

CASE REPORT

## 식도에 위치한 날카로운 생선가시의 투명캡과 Detachable Snare를 이용한 내시경적 제거방법

이종수, 전훈재, 이재민, 황영재, 김승한, 김은선, 진윤택, 이현주

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### Salvage Technique for Endoscopic Removal of a Sharp Fish Bone Impacted in the Esophagus Using a Transparent Cap and Detachable Snares

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A sharp, impacted fish bone in the esophagus is an indication for urgent endoscopy. Endoscopic removal of such an object is a challenging task. An endoscopic protector hood is then used to remove the object. However, an endoscopic hood protector is not always available. In a patient with a large hiatal hernia, the protector hood may not return to the original shape when it passes through the gastroesophageal junction and therefore may not properly protect the esophageal mucosa from the sharp foreign body. In our case, it was impossible to deploy the endoscopic hood protector through the gastroesophageal junction despite multiple attempts. We propose an alternative solution for such cases. We safely removed a large sharp-edged flat fish bone that was folded and compressed using a detachable snare after releasing and pushing the fish bone into the stomach using an endoscope equipped with a transparent cap used for dilating the esophageal wall. This method of using an endoscopic cap and detachable snare is a safe, useful alternative for endoscopically removing a large sharp-edged flat foreign body from the upper gastrointestinal tract. This alternative technique has not been reported in the English medical literature. (*Korean J Gastroenterol* 2013;61:215-218)

**Key Words:** Sharp fish bone; Foreign bodies; Detachable snare; Transparent cap; Endoscopes

### INTRODUCTION

A sharp, impacted fish bone in the esophagus is an indication for urgent endoscopy. Endoscopic removal of such an object is a challenging task. In general, first the impacted sharp object is released from the esophageal wall and moved into the stomach. An endoscopic protector hood is then used to remove the object. Such a technique is useful when removing sharp-pointed foreign bodies (FBs) by endoscope as it helps to prevent esophageal mucosal injury, especially injury

to the gastroesophageal junction (GEJ) and the upper esophageal sphincter (UES).<sup>1</sup>

However, an endoscopic hood protector is not always available. In a patient with a large hiatal hernia, the protector hood may not return to the original shape when it passes through the GEJ and therefore may not properly protect the esophageal mucosa from the sharp FB. We propose an alternative solution for such cases. We safely removed a large sharp-edged flat fish bone that was folded and compressed using a detachable snare after releasing and pushing the fish

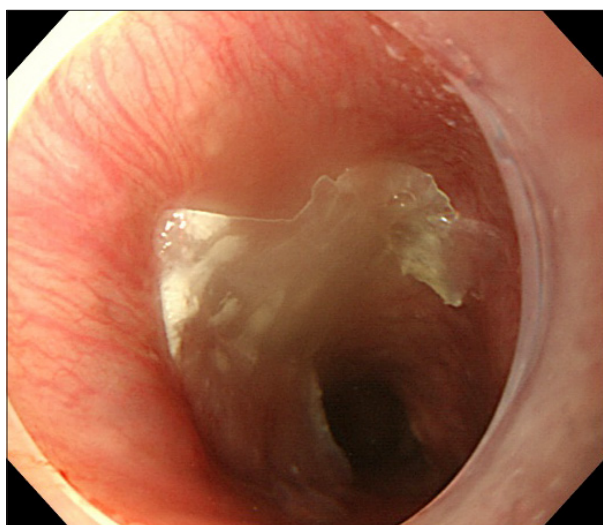
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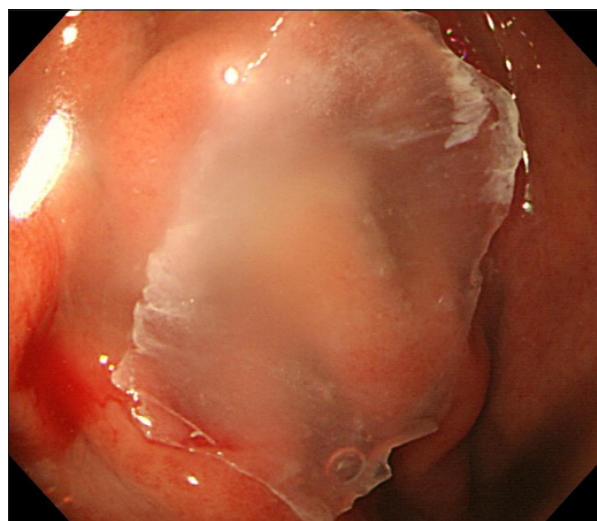
**Fig. 1.** The endoscope revealed that a large sharp-edged flat fish bone impacted just below the upper esophageal sphincter, 25 cm from the incisors.

bone into the stomach using an endoscope equipped with a transparent cap used for dilating the esophageal wall.

This alternative technique has not been reported in the English medical literature. We herein report on this case and provide a detailed description of the procedure.

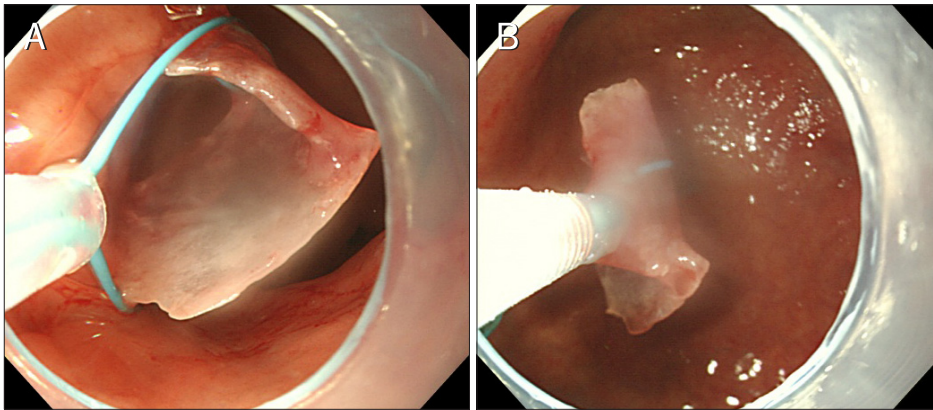
## CASE REPORT

An 84-year-old man was admitted to the emergency room of Korea University Anam Hospital (Seoul, Korea) due to odynophagia and a FB sensation in his neck after eating fish 6 hours earlier. A chest radiograph was normal. Urgent esophagogastroduodenoscopy was performed due to the risk of esophageal perforation secondary to a fish bone. Under conscious sedation with midazolam 3 mg and propofol 20 mg (intravenous bolus injection), the endoscope revealed that a large sharp-edged flat fish bone was impacted just below the UES, 25 cm from the incisors (Fig. 1). A transparent cap was attached to the distal part of the endoscope,<sup>2</sup> the endoscope was then inserted as far as the proximal aspect of the fish bone using high flow air insufflation. By angulating the tip of the endoscope, the esophageal lumen was dilated to release the impacted fish bone. The angulation of the endoscopic tip was performed very carefully in the direction of the impacted esophageal wall in order to avoid esophageal wall injury. Next, the proximal portion of the esophageal lumen was dilated and the impacted fish bone was released. The fish bone was thus

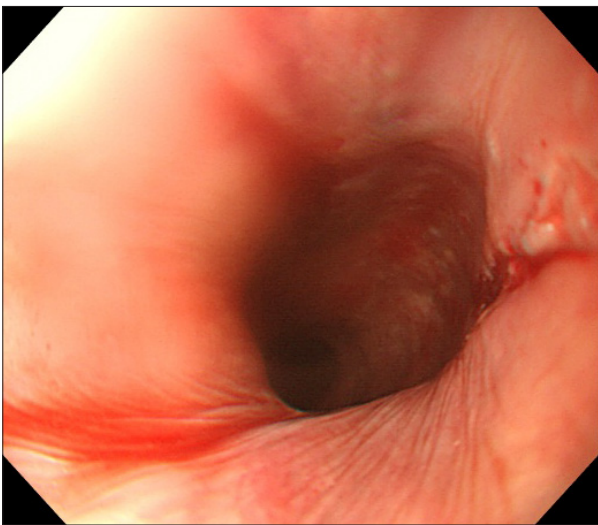


**Fig. 2.** The fish bone was moved into the stomach.

moved into the lower esophagus and stomach (Fig. 2). Since the sharp-edged fish bone could cause esophageal injury or perforation, we could not retrieve it directly through the esophagus. After the fish bone was released into the stomach, the endoscope was removed from the patient and an endoscopic hood protector (Kimberly-Clark, Roswell, GA, USA) was mounted on the tip of the endoscope. The endoscope was then reinserted and the released fish bone was visualized in the stomach. A rat tooth forceps (FG-44NR-1; Olympus Ltd., Tokyo, Japan) was inserted through the biopsy channel to grasp the edge of the fish bone. The endoscope was pulled back through the GEJ several times and, despite many attempts, the protector hood could not be deployed due to a large hiatal hernia. We then attempted to use a transparent cap and detachable snare for endoscopic removal of the large sharp-edged flat fish bone from the stomach. We applied detachable snares (Olympus MAJ-340; Olympus Ltd.) over the fish bone (Fig. 3A). The fish bone, which had a tetragonal shape, was compressed and folded using two detachable snares, thus transforming it into an elongated shape (Fig. 3B). As the rat tooth forceps grasped one end of the long axis of the fish bone, it was retracted into the transparent cap mounted on the tip of the endoscope. The endoscope was carefully pulled out and peroral removal of the fish bone was achieved. There was mild hemorrhage in the upper esophagus, which was where the fish bone was impacted, but there were no serious complications such as perforation (Fig. 4). The patient did well after removal of the fish bone and re-



**Fig. 3.** (A) Detachable snares (Olympus MAJ-340; Olympus Ltd.) were applied over the fish bone. (B) The fish bone, which had a tetragonal shape, was compressed and folded using two detachable snares, thus transforming it into an elongated shape.



**Fig. 4.** There was mild hemorrhage in the upper esophagus, which was where the fish bone was impacted, but there were no serious complications such as perforation.

ported no symptoms.

## DISCUSSION

Overall, 28-68% of gastrointestinal (GI) FBs are found in the esophagus.<sup>3</sup> The initial approach towards a patient with an esophageal FB demands urgent assessment of the respiratory status and establishment of an airway. Apart from this, the history is the most important part of the early evaluation. Examination should be followed by roentgenographic study. X-ray evaluation is indicated for all patients in whom an esophageal FB is suspected.<sup>3,4</sup> Lateral and anteroposterior roentgenograms of the neck, along with chest and abdomen x-rays, can be conducted to elicit a radiopaque FB. Using endoscopic access for diagnosis and removal, rigid phar-

yngoesophagoscopy may be used for re-moving sharp objects above the thoracic inlet, while flexible endoscopy should be preferred for intrathoracic FBs. Surgery remains the last alternative.<sup>5</sup>

Fish bones are the most common upper GI tract FBs in adult patients in Asia and many coastal countries.<sup>6</sup> Usually, fish bones are found in the pharynx.<sup>7</sup> When sharp-pointed objects, including fish bones, fall into the stomach, the majority of them can usually pass through the remainder of the GI tract. However, the rate of complications with sharp-pointed objects has been reported to be as high as 35%.<sup>8,9</sup> In the case of an impacted fish bone in the esophagus, the risk of esophageal perforation is directly related to the duration of impaction; therefore, urgent endoscopy is necessary.<sup>2,9</sup> Fish bones are one of the most dangerous FBs to endoscopically extract from the upper GI tract. The sharp edges of a fish bone can lead to such complications as hemorrhage, mucosal damage, or perforation of the esophagus. Perforation secondary to esophageal lacerations can occur in up to 15-30% of patients during endoscopic extraction of sharp FBs;<sup>2</sup> as such, special precautions and protective/safety devices for the endoscope are required. It is important that the initial step in releasing the impacted fish bone from the esophageal wall is performed without esophageal trauma. Next, the FB should be moved from the narrow esophagus into the stomach so that endoscopic safety devices, such as an overtube or protector hood, can be deployed. Different endoscopic equipment and methodology can be used according to the type of FB.

Several methods have been reported for protecting the GEJ, the esophageal mucosa, and the mucosa of the UES during endoscopic FB extraction. A plastic hood protector, an

overtube of esophageal and gastric length, and a FB protector hood are available to prevent esophageal mucosal injury during endoscopic extraction of FBs.<sup>9</sup> The usefulness of an endoscopic hood protector has been reported when a sharp FB larger than 15 mm is located in the stomach, as in this case. The large sharp FB can be removed with a hood protector without damage to the esophageal wall.<sup>1</sup>

However, there are several potential problems that can be encountered using the hood protector during endoscopic removal of FB. The bell portion of the device adds to the endoscope diameter, which increases the difficulty in passing the endoscope through narrowed or strictured areas. Also, contact of the bell portion of the hood with the mucosa during attempts to snare or capture FBs in the stomach can result in premature deployment. Furthermore, endoscopic hood protectors are not commercially available in some hospitals; there are hand-made hoods in some endoscopic units. Another problem is that hiatal hernias (37%) are a common underlying pathology in patients with ingested FBs.<sup>10</sup> For patients with a large hiatal hernia, the protector hood may not function properly (i.e., return to the original funnel shape) when the hood is pulled through the GEJ to extract the sharp FB.

In our case, it was impossible to deploy the endoscopic hood protector through the GEJ despite multiple attempts. Therefore, we sought an alternative method for endoscopic removal of the large sharp-edged flat fish bone in the stomach. We found that it was safe to endoscopically remove the fish bone once the endoscope was equipped with a transparent cap and the fish bone had been folded and compressed using a detachable snare.

This method of using an endoscopic cap and detachable snare is a safe, useful alternative for endoscopically removing a large sharp-edged flat FB from the upper GI tract.

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