Bronchial Aspiration of Capsule Endoscope

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Established Facts

- Video capsule aspiration is a potentially life-threatening complication that has been reported with increasing frequency.
- A rapid diagnosis can be made thanks to live transmission of the images from the capsule.
- Rigid bronchoscopy remains the safest method of extraction.

Novel Insights

- We report capsule extraction and gastrointestinal repositioning during the same procedure.
- This allows safe and successful digestive exploration without additional gastrointestinal endoscopy of patients who accidentally aspirated the capsule.

Key Words

Capsule endoscope · Complications · Bronchoscopy

Abstract

Capsule endoscope aspiration is an increasingly reported complication, potentially responsible for respiratory distress and asphyxia. This adverse event is primarily managed by rigid bronchoscopy when spontaneous expulsion does not occur. This complication is all the more detrimental to patients as it can delay or jeopardize further digestive exploration. We report direct repositioning of the capsule in the stomach at the same time as bronchoscopy, thus making second-line gastrointestinal endoscopy needless.

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Introduction

Over the past decades, capsule endoscopy has become a routine tool in the exploration of occult gastrointestinal (GI) bleeding after a non-diagnostic upper GI endoscopy and colonoscopy. The most frequent complication of capsule endoscopy is retention in the digestive tract, which occurs in 1–5% of cases. Bronchial aspiration of the capsule is a complication that has been increasingly reported. Although potentially responsible for acute respiratory distress, no fatality has been reported as yet. The method of choice for extraction of the capsule is rigid bronchoscopy with the use of a foreign body retrieval net or basket.

Fig. 1. Picture of the bronchial tree transmitted by the capsule.

Fig. 2. Chest X-ray performed just after aspiration showing the capsule at the entrance of the left main bronchus.

Table 1. Cases of reported capsule endoscope aspiration and the outcome regarding subsequent digestive exploration (adapted from Lucendo et al. [1] and Koulaouzidis et al. [2])

First author [ref.], year	Age, years/gender	History of swallowing disorders	Acute presentation	Favorable outcome	Mode of extraction	Subsequent GI video-exploration	Mode of subsequent insertion of the capsule in the GI tract
Schneider [see ref. 1], 2003	64/?	no	yes	yes	spontaneous	yes	none
Sinn [see ref. 1], 2004	69/f	no	yes	yes	spontaneous	yes	none
Tabib [see ref. 1], 2004	87/m	no	yes	yes	rigid bronchoscopy	?	?
Buchkremer [see ref. 1], 2004	74/m	no	no	yes	flexible bronchoscopy	?	?
Rondonotti [see ref. 1], 2005	?/?	no	no	yes	spontaneous	?	?
Shiff [see ref. 1], 2007	67/m	yes	yes	yes	rigid bronchoscopy	?	?
Nathan [see ref. 1], 2007	93/m	no	no	yes	spontaneous	yes	none
Sepehr [see ref. 1], 2007	67/m	yes	yes	yes	rigid bronchoscopy	?	?
Guy [see ref. 1], 2009	90/m	no	no	yes	rigid bronchoscopy	no	none
Leeds [see ref. 1], 2009	85/m	no	no	yes	spontaneous	?	?
Bredenoord [see ref. 1], 2009	65/m	?	yes	yes	spontaneous	yes	none
Choi [see ref. 1], 2010	75/m	no	no	yes	rigid bronchoscopy	?	?
Depriest [see ref. 1], 2010	90/m	no	no	yes	rigid bronchoscopy	yes	?
Kurtz [see ref. 1], 2010	73/m	no	yes	yes	rigid bronchoscopy	?	?
Lucendo [1], 2011	80/m	no	yes	yes	spontaneous	yes	none
Koulaouzidis [2], 2011	76/m	?	no	yes	spontaneous	yes	none
Pezzoli [3], 2011	82/m	no	no	yes	spontaneous	yes	none
Degani [4], 2011	74/m	no	no	yes	rigid bronchoscopy		
Borman [5], 2011	84/m	no	yes	yes	rigid bronchoscopy	?	?
Girdhar [6], 2012	83/m	no	no	yes	rigid bronchoscopy	?	?
Despott [13], 2012	65/m	no	no	yes	rigid bronchoscopy	yes	same endoscopy
	73/m	no	no	yes	flexible bronchoscopy	yes	subsequent endoscopy
	81/m	no	no	yes	rigid bronchoscopy	?	?
Parker [7], 2012	77/f	no	yes	no	spontaneous	yes	subsequent endoscopy
Singh [8], 2013	56/m	no	no	yes	rigid bronchoscopy	?	?
Pereira [9], 2013	78/m	no	yes	yes	spontaneous	yes	none
Ding [10], 2013	80/m	no	yes	yes	spontaneous	?	?
	88/m	no	yes	yes	spontaneous	yes	none
Mannami [11], 2015	85/m	no	no	yes	spontaneous	yes	none
Juanmartínez Fernández [12], 2016	82/m	no	no	yes	spontaneous	yes	none

?, not reported in the publication; GI, gastrointestinal.

Little is known about the outcome of patients regarding their further GI workup. Some patients undergo a second-line gastroscopy in order to place the capsule directly in the stomach or duodenum. This means that patients have to undergo repeated general anesthesia (GA), which is challenging in elderly patients with poor health. There is even a probability that digestive explorations are abandoned following aspiration, considering the unfavorable risk-benefit balance of a subsequent GA for capsule placement.

Case Report

A 74-year-old man with a medical history of ischemic stroke and chronic obstructive pulmonary disease, without an overt swallowing disorder, was referred to our center for iron deficiency anemia exploration. The upper GI endoscopy and the colonoscopy did not show any source of bleeding. Small-intestine exploration by capsule endoscopy was planned. No underlying neurological or swallowing disorder was detected, and the capsule (PillCam® SB2, USA) was ingested by the conscious patient without sedative premedication. Shortly after, the patient presented with a typical choking episode with mild respiratory distress with bouts of coughing and oxygen desaturation. Direct visualization of the images from the capsule confirmed its presence in the respiratory tract. The images showed the proximal lumen of a bronchial tree, with typical collapse at the end of expiration. Slight movements of the capsule were observed during coughing and expiration and showed the entrance of the left main bronchus and the main carina (Fig. 1 and online suppl. Video 1; for all online suppl. material, see www.karger.com/doi/10.1159/000453587). The chest X-ray performed quickly afterwards (Fig. 2) showed the capsule located in the left main bronchus.

A rigid bronchoscopy under GA was immediately performed and confirmed the presence of the capsule in the left main bronchus. The capsule was retrieved with a foreign body basket (Zero Tip™, Boston Scientific®, USA). The bronchoscope was then immediately introduced into the lower esophagus allowing direct repositioning of the capsule into the GI tract with peanut foreign body forceps. The respiratory outcome was uneventful. Subsequent small-bowel exploration could then be performed and showed duodenal and jejunal angiodysplasias.

Discussion

Device aspiration is a potentially life-threatening and increasingly reported complication of capsule endoscopy. It is estimated to happen in about 1/1,000 cases. A thorough review of cases reported in the literature (Table 1) shows that this complication occurs primarily in older males without a history of swallowing disorders [1–13]. Most of the time, aspiration remains asymptomatic, and the diagnosis is made a posteriori with spontaneous return of the capsule into the digestive tract.

Information regarding the outcome of digestive explorations remains scarce in reported cases. This underscores the fact that these patients may have a delayed or abandoned digestive workup following capsule aspiration.

In our case, the patient did not report any previous swallowing disorder, as in most of the reported cases. Nevertheless, several factors could explain the aspiration of the capsule, such as age (presbyphagia) combined with the small size and low weight of the device (<4 g, 11 × 26 mm). Moreover, a latent cerebrovascular disease could not be excluded since our patient was a former smoker and suffered from peripheral artery disease.

We demonstrated the feasibility and the success of GI capsule repositioning right after bronchoscopy when the patient was under GA. This procedure has only been reported once by Despott et al. [13] in 2012, but no information regarding the outcome of the digestive exploration was given. We consider that this option should be chosen for all patients undergoing bronchoscopic extraction of a video capsule under GA. This option avoids subsequent endoscopy and GA of the patient and allows a prompt and complete digestive workup of patients who are often in poor medical condition.

Financial Disclosure and Conflicts of Interest

The authors report no biomedical financial interests or potential conflicts of interest relevant to this article.

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