



One Case of Esophageal Obstruction Caused by Enteral Nutrition

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Abstract: We report a case of complete esophageal obstruction caused by continuous enteral nutrition infusion via nasogastric tube. A 77 year old man received mechanical ventilation due to severe pneumonia and severe respiratory distress. He began using enteral nutrition emulsion (TPF) through a nasogastric tube on admission. 15 days later, due to the difficulty of re-inserting the nasogastric tube, endoscopy found a large number of coagulations in the esophagus, resulting in complete esophageal obstruction. We remove a small part of the foreign body with a net basket under gastroscop. After the operation, the nasogastric tube was placed in the middle of the esophagus again, which was perfused with 5% sodium bicarbonate and vinegar through the gastric tube. One week later, the esophagus was completely unobstructed by gastroscopy. A conclusion can be drawn that the precipitation and coagulation of TPF can lead to the whole esophageal obstruction. Endoscopic removal of foreign bodies, sodium bicarbonate and vinegar retention in the esophagus can treat the food obstruction caused by TPF.

Keywords: TPF, gastroduodenoscopy, enteral nutrition, esophageal obstruction, sodium bicarbonate, vinegar

1. Introduction

Studies have shown that early enteral nutrition support treatment can reduce the severity of disease, reduce the risk of complications, shorten the length of ICU stay, and improve the prognosis of critically ill patients; and it is suggested that it should be implemented within 24-48 hours of admission^[1-2]. However, the incidence of gastrointestinal dysfunction in critically ill patients with enteral feeding intolerance is 30% - 70%, which depends on admission diagnosis, pre-disease status, drugs, ventilation mode and nutritional status^[3]. The foreign body should be removed as soon as possible after the formation and obstruction of the esophagus caused by the coagulant of nutrient solution. Biopsy forceps, foreign body forceps, snares and stone baskets are often used to remove the foreign body under gastroduodenoscopy^[4]. We report a case of esophageal obstruction caused by TPF. Vinegar and sodium bicarbonate retention and stone baskets under endoscopy combined to make the esophagus unobstructed again.

2. Case report

A 77 year old man, with sequelae of cerebrovascular accident, was bedridden for a long time and developed shortness of breath. On admission, he was given noninvasive mechanical ventilation for severe respiratory distress, and on the day of mechanical ventilation, enteral nutrition with TPF was given through nasogastric tube.

On the third day of mechanical ventilation, he was intubated because of no improvement in dyspnea. Tracheotomy was performed on the 8th day of mechanical ventilation.

On day 15, bronchoscopy was performed to assess possible airway mucus blockage. In this process, it was found that the nutrient solution flowed into the airway from the upper part of the tracheotomy catheter. Considering gastroesophageal reflux, the drug treatment was ineffective, and then we pulled out the nasogastric tube. Many attempts to replace the nasogastric tube were unsuccessful. Every time the gastric tube is inserted into the esophagus, resistance makes it impossible to insert distally. At this time, gastroduodenoscopy was performed in the Department of Gastroenterology, a solid food-like substance was found about 18 cm away from the incisors (Figure 1), which is rare on the 15th day of enteral nutrition.

The foreign body was removed by intravenous anesthesia and endoscopy lasting for up to 2 hours. It was difficult to remove the foreign body with the foreign body forceps under endoscopy during the operation. The coagulation was released along esophagus with foreign body forceps, and then the foreign body was removed with the basket net. After repeated operation, it was found that the distance between the obstruction in the esophagus and the incisor was still about 25 cm (Figure 2). The operation was halted because the foreign body basket was found damaged during the operation and could not be used, and the operation time was too long, which increased the risk of respiratory and circulatory organ dysfunction. Before the operation was halted, the nasogastric tube was inserted again under the guidance of endoscopy so that the end

of the tube was above the esophageal obstruction. 20ml 5% sodium bicarbonate and 20ml vinegar (pH 2.9) were injected through the gastric tube.

On the 7th day after endoscopic operation, we planned to remove the esophageal foreign body under gastroduodenum for the second time, during which, parenteral nutrition was given. When the endoscopy re-entered the esophagus, it was found that the coagulation of esophagus had disappeared, the cavity of esophagus, stomach and duodenum were very unobstructed, the mucosa was smooth, and the anatomical structure was normal. Under the guidance of endoscopy, a nutrition tube was placed into the jejunum for enteral nutrition for another time (Figure 3).



Figure 1. Coagulation obstruction of esophagus

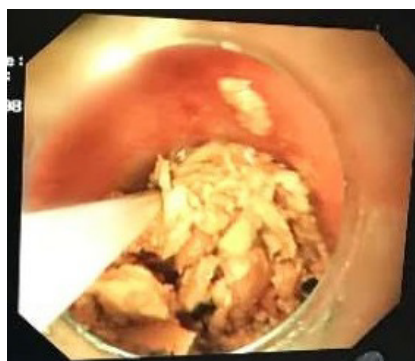


Figure 2. Removal of foreign body with gastroduodenal mesh



Figure 3. Re enteral nutrition by inserting jejunal tube

3. Discussion

We know that the gastrointestinal tract is not only an organ of digestion and absorption, but also an important immune organ, so it has become the consensus of many clinicians that enteral nutrition is the first choice in treating critically ill patients. It has been confirmed that compared with gastrostomy or jejunostomy, nasogastric tube or jejunostomy has obvious advantages in reducing hospitalization rate, complications and long-term mortality. Compared with liquid nutrients, semi-solid nutrients have no advantages in these aspects^[5,6]. Therefore, in order to facilitate the clinical implementation, we often

use the whole liquid nutrients to feed through the nasogastric tube, and there are few cases of esophageal obstruction caused by enteral nutrition coagulation in this way. Compared with other compound nutrient solutions, TPF had higher protein content, mainly casein and whey protein. Under the conditions of acidity, high calcium salt, different temperature, drug or protein ratio and composition change, the stability of high protein preparation may be destroyed, and coagulation may occur [7-9]. Although it has been reported that not monitoring the gastric residue may not increase the feeding intolerance, mortality and ventilator-associated pneumonia of ICU patients [10], for this patient, because we did not monitor the gastric residue, gastroesophageal reflux may not be found at the initial stage, and the reflux gradually coagulates and blocks the esophagus at the early stage, so surgical treatment is needed. Of course, for this case, we cannot rule out such causes as the distal end of the nasogastric tube bending in the esophagus, slow pump speed of the nutrition pump and gastric emptying disorder.

For the esophageal foreign body formed by the coagulation of nutrient solution, we should seek help from the digestive department in time, and often remove it with a stone basket under duodenoscopy [11]; the coagulation of this patient was narrow, long, hard, and seriously blocked the esophagus, so the removal efficiency of the foreign body was very low. Because of the long time of general anesthesia and intraoperative net bag damage, the operation stopped, sodium bicarbonate and vinegar remained in the esophagus for one week, and the foreign body disappeared when the operation was planned again. The change of esophageal pH value may lead to the release of coagulant mainly composed of mixed protein, and the carbon dioxide produced by the mixture of sodium bicarbonate and vinegar may also release coagulant. Under the movement of the esophagus itself, these loose foreign bodies move to the gastrointestinal tract and are digested.

TPF, a protein rich nutrient solution, has the characteristics of precipitation, which can coagulate and cause severe esophageal obstruction. This disorder can lead to bacterial and fungal overgrowth, mucosal inflammatory response, nutritional disorders and difficulty in weaning from ventilator, so this complexity should be recognized as early as possible. We should also be aware that in the process of daily patient care may occur feeding esophageal shift, gastric residue increase, in order to prevent esophageal feeding. we should also pay attention to the possibility of esophageal displacement and the increase of gastric residual fluid to prevent esophageal feeding. At the same time, we should also pay attention to other tendencies, such as esophageal compression caused by excessive filling of balloon catheter, which may lead to reflex vomiting. There are also improper posture, diabetes, hypothyroidism, obesity, partial gastrectomy and other factors.

It is advisable to be alert to the increased risk of complications of esophageal obstruction when feeding protein rich products (such as TPF) through common nasogastric tube. We also suggest that the position of feeding esophagus should be evaluated every day, feeding in the semi reclining position, giving prokinetic agents and proton pump inhibitors as preventive measures [12]. If feasible, nasojejunal tube should be used instead of orogastric tube or nasogastric tube.

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