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Esophageal Foreign Body Of Allium Sativum Induced Corrosive Pharyngeal And Esophageal Injury

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Abstract

Background: *Garlic (Allium sativum) esophageal foreign bodies are rarely reported. The acidic nature of garlic is able to cause corrosive injury to the esophageal mucosa and leads to esophageal perforation. A good understanding of the clinical evaluation and management options for garlic esophageal foreign bodies will improve outcomes and reduce the risk of complications.*

Purpose: *To report a rare case of garlic esophageal foreign body with pharyngeal and esophageal mucosa complications.*

Case Report: *A 50-year-old man complained of a lump in his throat after swallowing garlic without chewing 12 hours before going to the hospital. The patient vomited every time he took meals. The patient also had a mass in his nape since 15 years ago, making extending his neck difficult. The patient was scheduled for a rigid esophagoscopy with better preparation. The patient admitted no longer having any lump sensation four days after being treated. Transnasal esophagoscopy examination found multiple lesions at pharynx and esophagus.*

Treatment: *Proton pump inhibitor therapy, steroid, and antibiotics.*

Conclusion: *Medical management was performed after symptoms disappeared and confirmed by flexible esophagoscopy. The patient was given proton pump inhibitors, steroid, and antibiotics (levofloxacin and metronidazole). The patient did not experience any complaints of swallowing dysfunction six days after discharged.*

Keywords: *Esophageal foreign body, garlic, esophagitis, Allium sativum.*

INTRODUCTION

Esophageal foreign bodies (EFBs) are commonly found in 4% of cases of diagnostic and therapeutic endoscopic emergencies.[1] Esophageal foreign body is any object that should not be in and is stuck in the esophagus.[2] Impaction of EFBs is defined as swallowed foreign object or food bolus that causes symptoms of esophageal obstruction such as foreign body sensation, vomiting, acute dysphagia, and inability to swallow saliva.[3] Structure abnormality like eosinophilic esophagitis or Schatzki ring commonly found in adults, causing impaction.[2] Diagnosis can be made clinically and radiologically. CT scan can be performed for suspicion of esophageal perforation.[4]

The most common esophageal foreign bodies are whole meat with incidence of 13/100.000 individuals in Western countries, while fish bone is the most common in Asia.[5] Sharp foreign objects can lodged in palatine tonsils, tongue base, pyriform sinus, vallecula, and esophagus.[6] Esophageal foreign bodies were recorded as many as 1499 cases in 12 teaching hospitals in Indonesia from January 2011 to December 2015 with gender characteristics of 944 cases in men and 254 cases in women. Types of organic EFBs found were meat in 271 cases (51%), bones in 184 cases (35%), and meatballs in 24 cases (5%), while inorganic EFBs included coins in 481 cases (49%), dentures in 295 cases (30%), and batteries in 14 cases (1%).[7]

Esophageal mucosa erosion, bleeding, and perforation can occur in EFBs treated late because esophagus is located in the posterior mediastinum, adjacent to important structures such as the aorta, trachea, and heart. Severe secondary complications occur due to pharyngeal wall perforation, deep neck abscess, mediastinal abscess, aortic-esophageal fistula, pseudoaneurysm rupture, respiratory distress due to tracheoesophageal fistula, and pericardial effusion. Predisposing factors for complications include type, size, sharpness, consistency, time of exposure

exceeding 24 hours, mental disorders, and diabetes mellitus. Solid and sharp EFBs cause 90% more esophageal perforation than soft and blunt EFBs.[1, 6]
Endoscopic therapy success decreases if EFBs impaction is more than 24 or 72 hours and complications risk increases two to seven times. The degree of complications can be reduced by precise and timely EFBs removal.[1]
Time of impaction and concentration of corrosive substances affect tissue damage. Esophageal foreign bodies such as batteries can cause mucosal lesions within one hour, lesions reaching the muscle layer within two to four hours, and esophageal perforation within eight to twelve hours. Esophagus has a narrower lumen than the pharynx, this made the extent of injury more severe caused by increased contact time with the foreign body.[8]
Alkali and acid have the potential to damage tissue. Acids are able to create scar tissue over necrosis area, making it difficult to penetrate deeper layers. Gastric acid cannot neutralize acids in foreign objects, resulting in mouth, esophagus, stomach, and intestines lesions. Alkalis can mix with proteins in tissue to form proteinates which leads to necrosis and reach deeper tissues. Alkalis can also cause thrombosis.[8]
Eleven patients underwent esophageal perforation surgery due to EFB of garlic from January 2016 to December 2018 recorded in Iran. All cases were caused by consuming raw garlic without drinking water as a treatment or prevention for hypertension or hyperlipidemia. In all but one case, symptoms began within 24 hours after garlic consumption. The symptoms that appeared were chest pain and dysphagia.[9] There have been only two case reports of esophagitis due to swallowing whole garlic in other reports in Turkey.[10] Topical application of garlic as a herbal medicine is probably more common in the population, therefore garlic corrosive injuries may be rare.[11]
This paper aims to report one case of EFB of *Allium sativum* which caused corrosive injury in the pharynx and esophagus as complication.

CASE REPORT

A 50-year-old man with a lump sensation in his throat after swallowing garlic without chewing since 12 hours ago on. He also felt something stuck in the throat. The patient is used consuming garlic to control blood pressure. The patient also vomits every time he take meals. The patient also has mass in his nape since 15 years ago, making it difficult for the patient to extend his neck.
At physical examination, we found mass at posterior neck with dimension 7 x 6 x 2 cm extends to occipital area with limited neck extension. (Image 1).

Figure 1. (Left) Patient. (Middle) Posterior neck mass. (Right) Optimal extension.

Cervical X-ray showed narrowing of the intervertebral disc space at cervical vertebrae 1-2, 2-3, 3-4, 4-5, 5-6 accompanied by anterior syndesmophytes of cervical vertebrae 1-6 bridging which could be ankylosing spondylitis. Chest X-ray showed lung inflammation. (Figure 2).

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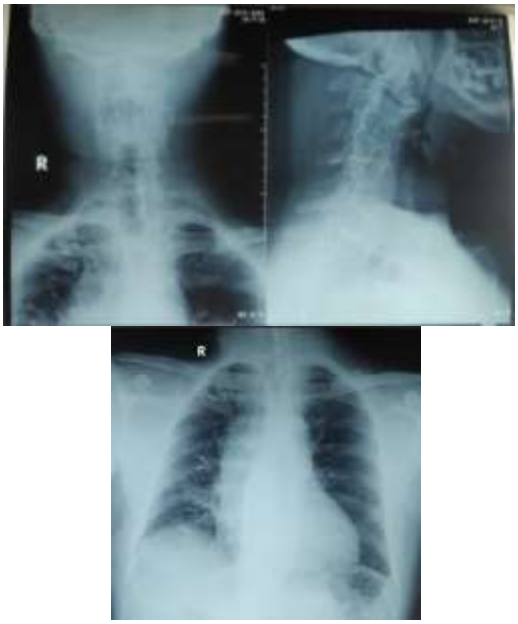

Figure 2. (Above) *Intervertebral disc space* narrowing in all cervical vertebrae. (Below) Lung inflammation.

Laboratory examination found increased liver function (SGOT 76 mg/dL and SGPT 69 mg/dL) with reactive hepatitis B serum antigen (HBsAg).

The patient was diagnosed with chronic hepatitis B without acute liver failure or cirrhosis from internal medicine. Liquid requirements were given with 1650 mL every 24 hours, carbohydrate 1155 calories every 24 jam (Triofusin E 1000 mL), fat 495 calories every 24 jam (Clinoleic 20% 500 mL), and protein 249,5 calories every 24 jam (Kalbamin 500 mL). The patient was also given Candesartan 16 mg every 24 hours by cardiologist.

Pulmonologist was consulted to determine pneumonia suspicion. The patient was given antibiotics with levofloxacin 750 mg every 24 hours, metronidazole 500 mg every 8 hours, N-acetylcysteine 200 mg every 8 hours, and chest physiotherapy.

Based on clinical history and physical examination, the patient was diagnosed as suspicious esophageal foreign body of garlic. Foreign body extraction was not performed in ER operating room because the patient could not extend his neck. Patient was hospitalized with nil per os (NPO) while waiting for esophagoscopy with better preparation.

On the fourth day, patient suddenly didn't feel any lump sensation in his chest and did not vomit after swallowing, patient planned to undergo flexible esophagoscopy. Nasopharynx appears edematous, hyperemic, ulcerative with bleeding points. Oropharynx shows edematous and hyperemic at posterior wall, edema at lingual tonsil also found. (Figure 3).

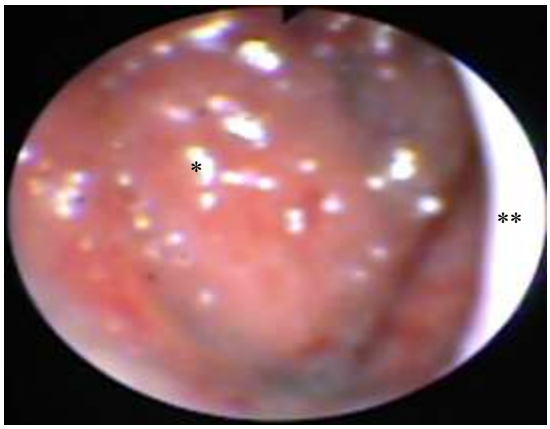

Figure 3. Right nasal cavity endoscopy examination. *Nasopharynx edema and hyperemic. **Nasal septum.

We also found edema and hyperemia at epiglottis, with the ulcer or granulation at 5 and 7 o'clock. Right and left arytenoids are severely edematous, right and left pyriform sinuses are narrow. Ventricular folds are edematous, hyperemic, and ulcers, with the granulation on both sides. Right and left vocal cords are mildly edematous, slightly hyperemic, and symmetrical movement (Figures 4 and 5).

Figure 4 *Edema and hyperemia at epiglottis. **Edema at lingual tonsil

Figure 5.
*Arythenoid edema. **Ventricular fold edema, hyperemia, and ulcer. ***Vocal cords edema and hyperemia.

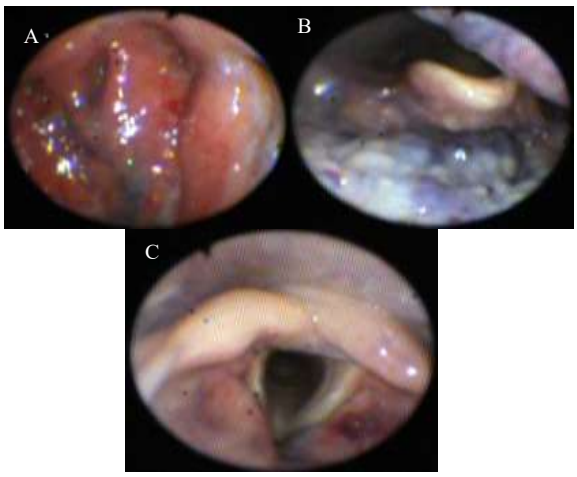

Figure 6 Endoscopy evaluation after therapy. (A) Edema and hyperemia at nasopharynx reduced. (B) Edema at epiglottis dan lingual tonsil reduced. (C) Edema at arytenoid and ventricular fold diminished.

Flexible esophagoscopy was performed. We found narrow cricopharynx. edema and hyperemia at esophageal mucosa. We also found plaque lesion at 5 to 8 o' clock without bleeding point. Gaster was found at 45 cm from upper teeth line, with edema impression at rugae. As for conclusion, from transnasal esophagoscopy we found multiple lesion as mentioned above, no foreign body was found, and rigid esophagoscopy was cancelled. Patient was given additional therapy of intravenous dexamethasone 5 mg every 8 hours and omeprazole 20 mg every 12 hours.

Seventh days after admission (three days after additional therapy), patient shows no symptoms of odynophagia and endoscopic evaluation was performed. Edema and hyperemia at nasopharynx was reduced, we also found discharge at nasopharynx. Lingual tonsil edema was reduced, but posterior wall of oropharynx still edema. Edema at epiglottis, arytenoid, and ventricular fold reduced, lesion at epiglottis declined, slight edema and hyperemia at vocal cord, and both pyriformis sinus overt (Figure 6).

Patient was discharged after endoscopic evaluation with continuing therapy of dexamethasone 0,5 mg every 8 hours dan omeprazole 20 mg every 12 hours for 7 days. Patient also advised to chew garlic properly and planned to follow up 7 days after discharged but refused because he was working overseas. Follow up was taken by phone and the patient admitted no symptoms.

DISCUSSION

Esophageal foreign bodies were more frequently found in males (944 out of 1499 cases) with the most frequent age range being under ten years old (568 cases) in twelve teaching hospitals in Indonesia from January 2011 to December 2015. The type of organic EFBs most frequently found was meat, with 271 cases (51%).[7] Duration of foreign body impaction increases the risk of complications fourfold if the extraction is performed more than 24 hours from onset compared to extraction at onset of less than twelve hours.[12]

In this case, a 50-year-old man with EFB of *A. sativum*. Organic esophageal foreign bodies in adults are mostly meat, but in this case, garlic was found. The type of foreign body in this case was not common based on the literature because patients, in general, rarely consume garlic. The case of garlic being swallowed whole is based on superstition belief that garlic is more effective when swallowed whole. The garlic's large size causes blockade in esophagus. The type of foreign body (organic) and the impaction time in this case exceeded 24 hours, causing complications, both of which are similar with literature.

Garlic corrosive injury have been reported in the literature only a few cases. Almost all reported cases involve skin damage. The first report in the literature dates back to 1987 when a mother applied crushed garlic to her daughter's feet to treat diarrhea and fever.[13] Publication of garlic EFB was recorded in two case reports in Turkey in 2012 and 2013. Garlic was seen in the proximal esophagus during endoscopy and then was pushed into the stomach. Esophageal mucosa appeared edematous, fragile, and superficial erosion 2.5 cm at the proximal esophagus in the first case. Endoscopic findings in second case showed fragile esophageal mucosa, edema, and superficial ulcer at proximal esophagus.[10] Our endoscopic findings showed multiple lesions in the form of edema, hyperemia, and ulcers on the pharyngeal and esophageal mucosa. Lesions in the esophagus are in accordance with both cases in Turkey, but no lesions were found in the oropharynx at those reports.

The diagnosis of corrosive injury is usually based on clinical and physical examination. A chronological history of contact with a potential causative agent and the onset of symptoms helps establish the diagnosis. Histopathological examination of the lesion and surrounding tissue is rarely performed unless the diagnosis based on the history is difficult to establish or there is suspicion of malignancy. Histopathology of the lesion shows localized areas of coagulative necrosis of the epithelium, ulceration, intra- and extracellular edema, and acute inflammatory cell infiltration.[14]

Garlic belongs to *Liliaceae* family. Raw allium sativum has a pH of 6.42, but if heat-treated at 40° C for five days, the pH will decrease to 5.94.[15] The components of *A. sativum* consist of water (65%), carbohydrates (28%), organosulfur compounds (2.3%), alliinase protein (2%), arginine amino acid (1.2%), and fiber (1.5%). The active components of *A. sativum* are organosulfur compounds consisting of diallyl thiosulfate (allicin), diallyl sulfide (DAS), diallyl disulfide (DADS), diallyl trisulfide (DATS), ajoene, S-allyl-cysteine (SAC), and S-allyl-cysteine sulfoxide (alliin).[16] These active components are reported to reduce the risk of diabetes, cardiovascular disease, activate the immune system, antimicrobial, antifungal, anti-aging and anti-cancer properties.[17]

Allium sativum may cause a caustic effect on esophageal mucosa due to its acidic pH content.[10] Other side effects in sensitive individuals can provoke a type IV hypersensitivity reaction resulting in contact dermatitis. Allicin, DAS, and allyl propyl disulfide are thought to cause such reactions, especially DAS which is the strongest sensitizer. These components are sensitive to heat because side effects have only been recorded in raw *A. sativum*.[18, 19] Allicin causes acantholysis based on in vitro studies, disrupts cysteine protein metabolism at the epidermal junction, and causes coagulation necrosis.[13] Other factors such as the concentration and freshness of *A. sativum*, duration of exposure, body parts contact, pre-existing skin conditions, and individual sensitivity also influence the formation of corrosive injury.[18,19]

The use of antibiotics for corrosive injury ingestion is still debated in some consensus. A survey by the World Society of Emergency Surgery, respondents believed that antibiotics can be given to all patients (34% respondents), as surgical prophylaxis (32% respondents), and depending on the severity of the wound (34% respondents).[20] Broad-spectrum antibiotics can be used if there is an infection or perforation and lung involvement in other studies. In pediatric patients, antibiotics can be given for third-degree wounds.[21,22] Another indication for the use of broad-spectrum antibiotics is if steroids was given. [22] In this case, the lesion was in accordance with the characteristics of a grade II A wound according to the Zargar classification. We gave fluoroquinolone (levofloxacin) and nitroimidazole (metronidazole) groups due to suspicion of aspiration pneumonia, this is in accordance with the literature.

World Society of Emergency Surgery stated that 45% of respondents did not give steroids, while 25% gave steroids, and 30% recommended giving steroids to severe wounds. Although it has not been proven clinically, the theoretical basis for giving steroids to this group is to reduce collagen formation through changes in the fibronectin and cytokine pathways that reduce the risk of stricture formation.[20] A meta-analysis of 572 adult patients with corrosive ingestion found no difference in the incidence of esophageal stricture formation between patients with second- and third-degree corrosive injury.[21] Steroids did not affect stricture prevention in a meta-analysis studies between 1991 and 2004 and 1956 to 2006, especially in third degree esophageal corrosive wounds. Steroids may be given to patients with airway involvement. [22] This patient was given an intravenous dexamethasone 5 mg / 8 hours and after a follow-up six days after discharge from the hospital, the patient stated there were no difficulty in swallowing.

Proton pump inhibitors reduce gastric acid secretion, thereby reducing gastroesophageal reflux which can worsen corrosive injury. Proton pump inhibitors have also been shown to have anti-inflammatory and antioxidant properties.[23] A prospective study from Turkey in 13 patients showed that the use of omeprazole 80 mg loading dose followed by 8 mg / hours for 72 hours can be used for the treatment of acute corrosive esophageal ulcers.[24] Pantoprazole usage with the same dose was also shown to accelerate mucosal healing in a study of 55 patients with esophageal corrosive wounds in another study in India.[23] Two case reports of esophagitis due to *A. sativum* have been reported in Turkey in 2012 and 2013. Therapy consisted of lansoprazole 30 mg every 12 hours, sucralfate every 6 hours, and a liquid diet in these cases. Symptoms disappeared within three and five days and esophagoscopy showed no lesions in the esophagus during a check-up 4 weeks later in both reports.[11] The medications given in this case were appropriate with cases from Turkey. Evaluation should have been done with endoscopy, but the patient did not come for follow-up. Evaluation was done with remote communication by telephone and patient was symptoms free.

CONCLUSION

We reported a single case of pharyngoesophageal corrosive injury due to an esophageal foreign body of *A. sativum*. The patient received proton pump inhibitor, steroids, and antibiotics (levofloxacin and metronidazole) with no symptoms on swallowing function.

DISCLOSURE

No conflicts of interest.

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