



A chicken bone in throat

Dr. Law Ping Keung, Joe

FHKCEM, FHKAM (Emergency Medicine)

A 35-year-old female of good past health attended accident and emergency department for foreign body ingestion while eating chicken.

She complained of severe sore throat and foreign body sensation.

On examination, her vitals were:

- Blood pressure: 110/80 mmHg, pulse 60 beats per minute
- SpO₂: 99% on room air with normal respiratory rate

She was able to swallow saliva but had difficulty in speaking. There was no foreign body seen in the oropharynx.

What is the approach to this patient?

The patient was suspected to have foreign body (chicken bone) impaction in the upper aerodigestive tract. Most patients have mild symptoms and are in stable condition.

History should focus on the type, the time of foreign body ingested and symptoms.

Common symptoms include foreign body sensation and dysphagia. Other symptoms include retrosternal fullness, regurgitation, odynophagia, blood-stained saliva, gagging and choking.

We should also look for symptoms suggestive of complications.

- Hypersalivation and inability to swallow any liquid should raise the suspicion of complete oesophageal obstruction.
- Respiratory symptoms including choking, noisy breathing or dyspnea can result from aspiration of saliva or from tracheal obstruction by the foreign body.

On examination, we should first focus on patient's airway patency and look for any signs of complications:

- Signs of upper airway obstruction
- Abnormal breath sounds due to aspiration
- Neck tenderness
- Neck crepitus suggestive of subcutaneous air due to perforation of oesophagus

We can then examine the oral cavity, oropharynx and hypopharynx for foreign body.

Foreign body lodged in oral cavity and tonsillar region can be easily diagnosed by careful clinical examination under a good light source.

A direct laryngoscope is helpful in detecting foreign bodies in the tongue base and vallecula.

The patient can localize the foreign body impacted at C6 level. Does it reflect the true position of the foreign body?

Patient can often localize a site of discomfort, however, it may not correlate with the site of impaction.¹⁻³

The oropharynx is well innervated. Studies had shown objects above the cricopharyngeus were more accurately located than objects below.¹

Therefore, for anybody who can localize a presumptive foreign body within the cervical region, that object is likely to be above cricopharyngeus and at the indicated side.⁴

However, a foreign body sensation can also be caused by minor scratches or abrasions to the mucosal surface of the oropharynx. In that case, symptoms usually disappear in 24 to 48 hours.

Progress of patient

A lateral x-ray of neck (soft tissue) was taken (Figure 1). There was a 1 cm linear radio-opaque shadow in the pre-vertebral soft tissue at C5/C6 level, suspicious of foreign body in the upper oesophagus.



Figure 1: Lateral x-ray of neck (soft tissue)

What are the common sites of foreign body impaction in the oesophagus?

The oesophagus is the most common site of foreign body. It is approximately 20-25 cm in length extending from the hypopharynx to the stomach. Foreign bodies are often impacted at the normal anatomical narrowing of the oesophagus. (Figure 2).⁵

1. Upper oesophageal sphincter that includes the cricopharyngeus (commonest)
2. Middle oesophagus where it crosses the aortic arch
3. Lower oesophageal sphincter near the diaphragmatic hiatus.

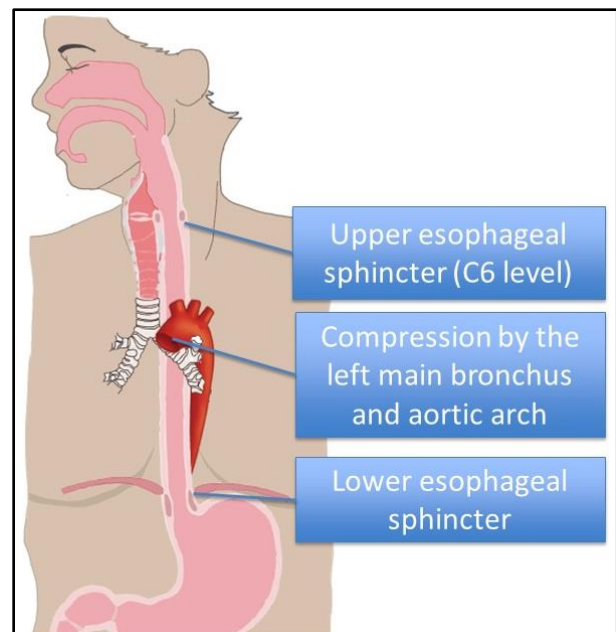


Figure 2: Physiological narrowing of oesophagus

Once foreign bodies have passed through the oesophagus, most objects pass within 4-6 days. However, objects bigger than 2-2.5cm in diameter will not pass through the pylorus or the ileocecal valve. Objects longer than 5-6 cm will not pass through the duodenal sweep.^{2,6,7}

What is the role of imaging?

Routine x-ray is usually the first step when a radio-opaque object is suspected. X-ray of the neck, chest and abdomen may be needed depending on the clinical presentation.

Plain radiographs allow detection of the location, size, shape and number of ingested foreign body as well as signs of complication e.g. pneumo-mediastinum in case of oesophageal perforation.

In the plain neck x-ray, we should also look for pre-vertebral soft tissue swelling. If present, it usually develops 3-12 hours after ingestion.⁸

The normal prevertebral soft tissue thickness on the lateral neck x-ray is

- At C3: < 3 mm or less than 1/3 anteroposterior diameter of vertebral body
- At C6: < the width of C6 vertebral body

The yield of plain radiographs is low with only 20-50% of endoscopically proven bones detected.⁹ Therefore, if suspicion of foreign body remains high, a diagnostic endoscopy or computed tomography (CT) scan is indicated.

CT scan is superior to plain radiographs for localization and identification of foreign body. Sensitivity ranges from 90-100% while the specificity is 93.7%-100%.^{10,11} CT scan is also very useful in detecting complications e.g. abscess formation, mediastinitis or aortic/tracheal fistulas.

However, CT scan is probably not necessary for every cases, since only a minority (17-25%) of patients with foreign body sensation after eating chicken or fish have a bone present.¹²

An oral contrast imaging study e.g. barium swallow should not be performed because of risk of aspiration and contrast leakage in patients with perforation. Coating of the foreign body and oesophageal mucosa with contrast also interferes endoscopic visualization.⁵

In general, what is the management for patient with foreign body ingestion?

The majority (80-90%) of ingested foreign bodies pass spontaneously without any complications. Endoscopic intervention is required in 10 to 20%

of patients and surgical intervention is required in less than 1%.^{2,3,5,6}

The choice of treatment is guided by clinical condition of the patients, type of foreign body, location and degree of obstruction and the duration.^{13,14}

Unstable patient

Patients with airway compromise, drooling, intolerance to fluids, evidence of sepsis, perforation, or active bleeding are regarded as unstable.

Treatment should focus on airway management including endotracheal intubation followed by emergency endoscopy.

Stable patient

If the foreign body is identified during direct examination of the oropharynx or with help of direct laryngoscopy, it could be removed with McGill forceps. The success rate of removal by direct laryngoscopy at ED ranged from 58%-89%.^{15,16}

If the foreign body passed beyond the level of direct visualization, endoscopic examination and removal is indicated in patients with persistent symptoms even if the radiographic examination is negative.¹⁷

All foreign body in the oesophagus should be removed within 24 hours because delay decreases the chance of successful removal and increases the risk of complication.⁵

The risk for major complications e.g. perforation, retropharyngeal abscess and aorto-oesophageal fistula increases 14.1 times if the foreign body is impacted for > 24 hours in the oesophagus.¹⁸

Depending on types and size of foreign bodies, timing of endoscopy can be divided into emergency, urgent and non-urgent (Table 1).²

Timing of endoscopy for ingested foreign bodies
Emergent Endoscopy (preferably <2hr, at latest <6hr) <ul style="list-style-type: none"> - Esophageal Obstruction - Disk batteries in the esophagus - Sharp-pointed objects in the esophagus
Urgent (within 24hr) <ul style="list-style-type: none"> - Esophageal objects that are not sharp-pointed - Esophageal food impactions without complete obstruction - Sharp-pointed objects at or above the duodenum - Objects >6cm in length at or above duodenum - Magnets within endoscopic reach - Coins in esophagus (may be observed for 12-24hrs in asymptomatic patient)
Non-urgent <ul style="list-style-type: none"> - Objects in the stomach greater than 2.5cm diameter - Disk battery in stomach up to 48hours if asymptomatic - Blunt objects that fail to pass stomach in 3-4weeks

Table 1: Timing of endoscopy

Endoscopy is first-line intervention for removal of foreign body and is successful in more than 90% cases with complication rate less than 5%.¹⁹

Progress of patient

She was admitted to ward and an ENT specialist was consulted. Flexible laryngoscopy under local anaesthesia was performed. There was a large piece of chicken bone with meat lodged at proximal oesophagus at the level of cricoid which was then removed. (Figure 3)

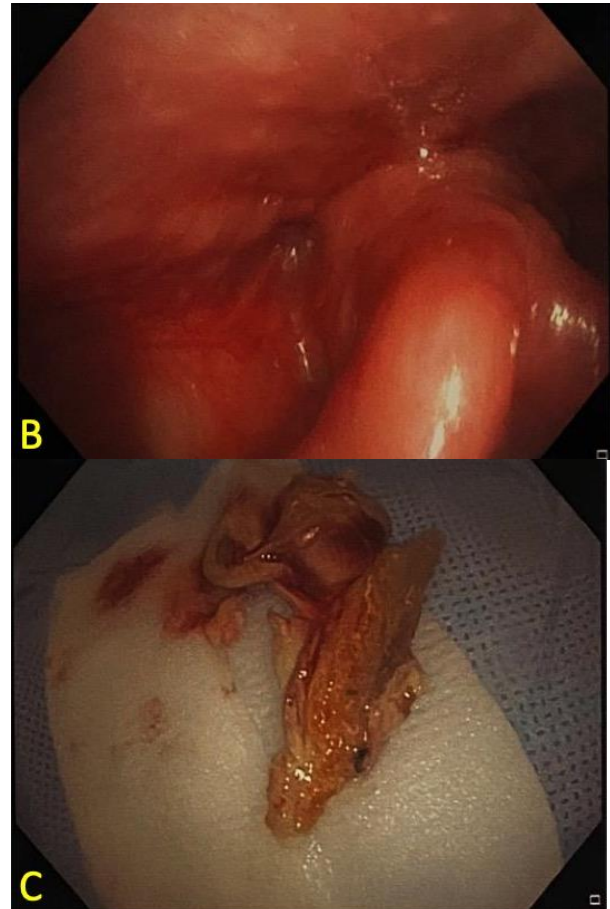


Figure 3: A: The impacted chicken bone; B: After removal of the chicken bone; C: The removed chicken bone

What are the potential complications of foreign body ingestion?

Most of the foreign bodies pass through the gastrointestinal tract spontaneously.² However, complications do happen occasionally and are directly related to the type of foreign body and the location of impaction.

The possible complications of FB ingestion include

- Mucosal injury e.g. abrasion or laceration
- Stricture formation
- Oesophageal perforation
- Traceoesophageal fistula
- Aortoesophageal fistula
- Retropharyngeal abscess
- Mediastinitis
- Pericarditis

What is the precaution if the patient swallowed (A) multiple magnets or (B) button batteries?

The risk of complications is much higher for both.

Button batteries

If impacted in the oesophagus, button batteries should be removed promptly. Contact of oesophageal wall with the poles of the battery creates electric current that cause thermal injury resulting in liquefaction necrosis due to generation of hydroxide ions at the negative pole.^{20,21}

Batteries less than 15 mm in diameter almost never lodge in the oesophagus.²² Once in the stomach, most button batteries passed out without complications. The risk of electrical burn in the stomach is low compared with those lodged in the oesophagus.²

Therefore, patient with button batteries in the stomach can be followed up with a radiograph every 3-4 days. 85% pass within 72 hours once the battery is beyond the duodenal sweep.²³

Endoscopic removal is indicated if

- The patient develops signs or symptoms of gastrointestinal tract injury
- The ingested battery is larger than 20 mm in diameter
- The battery remains in stomach for longer than 48 hours.

Multiple magnets or magnet with metal pieces

While a single, small smooth magnet will usually pass without complications, multiple magnets or co-ingestion with pieces of metal can create complications.

Tissue may become trapped between the

magnets causing pressure ischaemia and necrosis. This can result in fistula formation, perforation, obstruction, volvulus or peritonitis.²⁴ As a result, all magnets within endoscopic reach should be removed if possible.

What is the indication for surgery?

In general, the indications for surgical treatment include:

- Irretrievable FB
- Development of complications (e.g. obstruction, perforation)
- Non-progression of a foreign body
 - o A blunt object distal to duodenum that remains in the same location for more than 1 week.
 - o A sharp foreign body that does not advance radiographically for 3 consecutive days.

Oesophagotomy using different surgical approaches may be used depending on the location of the foreign body and patient comorbidities.¹⁷

- Left cervicotomy
- Minimally invasive right/left thoracoscopy
- Right / left thoracotomy
- Laparoscopy
- Laparotomy

Progress of patient

She was discharged on the same day after the endoscopy with analgesics and antibiotics. She recovered uneventfully.

Reference

1. A. A. P. Connolly, M. Birchall, G. P. Walsh-Waring, and V. Moore-Gillon, "Ingested foreign bodies: patient-guided localization is a useful clinical tool," *Clinical Otolaryngology and Allied Sciences*, vol. 17, no. 6, pp. 520–524, 1992
2. ASGE Standards of Practice Committee. Ikenberry SO, Kue TL, Andersen MA et al. Management of ingested foreign bodies and food impactions. *Gastrointest Endosc* 2011;73:1085-1091
3. Ko HH, Enns R. Review of food bolus management. *Can J Gastroenterol* 2008;22:805-808
4. Ngan JH, et al. A Prospective Study of Fish Bone Ingestion: Experience with 358 Patients. *Ann Surg*, 1990;11:459
5. Birk Michael et al. Removal of foreign bodies in the upper gastrointestinal tract in adults: European Society of Gastrointestinal Endoscopy (ESGE) Clinical Guideline. *Endoscopy* 2-16;48:489-496
6. Telford JJ. Management of ingested foreign bodies. *Can J Gastroenterol* 2005;19:599-601
7. Palta R, Sahota A, Bemarki A et al. Foreign-body ingestion: characteristics and outcomes in a lower socioeconomic population with predominantly intentional ingestion. *Gastrointest Endosc* 2009;69:426-433
8. Knight LC, Lesser TH. Fish bones in the throat. *Arch Emerg Med*. 1989;6 (1): 13-6.
9. Webb WA. Management of foreign bodies of the upper gastrointestinal tract. *Gastroenterology* 1998; 94: 204-16
10. Sugawa C, Ono J, Taleb M et al. Endoscopic management of foreign bodies in the upper gastrointestinal tract: A review. *World J Gastrointest Endosc* 2014;6:475-481
11. Liew CJ, Poh AC, Tan TY. Finding nemo: imaging findings, pitfalls, and complications of ingested fish bones in the alimentary canal. *Emerg Radiol* 2013;20:311-322
12. A Prospective Study of Fish Bone Ingestion: Experience with 358 Patients, Ngan JH, et al, *Ann Surg*, 1990;11:459
13. Fung BM, Sweeter S, Wong Kee Song LM, Tabibian JH. Foreign object ingestion and esophageal food impaction. An update and review on endoscopic management. *World J Gastrointest Endosc*. 2019;11(3):174
14. Eisen GM, Baron TH, Dominitz JA, Faigel DO, et al. American Society for Gastrointestinal Endoscopy: Guideline for the management of ingested foreign bodies. *Gastrointest Endosc*. 2002;55(7):802
15. Wong YT. Swallowed fish bone – a prospective study in AED. *Emergi-news* 1992;3(4):4-8.
16. Chiu HS, Chung CH. Management of foreign bodies in throat: an emergency department's perspective. *Hong Kong j.emerg.med*. 2002;9:126-130
17. Chirica, M., Kelly, M.D., Siboni, S. et al. Esophageal emergencies: WSES guidelines. *World J Emerg Surg* 14, 26 (2019)
18. Loh KS, Tan LK, Smith JD et al. Complications of foreign bodies in the esophagus. *Otolaryngol Head Neck Surg* 2000;123:613-616
19. Libanio D., Garrido M., Jacome F, Dinis-Ribeiro M., Pedroto I., Marcos-Pinto R. Foreign body ingestion and food impaction in adults: Better to scope than to wait. *United Eur. Gastroenterol. J.* 2018;6:974–980
20. Litovitz T, Schmitz BF. Ingestion of cylindrical and button batteries: an analysis of 2382 cases. *Pediatrics*. 1992;89(4 Pt 2):747
21. Gordon AC, Gough MH. Oesophageal perforation after button battery ingestion. *Ann R Coll Surg Engl*. 1993;75(5):362.
22. Yardeni D, Yardeni H, Coran AG, Golladay ES. Severe esophageal damage due to button battery ingestion: can it be prevented? *Pediatr Surg Int*. 2004;20(7):496.
23. Litovitz TL. Battery ingestions: Product accessibility and clinical course. *Pediatrics*. 1985;75(3):469
24. Centers for Disease Control and Prevention (CDC). Gastrointestinal injuries from magnet ingestion in children-United States, 2003-2006. *MMWR Morb Mortal Wkly Rep*. 2006;55(48):1296