Case Report

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The Use of Intravenous Nitroglycerin During Endoscopic Removal of Sharp Esophageal Foreign Body: A Case Report

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Abstract

Background: Esophageal spasm is a common problem after Foreign Body Ingestion (FBI) and causes difficulties for foreign bodies' removal by endoscopic intervention. Sometimes, medication may help relieve spasms and facilitate the removal of a foreign body. In the current study, we introduce a patient with esophageal spasm due to FBI for whom intravenous nitroglycerin was used to treat the spasm.

Methods: The patient was a 48-year-old man who was admitted to emergency department of Shohadaye Tajrish academic Hospital, Tehran, Iran due to FBI and following sever mid-anterior neck pain, nausea and drooling. His vital signs were normal and during endoscopic procedure, we noticed a sharp object attached to the wall of the upper third of the esophagus, causing severe spasm. After trying for an hour to remove the glass under general anesthesia, we were not able to remove it. Finally, intravenous nitroglycerin was used to relieve the spasm and it was easily removed after 2 minutes.

Conclusion: Due to inconsistencies in the clinical results of nitroglycerin, and as notable lack of studies are investigating the effectiveness of the intravenous method, we aimed to share our successful experience.

Keywords: Anesthesia, Eating, Foreign bodies, Nitroglycerin

Introduction

Foreign Body Ingestion (FBI) is a relatively common problem that occurs mostly in children between the ages of 6 months and 6 years (1). In adults, FBI is usually accidental, and in most cases, it is observed in the elderly, patients with psychological problems, mentally retarded patients and alcoholics. In prisons, intentional and repeated ingestion of foreign bodies is common. Complications associated with foreign bodies in adults are usually more dangerous than children and cause more mortality (2-4). Common places for foreign object clamping are usually physiologically narrow parts of the esophagus (1-4). In approximately 80-90% of cases, the foreign body passes away from the gastrointestinal tract without any intervention and in only 10-20% of the cases, it requires emergency endoscopy and in less than 1%, surgery is required (5).

Endoscopy is the preferred method in cases of FBI and is also used as a diagnostic and therapeutic method. If a complete obstruction occurs via sharp objects, clamping of a foreign object in the upper third of the esophagus, or button batteries, emergency endoscopy should be performed without delay, regardless of whether the stomach is full or not. In the case of esophageal rupture or cocaine pack ingestion, endoscopy is not recommended (6).

Considering the rare but dangerous complications that can occur following the FBI, each foreign esophageal object must be removed within the first 24 hours after swallowing (1). The prognosis of untreated foreign body may be catastrophic due to possible complications. Complications associated with FBI include mucosal ulceration, esophageal perforation, adjacent vascular trauma, mediastinitis, complete esophageal obstruction, aortoesophageal fistula, pseudoaneurysm, paraesophageal abscess and pneumothorax. Esophageal perforation can be very dangerous and even life-threatening (3,4).

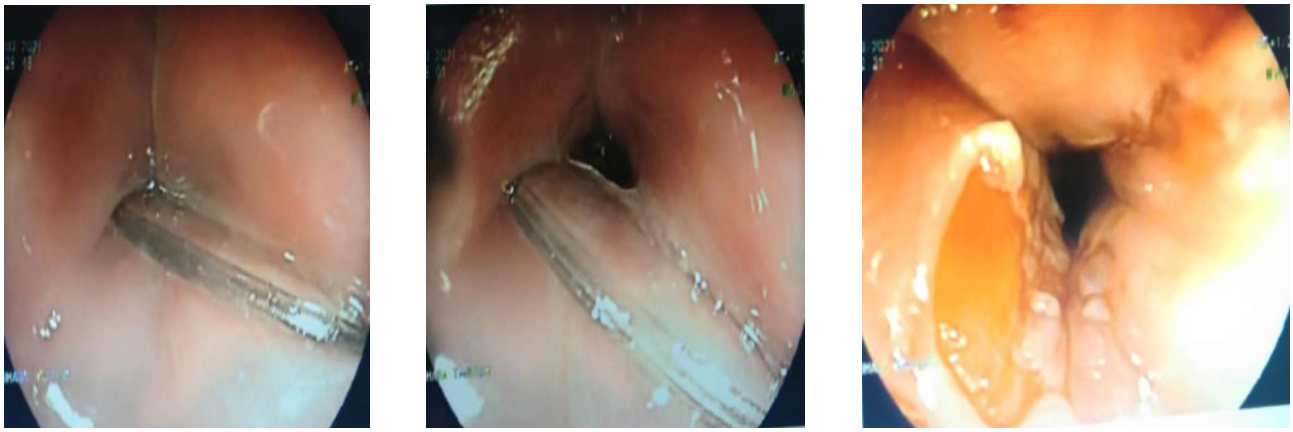
Case presentation

A 48-year-old man with severe pain in the middle of the neck, swallowing discomfort, drooling and nausea without vomiting referred to the emergency room. After taking a history, anterior-posterior and lateral view radiographs of chest and neck were performed that showed a normal pattern and with probable diagnosis of a foreign object in the esophagus, he was a candidate for emergency endoscopy by the gastrointestinal service. The patient had a gradually increasing pain in the neck area about 18 hours prior to referring to the emergency room after eating roast chicken.

The patient had no history of a specific illness, drug use, and no psychological problems. Vital signs were normal and tenderness was sensed in the middle of the neck. Oropharynx examination was normal and the patient was fasting for 12 hours. The decision was to perform an endoscopy under sedation. After transferring the patient to the endoscopic ward, the initial evaluation of airway examination was normal. The patient was monitored by EKG, pulse-oximetry and NIBP. An 18G Intravenous (IV) catheter was fixed on the right hand. Oxygen was inserted with 3-5 *lit/min* flow for the patient through the nasal channel. The patient was sedated with 2 *mg* of Midazolam, 0.5 *mg* of Atropine, and 100 μg of intravenous Fentanyl. After entering the endoscope, we noticed a piece of irregular and sharp glass that was stuck horizontally on both sides of the esophagus on the surface of the aortic arc. The glass object caused moderate stenosis, edema, moderate inflammation and esophageal spasms. Firstly, the endoscopy failed to remove the foreign object. Despite deepening the sedation with Propofol in intravenous infusion and intravenous Hydrocortisone injection and efforts to reduce wall edema and remove esophageal spasms, we failed to remove the glass and had to increase the dose of Propofol to 75 $\mu g/kg/min$ with breathing control. One hour after beginning the procedure, following failure to remove the foreign object and intensifying esophageal spasms after manipulation despite sufficient depth of anesthesia, the patient was injected 100 μg Nitroglycerin (TNG) intravenously to reduce esophageal spasm and about 2 minutes later, the object was removed with a significant reduction in esophageal spasm. Finally, 5 *ml* Epinephrine 1.200000 was injected locally and the patient was admitted to the gastrointestinal ward for 24 hours and discharged with a healthy situation (Figure 1).

Discussion

FBI or food impaction is relatively common and is one of the most challenging cases in emergency



A B C

Figure 1. A: Before TNG, B: Two minute after TNG, C: After the removal of FB.

departments. Diagnosis in most cases is based on history and examination and often does not require radiological examination. Adults can provide a more complete history and localize the area where they feel uncomfortable more than children, although in all cases this localization is not accurate.

Symptoms in adults include retrosternal pain (78%), odynophagia (43.4%), dysphagia (48%), nausea or vomiting, and children complain more about the feeling of suffocation (2,6). Symptoms may not occur immediately after swallowing the foreign object and may manifest themselves delayed and causing complications (1). Complete obstruction of esophagus can lead to excessive increase in saliva secretion and aspiration and intolerance of secretions. Complete long-lasting esophageal obstruction can lead to tachycardia and hypoxia (1,6). On examination, we may see erythema and edema and cervical tenderness. In cases of perforation in the upper regions, there may also be signs of emphysema in the examination (2-6). Younger children and patients with mental disorders often cannot provide accurate history and it is necessary to include foreign object swallowing in differential diagnosis lists in cases that the patient presents with the above symptoms (1-6).

The esophagus is about 25 cm longitudinal and usually there is physiological narrowing in 4 regions, where food impaction occurs in most cases. In 75% of the cases, the foreign object is stuck on the surface of the cricopharyngeus muscle. Although in most cases the examination and history are sufficient for diagnosis, radiological examination can be very beneficial in certain cases, including swallowing metal objects or examining pneumoperitoneum or pneumonia (1,6).

Generally, the first step of examination is simple Anterior-Posterior or Lateral chest radiology. Simple radiography usually has low success in the diagnosis of bone, glass and wood, and if there is a strong clinical suspicion, other imaging methods can be used. In a study conducted in 59% of children and 47% of adults, simple radiography failed to detect foreign objects. False-positive cases have also been reported in simple radiology due to stylohyoid ligament calcification or styloid appendages (1). In cases that the radiography is negative but there is strong clinical suspicion or there is a need for careful examination of pneumonia, a CT scan is a better option. The overall sensitivity of CT is 90 to 100% (specificity from 93.7 to 100%) (1). CT scan can determine the shape, size, number, and exact location of the foreign object and possible complications.

Conclusion

Evaluation of the patient's airway is the first step in managing patients with foreign object swallowing. Patients with respiratory distress or inability to tolerate high secretions who are at risk of aspiration should undergo tracheal intubation. Endoscopy is the most commonly used method for diagnosis and treatment of esophagus foreign object, which simultaneously allows examining the esophagus in terms of underlying pathology or other possible

problems or complications. Endoscopy can be performed using local anesthesia and mild sedation or even general anesthesia, depending on the available facilities and the patient's condition. We immediately check the patient in terms of the airway and respiratory status and prepare the necessary equipment for the difficult airway administration. In non-emergency cases, the patient is usually monitored and often the foreign object is excreted and if necessary, the patient is kept fasting for 6 to 8 hours and then we choose the type of anesthesia according to the patient's condition. Moderate intravenous sedation is often used in adult patients, which was used in our case, but due to failure to remove the foreign object, the depth of sedation increased and finally the patient received general anesthesia with spontaneous breathing. General anesthesia with endotracheal tube insertion is recommended in patients with higher risk of aspiration, children, non-cooperative patients and patients with mental disorders.

In cases of bolus impaction, several pharmacological methods and treatments have been used and there are various reports with conflicting results that have not been so promising (7-10). Currently, the consensus is that medications should not postpone endoscopy if necessary. One of the proposed methods is the use of carbonated beverages, which due to the creation of CO2 gas can squeeze the bolus impact downwards. However, this method should be avoided in cases of complete obstruction due to the risk of aspiration (7-9). Hyoscine, Benzodiazepines and calcium channel blockers and Glucagon are other drugs that have been tried to reduce esophageal spasm and help the passage of stuck food through the esophagus (7).

Nitroglycerin is one of the drugs that has been published in the report of use. Nitroglycerin, as a vasodilator, is commonly used in acute coronary syndrome, acute pulmonary edema, and hypertensive creases. Metabolites derived from nitroglycerin metabolism can cause smooth muscle relaxation and this property has been utilized to relax the smooth muscles of the esophagus and relieve esophageal spasms, which in some reports has had promising results (7,8). Some researchers believe that oral nitroglycerin is preferred over sublingual and intravenous since it is inserted precisely in place to take effect and there is no need to create a high blood level of the drug. In most of the available reports, oral nitroglycerin has been used to relax the esophageal muscles (7). In this case, when endoscopy failed to remove the stuck glass object due to esophageal spasm, considering the patient's unconsciousness and the impossibility of oral nitroglycerin administration, we used intravenous nitroglycerin to remove the spasm. About 2 minutes after the injection, the spasm of the esophagus was resolved, which was quite evident in endoscope view and the endoscopist was able to successfully remove the foreign object. Due to inconsistencies in the clinical results of nitroglycerin, and as notable lack of studies are investigating the effectiveness of the intravenous method, we aimed to share our successful experience.

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Conflict of Interest

None.

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