

## ESOPHAGEAL IMPACTION OF FERTILIZED DUCK EGG ALBUMEN (HARDENED BALUT WHITE) IN A TERTIARY GOVERNMENT HOSPITAL IN THE PHILIPPINES: A CASE SERIES

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### Abstract

**Background:** This study described the clinical profile of patients who developed esophageal impaction after ingesting the hardened white portion (albumen) of a fertilized duck egg (colloquially termed *balut*).

**Methods:** A review of patients with foreign body impaction of hardened *balut* egg white was performed. These patients were admitted in the emergency room from November 2013 to November 2018. Clinical features analyzed included age, sex, clinical signs and symptoms, imaging performed, operative findings and complications.

**Results:** In all, 18 patients were included in the review. Seventeen were male with a majority in the 20- to 40-year-old age range. Dysphagia and neck tenderness were the most commonly presented symptoms and physical examination finding, respectively. Twelve cases were successfully extracted via rigid esophagoscopy under general anesthesia, while one case was resolved through spontaneous ejection. The most common site of impaction was at the cervical esophagus. One third of patients undergoing extraction had minor noncircumferential esophageal abrasions.

**Conclusion:** Ingestion of the entire hardened *balut* white can lead to esophageal impaction, necessitating admission and operative management. Young males are commonly affected. Due to its intrinsic characteristics as a foreign body, its removal can prove challenging. Push technique and extraction (both via piecemeal and wholly) were found to be effective, and when performed correctly, minimized complications. Nevertheless, this condition may be prevented with health education.

**Keywords:** Esophageal impaction, Hardened white portion (albumen), Fertilized duck egg

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## Introduction

Esophageal foreign body impaction is one of the more common reasons for consults and referrals directed to an otorhinolaryngologist in the emergency room necessitating urgent operative management. Among adults, the most commonly ingested foreign body leading to impaction is food<sup>(1,2)</sup> containing food bolus, meat chunks or bones.<sup>(3-5)</sup>

Eating boiled fertilized duck egg (*balut*) is a shared practice in Asian culture. In the Philippines, *balut* is usually sold by local street vendors and eaten as a stand-alone snack. Traditionally, males believe it bestowed aphrodisiac properties when ingested, is deeply nourishing and an energy-giving source for females.<sup>(6,7)</sup> The cooked *balut* egg consists of four parts, the liquid (soup), the egg yolk, the chick embryo, and the hardened egg white (albumen) (**Figure 1**). All parts of the *balut* are eaten and consumers usually save the chick embryo for last. The hardened white is ingested as a matter of preference. Some first chew it into pieces then swallow. Others do not attempt to eat this part due to its tough consistency, while others consume the hardened *balut* white whole. Unfortunately, due to the albumen's peculiar shape and firmness, it has been known to cause esophageal impaction. Limited literature is available describing this phenomenon. A case

report of three patients was noted to provide some description regarding its removal.<sup>(8)</sup> Vietnam, Cambodia, Thailand and China share this particular food culture, but language barriers precluded the authors from performing thorough literature reviews in their respective local publications.

This study aimed to describe the clinical profile and characteristics of patients developing esophageal impaction after wholly ingesting the hardened white part (albumen) of a fertilized duck egg (*balut*), and to review its presentation, management, and outcomes among patients admitted at a tertiary university hospital in the Philippines from November 2013 to November 2018.

## Methods

A review of medical records was conducted for all patients who attended for foreign body impaction of hardened *balut* white (HBW) from November 2013 to November 2018. Data collected included age, sex, clinical symptoms, physical examination findings, imaging performed, management or method of extraction performed, including esophageal level at which impaction was found, complications, and number of hospital days. Total patients were enumerated given the small size of the patient population.



**Figure 1.** Parts of a *balut*: (A) duck egg just removed from its shell. (B) hardened albumen (C) from left to right: chick embryo, yolk sac, hardened albumen

Data were encoded and analyzed using Stata 14 Software and presented in frequencies and percentages. The case series was approved by the hospital Health Research Ethics Committee.

**Results**

*Demographics*

Between November 2013 and November 2018, 1,367 consults were recorded for esophageal impaction in our institution. Three hundred sixty-five patients (26.7%) suffered from food-related impaction. Eighteen patients were identified as presenting esophageal impaction from HBW, which totaled 5% of food impactions. **Table 1** shows a summary of their clinical information. Seventeen were male. The ages ranged from 17 to 50 years old with more than two thirds of the patients (13/18) between 21 and 40 years.

*Clinical signs and symptoms, and physical examination findings*

The most commonly presented symptoms included dysphagia (12/18 or 66.7%), globus sensation (7/18 or 38.9%), increased salivation and drooling (6/18 or 33.3%), and neck pain (6/18 or 33.3%). Other elicited symptoms are detailed in **Table 1**.

Three of the 18 patients (16.7%) presented neck tenderness on palpation of the anterior neck, while the rest showed unremarkable physical examination. No associated erythema, or other signs of inflammation were observed. None of the patients presented a visible foreign body in the oropharynx, hypopharynx, and laryngeal inlet on flexible nasopharyngolaryngoscopy.

*Imaging*

Radiographs of the chest and neck soft tissue were ordered but only one revealed a retropharyngeal lucency. Two patients underwent modified barium swallow demonstrating filling defects. One was at the level of the 7<sup>th</sup> cervical vertebra, and the other at an area between the 1<sup>st</sup> and 2<sup>nd</sup> thoracic vertebra.

*Treatment*

Fourteen of the 18 patients (77.8%) completed the course of management, while four either went home against medical advice or absconded. One patient spontaneously ejected the HBW while the rest underwent rigid esophagoscopy under general anesthesia for extraction. The HBW was directly visualized in twelve cases, where eight

**Table 1.** Demographic and clinical profiles of patients presenting esophageal impaction after ingesting a hardened white portion (albumen) of a fertilized duck egg

Clinical Profile	Frequency (%) n=18
<b>Age (years)</b>	
0 to 10	0
11 to 20	2 (11.1)
21 to 30	8 (44.4)
31 to 40	5 (27.8)
41 to 50	3 (16.7)
51 and above	0
<b>Sex</b>	
Male	17 (94.4)
Female	1 (5.6)

**Table 1.** Demographic and clinical profiles of patients presenting esophageal impaction after ingesting a hardened white portion (albumen) of a fertilized duck egg (ext.)

Clinical Profile	Frequency (%) n=18
<b>Symptoms</b>	
Dysphagia	12 (66.7)
Globus sensation	7 (38.9)
Increased salivation	6 (33.3)
Neck pain	6 (33.3)
Vomiting	5 (27.8)
Odynophagia	5 (27.8)
Difficulty of breathing	3 (16.7)
Chest pain	2 (11.1)
Dysphonia	1 (5.6)
<b>Treatment provided</b>	
Rigid esophagoscopy with push technique	7 (38.9)
Rigid esophagoscopy with en bloc extraction	4 (22.2)
Rigid esophagoscopy with piecemeal extraction	1 (5.6)
Rigid esophagoscopy without extraction (no foreign body seen)	1 (5.6)
Spontaneous ejection and observation	1 (5.6)
No treatment (absconded or home against medical advice)	4 (22.2)
<b>Esophageal level of foreign body</b>	
Cervical esophagus <sup>a</sup>	8
Upper thoracic esophagus <sup>b</sup>	4
Middle thoracic esophagus <sup>c</sup>	0
Lower thoracic esophagus <sup>d</sup>	0

<sup>a</sup> 15 to 19 cm from upper central incisors; <sup>b</sup> 20 to 24 cm from upper central incisors; <sup>c</sup> 25 to 29 cm from upper central incisors; <sup>d</sup> 30 to 39 cm from upper central incisors <sup>(9)</sup>

were found at the cervical esophagus (15 to 19 cm from the upper central incisors) and four were found at the upper thoracic esophagus (20 to 24 cm from upper central incisors). In one case, no foreign body was noted on two passes of the esophagoscope reaching to the level of the lower esophageal sphincter, despite the patient's symptoms. The most common method of resolution was using push technique, which was provided among more than one third of patients (7/18 or 38.9%).

#### Complications

Four of the 12 patients undergoing esophagoscopy with extraction had minor esophageal noncircumferential abrasions on second pass esophagoscopy. None of the four showed profuse bleeding or necessitated a nasogastric tube insertion, but they were maintained on soft diet for one week. No major complications were noted. All patients were discharged within 1 to 2 days postoperatively.

## Discussion

Foreign body ingestion is one of the more common cases for which emergent intervention by an otorhinolaryngologist is called upon. Among adults, food is the most common cause of esophageal impaction.<sup>(1-4)</sup> The nature of foreign bodies ingested may vary by region or country based on cultural nuances. This study described the clinical profile and management course of 18 patients who experienced esophageal impaction after ingesting the hardened white (albumen) of a fertilized duck egg (*balut*). Young males were the most commonly afflicted, which was consistent in the case report by Gonzales and Gonzales.<sup>(8)</sup> In their report, they stated that their patients may have had a history of alcohol intoxication. This was unsurprising as *balut* is a snack commonly accompanying intake of alcoholic beverages during street drinking sessions.<sup>(6,7)</sup>

Signs and symptoms of impaction for this particular foreign body does not appear to differ from other causes of food impaction with dysphagia and neck tenderness being the most common.<sup>(4,5)</sup> Wu, et al. (2011) reported that nearly all 326 patients included in their study reported dysphagia or foreign body sensation, while our study reported two thirds of patients having dysphagia and more than one third experiencing globus sensation. Results of imaging studies were also consistent with the related literature where plain radiographs were usually negative ranging from 60 to 85% of the time.<sup>(1,4,5)</sup> These estimates from related literature might even constitute an underestimation as they included radio-opaque foreign bodies such as coins and wires. The European Society of Gastrointestinal Endoscopy (ESGE) recommends against radiographic evaluation for nonbony food impaction. Barium swallow is also not recommended due to risk of aspiration in addition to serving as hindrance to endoscopic evaluation.<sup>(10)</sup> The role of imaging also occurs much less frequently in the setting of an obviously symptomatic patient.

The most common site of impaction of the HBW was at the cervical esophagus, followed by the upper thoracic esophagus, similar to other studies on esophageal foreign bodies, where 34 to 89% can be found in the proximal or cervical esophagus.<sup>(1,4,5)</sup> In one case, no foreign body was

noted on esophagoscopy. This may be due to the spontaneous passage of the foreign body along the gastrointestinal tract before the procedure.

Removal of the HBW can be challenging, given its intrinsic properties. It has a smooth curved surfaces that may be difficult to securely grasp using standard forceps. On occasion, some areas of the HBW turn soft and friable, impeding attempts to remove the foreign body wholly. The cases that were managed operatively elucidated impaction removal in three distinct ways—rigid esophagoscopy using push technique, piecemeal extraction, and enbloc extraction of the entire hardened *balut* white. The push technique, or what we call in our institution as *aided ingestion*, where impacted food contents are gently guided past the lower esophageal sphincter into the stomach, is the primary method to treat food bolus impaction with a success rate of 90%<sup>(10)</sup> low quality evidence. In the study by Wu, et al. (2011), this technique was used among only 5.5% of patients, while in our review, more than one third of the 18 patients were successfully managed using this technique without complications. A major difference was the age of the studied population—the average age of the patients in Wu's study was 50 years old, while our cohort were all below 50 years old. The older population in Wu's study was associated with a higher prevalence in gastrointestinal tract abnormality with almost 65% of patients with food bolus impactions found to have esophageal stricture or carcinoma. The study by Vizcarrondo et al. (1983) showed a similar trend where 72% of food-related impactions subjects were older than 60. Available literature advises against blindly pushing impacted food bolus into the stomach among patients with pre-existing dysphagia or esophageal disease, as they have an increased risk for perforation<sup>(10-13)</sup>, which was fortunately not the case in our cohort consisting mostly of young healthy males. Nevertheless, even when assessing the esophagus beyond the impacted food is impossible, as was the case in our institution due to some limitation in equipment, food boluses may be safely pushed into the stomach by breaking the bolus into smaller pieces.<sup>(10)</sup>



Piecemeal or enbloc extraction continues to constitute options for managing HWB especially in cases where significant resistance is encountered. However, enbloc retrieval is personally preferred by the authors as it ensures that no large chunk remains in the esophagus. Second pass esophagoscopy was performed at the end for all methods to ensure that no residual foreign body was left behind.

Although limited in sample size, this study illustrated the hardened *balut* white's unique qualities as a foreign body, as well as its implication in managing esophageal impaction. Several techniques may be employed, such as the push technique and extraction, whether via piecemeal or enbloc, which were all found effective. Regardless of technique used, all patients were without major complications in the immediate postoperative period and upon discharge from the hospital. Nevertheless, esophageal impaction from HBW is a preventable condition and steps should be taken to educate the younger male population regarding this.

### Conclusion

Ingestion of the entire hardened *balut* white can lead to esophageal impaction, necessitating admission and operative management. Young males were commonly affected unlike the demographic profile seen in related studies, where patients 50 years and above were more commonly affected by food-related impaction. Due to its intrinsic characteristics as a foreign body, its removal can prove challenging. Push technique and extraction (both via piecemeal and wholly) were found to be effective techniques, and when performed correctly, minimized complications. Nevertheless, this condition may be prevented with health education.

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