necrosis particularly button batteries must be removed endoscopically as early as possible.[5] While BBs account for a minority of pediatric FBIs, they contribute disproportionately to morbidity and mortality, particularly those larger than 20 mm and composed of lithium cells. Injury may commence within 15 minutes post-ingestion, with full-thickness necrosis potentially developing within 2 hours, and delayed complications such as tracheoesophageal or aortoesophageal fistulas may manifest days to weeks later.[11]

CONCLUSION

In conclusion, while radiographic signs remain a useful screening tool, they lack the specificity required to confidently distinguish button batteries from stacked coins. As such, clinical suspicion-particularly in cases with unwitnessed ingestion or suggestive symptoms-must guide management. In all cases of suspected BB ingestion, esophagoscopy should be urgently undertaken to both confirm diagnosis and mitigate the risk of life-threatening complications.

Stacked coins are an important radio graphic mimic of oesophageal button batteries. Given the high stakes of missed BB injury and the unreliability of reliable plain film discrimination, any double-rim sign warrants the same emergent pathway: airway protection and rapid endoscopic extraction

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