

Chicken Bone Perforation “The Missing Link” in a Bemused Breathless Octogenarian-A Case Report of Endoscopic Revivification

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Abstract Esophageal perforation is a rare complication of foreign body ingestion. The most common foreign bodies causing esophageal perforation in adults are fish and chicken bones. We present the case of an octogenarian man with mild cognitive impairment presenting with respiratory complaints of dyspnoea and orthopnoea in the emergency room. He had hyponatremia induced confusion in addition to his mild cognitive impairment. The diagnosis for his clinical condition was not evident. Evaluation by imaging detected the "missing link" chicken bone as the cause of esophageal double perforation with mediastinitis and bilateral pleural effusion. Following multidisciplinary discussion, the minimally invasive endoscopic approach was decided as the definitive therapy. After medical stabilization in ICU, he underwent endoscopic retrieval of the foreign body followed by fully covered self-expandable metallic stenting. He recovered well and the stent removed after three weeks. Six months down the lane he is doing well and under neurology follow up for mild cognitive impairment. This clinical case shows the atypical, delayed perplexing presentation of esophageal foreign body in the elderly and the need for individualized treatment decision making for a successful outcome.

Keywords: *esophageal, perforation, chicken bone, cognitive impairment, endoscopy*

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1. Introduction

Esophageal perforation is a rare but potentially fatal injury of the digestive tract. Ingested foreign bodies are responsible for 80% of cervical perforations and 9- 35% of all esophageal perforations [1]. Among adult patients, fish and chicken bones are the most common causes of foreign body esophageal perforation.

Most foreign body ingestion occurs in children and adults with an underlying psychiatric disorder, substance abuse like alcoholism, developmental disorder, and neurological disorders with impaired gag reflex like Parkinson’s disease, stroke, and dementia [2].

As in our patient, foreign body esophageal perforation can have atypical presentation as well as a delayed diagnosis that can result in mortality that hovers around 20% [3]. For this reason, a high degree of suspicion for diagnosis is vital. The method selected for the treatment of esophageal perforation also plays an important role in the morbidity and mortality of these patients. We present the case of an octogenarian presenting with respiratory complaints. His cognitive impairment and acute confusional

state obscuring and delaying the diagnosis of the “missing link” chicken bone that caused esophageal double perforation.

2. Case Report

An 83 year old Indian man was received in the emergency room with complaints of breathlessness and orthopnoea for 2 days. He appeared confused at the presentation. He was a diabetic for the last 35 years with diabetic nephropathy on treatment and a history of mild cognitive impairment on neurology support.

On examination he was afebrile (temperature 97°F). He had a pulse of 94/min, BP-150/80mm of Hg, respiratory rate of 26/minute, Sao₂ 96% at room air. He had pallor and bilateral pitting pedal edema. System examination revealed decreased air entry in bilateral basal lung fields with deficit comparatively greater in the right lung base. He was conscious but confused and disoriented. No focal neurological deficits detected. ECG showed left ventricular hypertrophy, no ischemic changes. 2D echocardiogram demonstrated grade I LV diastolic dysfunction and thin pericardial effusion. His BNP level and Trop I came

normal. CXR showed bilateral pleural effusion. CT brain showed age-related atrophic changes. ABG showed compensated metabolic acidosis. His biochemistry screen showed normocytic normochromic anaemia (Hb 9.8gm%), leucocytosis ($19000/\text{mm}^3$) and blood sugar 220mg%, deranged renal function parameters (s. Creatinine 2.3mg%, B. Urea 72mg%, sodium 126 meq/dL and potassium 4.4meq/dL). Urine analysis showed proteinuria, glucosuria but was negative for ketones or nitrite. His procalcitonin was 10.8 ng/ml and CRP 288mg/L. The patient was admitted to ICU. Considering the differential diagnosis of pulmonary etiologies like evolving pneumonia, pulmonary edema, interstitial pulmonary disease, and pulmonary embolism he underwent HRCT chest. The contrast was not given because of diabetic nephropathy and acute renal dysfunction with hyponatremia. CT revealed mid esophageal anteroposteriorly placed foreign body with pneumomediastinum and bilateral pleural effusion. (Figure 1)

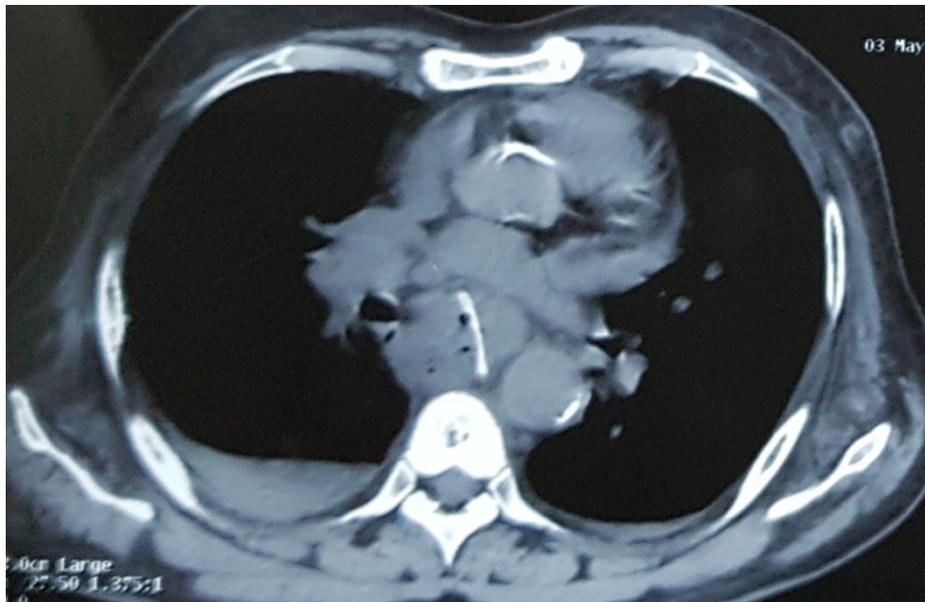


Figure 1. HRCT chest showing esophageal foreign body perforation with pneumomediastinum and bilateral pleural effusion

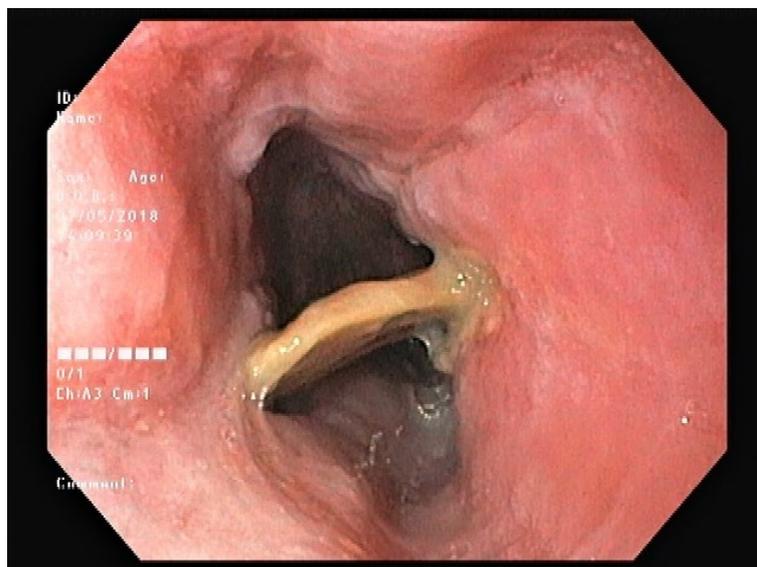


Figure 2. Endoscopy view of chicken bone impaction with double perforation from 26cm to 30cms from the incisors

He had no history of dysphagia, odynophagia, or chest pain but a history review with relatives revealed the fact that a week back he had a consumption of chicken biriyani, a popular Indian main course with bone-in chicken pieces. A gastrograffin study showed no contrast extravasation into the mediastinum. He was initiated on a conservative line of treatment with nil by mouth, broad antibiotic coverage of cefoperazone sulbactam, and metronidazole. Blood sugars, fluid, and electrolyte status were monitored and corrected. He underwent esophagogastroduodenoscopy, which showed a mid esophageal anteroposterior impacted bone fragment with double perforation (Figure 2).

The minimally invasive endoscopic approach was favored in this patient. The chicken bone was grasped with rat tooth forceps and the shallow penetrated end was visualized and grasped (Figure 3). An overtube helped in safe retrieval outside. The linear double perforation of about 40mm in length was inspected for any active bleeding or draining pus, which was absent. (Figure 4 & Figure 5)

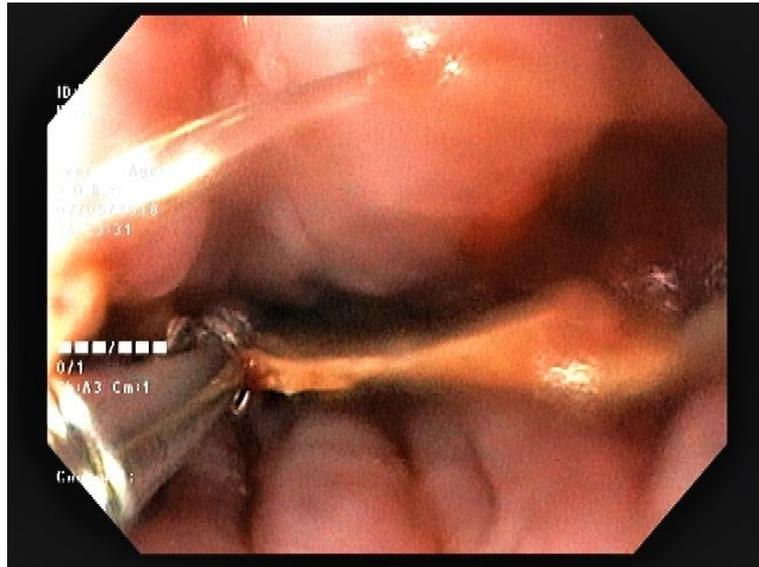


Figure 3. Rat tooth grasping forceps retrieval of chicken bone

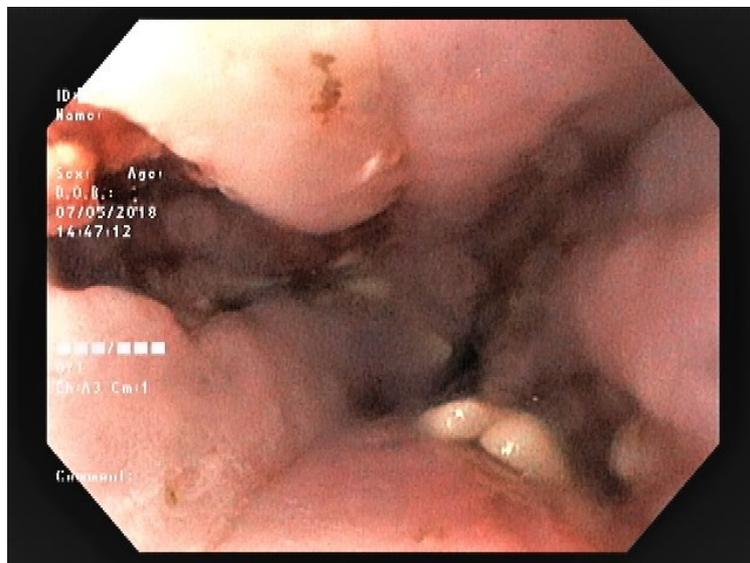


Figure 4. Linear double perforation seen after bone removal (Endoscopically 26cm to 30cm from incisor)



Figure 5. An almost square-shaped chicken bone piece (40x40mm) with sharp edges seen

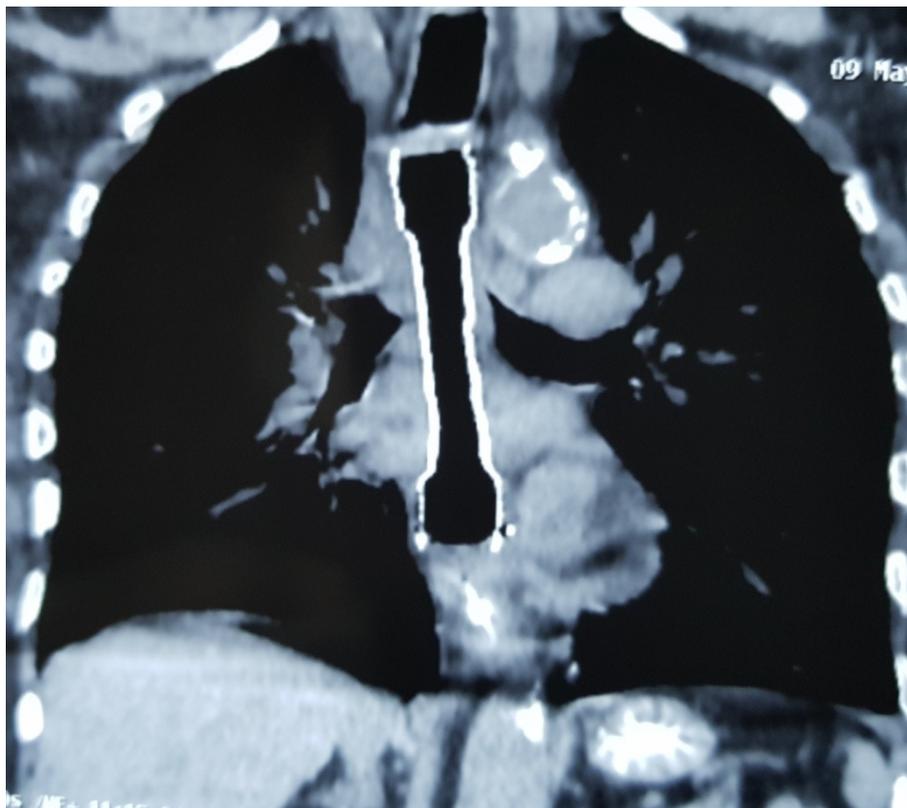


Figure 6. Fully covered SEMS in situ. Resolution of mediastinitis and pleural effusion can be noted by day 6

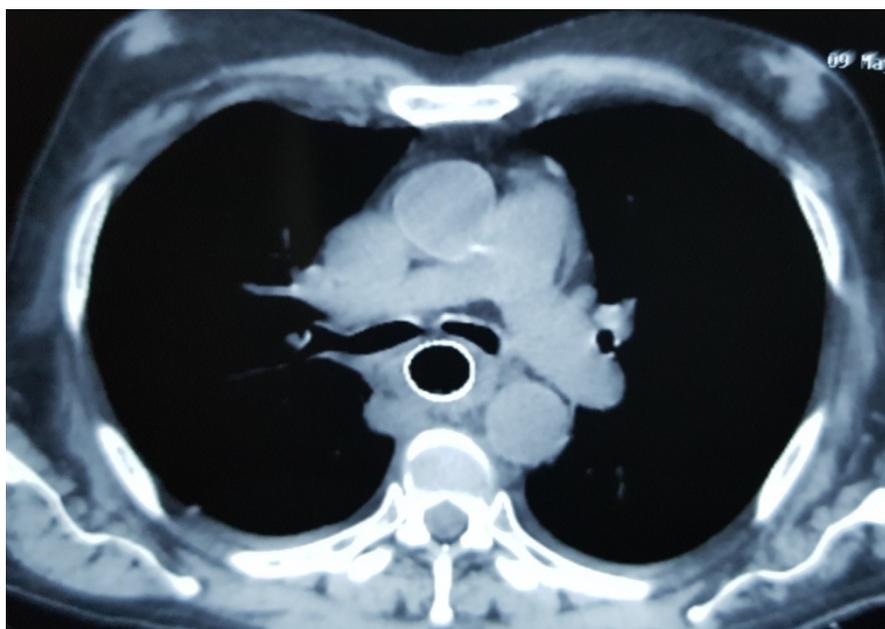


Figure 7. Bilateral pleural effusions and mediastinitis have resolved by day 6

A fully covered esophageal self-expandable metallic stent (FCSEMS) (Evolution Controlled Release Esophageal Stent System, Cook Medical, Winston-Salem, NC, USA) was deployed across the perforation. Oral contrast study the next day showed no leak or stent migration. By day 6, his total leucocyte count became normal. His renal function parameters returned to baseline. A plain CT chest was done on day 6, showed SEMS in situ, no contrast leak, no mediastinitis, or pleural effusion (Figure 6 & Figure 7).

The patient was discharged on day 7. He recovered uneventfully. The FCSEMS was removed 3 weeks later. Six

months down the lane, he has no related complaints. He is under neurology support for cognitive impairment and continuing his treatment for diabetes and diabetic nephropathy.

3. Discussion

Esophageal perforation can be iatrogenic, spontaneous, traumatic, or secondary to tumors. [4] A partially edentulous octogenarian with cognitive impairment presented with chicken bone esophageal perforation one week after ingestion. Persons with cognitive impairment may have a

reduced ability to chew hard food due to tooth loss. [5] Aging promotes loss of esophageal sensation and failed secondary peristalsis. Lasch et al demonstrated a lack of esophageal pain sensation to balloon distension in elderly compared to young in their study. [6] Aging is associated with reduced esophageal emptying with tertiary contractions, decreased contraction velocity, and duration. Structurally, with aging a reduction in myenteric ganglion cells, thickening of the smooth muscle layer, and a lymphocytic infiltrate of the myenteric plexus is seen even in the asymptomatic. [7] Weusten et al in their study noticed age-related alterations in cerebral potentials evoked by esophageal balloon distention. [8] These changes suggest aging induces altered esophageal neural function, afferent sensory transmission, and most certainly degeneration in central innervation.

In our patient, the chicken bone resulted in mid esophageal double perforation in a week. [Figure 4] Esophageal perforation by foreign bodies occurs by direct penetration, impaction and pressure necrosis, chemical tissue necrosis, or during endoscopic manipulation. One-third of cases of the perforated esophagus have an atypical presentation. Literature reports presentation of esophageal perforation as retropharyngeal abscess, periesophagitis, periesophageal abscess, mediastinitis, thyroid abscess, vascular complications such as aorto-esophageal fistula, innominate esophageal fistula, and carotid rupture. [9] Each presentation of esophageal perforation needs individualized treatment. The definitive treatment approach is decided by type, location, size, and margins of the defect; the time interval to diagnosis; underlying esophageal disease; and the overall health status of the patient. In our case, a minimally invasive endoscopic approach was favored against surgery or combined hybrid approach because the perforation was by far confined to the mediastinum, no draining perforated cavity or collection present, absent systemic complications of perforation and octogenarian with performance status ECOG 3 indicating a poor surgical candidacy. We used FCSEMS to cover the double perforation. FCSEMS or partially covered (PCSEMS) diverts esophageal contents away from the perforation site thus promoting tissue growth and epithelialization, facilitating the resumption of oral nutrition, and faster recovery. [10] A recent systemic review noted 91.4% technical success and 81.1% clinical success in a total of 340 patients from 27 case series. [11] Stents are typically left in place for 2-4 weeks before endoscopic removal. Complications are embedment of PCSEMS, failure in larger perforations, and clinical failure of stent placement in defects that cross the gastroesophageal junction. Our case highlights the need for higher degree of suspicion in the emergency for diagnosis of esophageal perforation in elderly. A diagnostic delay more than 24 hours in esophageal perforation does not always preclude

a poor prognosis. There is a greater shift towards minimally invasive treatment strategies for esophageal perforation now. Non-operative procedures like temporary esophageal stenting, percutaneous approach to drainage of collections, esophageal clips, and esophageal sponge are some of the minimally invasive approaches in the forefront of this paradigm shift. Algorithms for esophageal perforation guide physicians in treatment but careful evaluation of each patient is mandatory for treatment decision making.

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