Capsule Endoscopy Removal through Flexible Bronchoscopy

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Established Facts

- Video capsule endoscopy has become an increasingly popular test employed by gastroenterologists worldwide. With the increased use of video capsule endoscopy, pulmonologists are beginning to be consulted on patients who have aspirated the capsule.

Novel Insights

- With the use of a Roth Net retriever, we were able to remove the capsule with a flexible bronchoscope preventing the need for rigid bronchoscopy in this elderly patient.

Key Words

Flexible bronchoscopy · Capsule video endoscopy · Aspiration

Abstract

Since its introduction over 9 years ago, capsule video endoscopy has become increasingly popular within the gastroenterology community, leading to its use in a growing number of patients including the elderly. With the widespread adoption of this diagnostic modality within the elderly population comes the added risk of capsule aspiration. We present such a case where a 90-year-old patient was admitted after

accidental aspiration of a capsule. Removal of the capsule posed a therapeutic challenge. In the article, we discuss the novel use of a Roth Net expandable foreign body extractor to remove the capsule using a flexible bronchoscope with minimal need for sedation. As video capsule endoscopy is used more routinely in elderly patients and clinical pulmonologists will be more frequently called up to assist in foreign body removal, our experience highlights that it is possible to remove these large capsules with a flexible bronchoscope and avoid the need for rigid bronchoscopy in this high-risk patient group.

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Introduction

Video capsule endoscopy (VCE) is a disposable 26 × 11 mm video capsule first introduced in 2000 by Iddan et al. [1]. Since being approved for clinical use, it has become an important tool used in diagnosing small bowel pathologies [2]. We present the case of an elderly patient with multiple comorbidities who presented with capsule aspiration. The capsule was successfully removed with a flexible bronchoscope avoiding the need for rigid bronchoscopy.

Case Report

A 90-year-old man was referred to our institution for foreign body aspiration. The patient had a history of recurrent melanotic stools and anemia with a >2-gram drop in his hemoglobin from 9.4 gm/dl to <7 gm/dl. His gastroenterologist performed an endoscopy, colonoscopy and tagged radionuclide red blood scan; however, the source of bleeding could not be identified. As a result, he ordered a VCE for occult gastrointestinal hemorrhage. The patient's medical problems included coronary artery disease, atrial fibrillation, peripheral vascular disease, cerebrovascular accidents and chronic obstructive pulmonary disease. The patient was being managed for his atrial fibrillation and peripheral vascular disease with warfarin and clopidogrel. These medications were stopped prior to the procedure. After the procedure, he noted some cough, but otherwise, did not complain of dyspnea or chest pain. Initial post-procedure chest X-rays confirmed that the patient had aspirated the capsule into his left mainstem bronchus.

Upon transfer to our institution, the patient was noted to be in no apparent respiratory distress, and oxygen saturation by pulse oximetry was noted to be 95% via a nasal cannula at 2 l/min. Therefore, the decision was made to attempt chest percussive therapy (CPT) with postural drainage to potentially aid expectorating the device. Although the patient tolerated the CPT, a follow-up chest X-ray revealed that the capsule had migrated to the right mainstem bronchus. After failure of CPT, the decision was made to attempt bronchoscopic removal. A portable chest X-ray directly prior to the procedure showed that the capsule had migrated back to the left upper lobe bronchus causing atelectasis of the left upper lobe and lingular segments (fig. 1).

Procedure

We used an Olympus (BF-XT160) therapeutic bronchoscope (working channel 3.2 mm diameter) via the oral route. On inspection, the capsule was lodged in the left upper lobe (fig. 2). Attempts at removal with a Web 2 × 4 cm extraction basket (Cook Medical, Ill., USA) were unsuccessful, as was an attempt using a cryoprobe. Subsequently, an expandable basket foreign body retriever

Fig. 1. Capsule (arrow) lodged in the left upper lobe bronchus with associated atelectasis.

(net size 3 × 6 cm; Roth Net, US Endoscopy, Mentor, Ohio, USA) was employed through the therapeutic bronchoscope working channel. The Roth Net foreign body retriever was originally developed for colonic polyp retrieval but later adapted for foreign body removal. It is a patented butterfly net that forms a stable pouch at one end of a flexible catheter; at the other end, there is a single plunger that allows the net to move in and out of the sheath, simultaneously closing and opening the pouch. The net is deployed flat as it leaves the sheath but can be manipulated to ensnare the foreign body. Initial efforts at removal were unsuccessful; however, the Roth Net was then introduced to the foreign body in the semi-closed position so that it formed a cup in which the capsule could be seated. After manipulation of the net and capsule, the bronchoscope, net and capsule were removed without complication (fig. 3).

The patient was returned to his patient room for further evaluation of the occult bleeding in stable condition and required only 2 mg of midazolam for sedation. The total procedure time (from scope entry to exit) was 36 min.

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Fig. 2. Capsule lodged in the orifice of the left upper lobe bronchus.

Fig. 3. Capsule after successful removal secured within the Roth Net basket.

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Color version available online

Discussion

VCE has become an important tool used in diagnosing small bowel pathologies [2]. Since it was introduced into clinical practice, over 80,000 studies have been performed worldwide [3]. The commonest reported complication of capsule endoscopy is capsule retention with a reported frequency of 0.75% amongst all comers and 8% amongst known Crohn's disease patients [2]. However, given its size, one can imagine that swallowing it may be problematic in some patients. In a retrospective review of 733 VCEs, Rondonotti et al. [4] reported difficulty or inability to swallow the capsule in 11 (1.5%) patients. In only 1 case did the patient aspirate the capsule; however, he was able to cough it out. We were able to identify 8 case reports of aspiration of VCEs in the gastroenterology and otolaryngology literature [5–12]. All 8 patients described were elderly (age range 64–93 years). This finding is consistent with previous reports of foreign body aspiration in adults which have identified old age as a risk factor for aspiration [13].

Of the 8 reported cases, 4 patients were able to spontaneously cough the capsule out without requiring any intervention. One patient had the capsule lodged in his cricopharyngeus [11] while 2 others required the use of rigid bronchoscopy to remove the capsule [9, 11]. In 1 case report [7], the use of flexible bronchoscopy for retrieval was mentioned; however, details of the procedure were not described other than that the removal of the capsule 'proved to be rather difficult' because of the smooth surfaces of the capsule. As a consequence of the size of the capsule and the smooth surface, we also encountered some difficulties in removal. However, in our experience, the Roth Net expandable foreign body retriever, when

partially closed to form a cup to seat the capsule, proved to be most suited for removal. This device was also successfully used by Sepehr et al. [11] through a rigid bronchoscope.

Most patients who aspirate video capsules are not in respiratory distress, and therefore, an attempt at retrieval with flexible bronchoscopy can be made sparing the elderly patient the risks of general anesthesia and rigid bronchoscopy. The success rate of flexible bronchoscopy in removing foreign bodies has been reported to be >90% [14–16]. Therefore, we recommend consideration of removal of foreign bodies with flexible bronchoscopy by an experienced team with the availability of rigid bronchoscopy. It is important to remember that excessive manipulation into the airway when flexible bronchoscopy is unsuccessful can lead to complications that could be avoided by early conversion to rigid bronchoscopy.

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