

Unusual cause of gastric aspiration with a laryngeal mask airway (LMA) : discussion and review of the literature

J.-E. GUILLAUME (*), P.-Y. HARDY (**), N. MOREAU (*)

Abstract : Aspiration of gastric content is a rare complication following general anesthesia (GA), and is responsible for significant morbidity and mortality.

We report the case of a 69 years-old man who underwent a JJ-stent replacement for ureterohydronephrosis carried out under GA with a laryngeal mask airway (LMA). During this procedure, an unexpected enterovesical fistula (EVF) resulted in a massive gastric aspiration. Through this case, we will discuss the indications and contraindications of supraglottic airway devices (SAD), as well as the etiology, diagnosis and work-up of EVF.

Keys words : gastric aspiration, laryngeal mask airway, entero-vesical fistula, cystoscopy

Case report

A 69-year-old male (ASA physical status III, BMI 19,5 kg/m²) with low-grade sepsis presented at the emergency room for recurrent urinary tract infection (UTI) associated with ureterohydronephrosis. He had a past medical history of radical prostatectomy for adenocarcinoma pT2cN0M0R0 in 2010 (Gleason's score of 6). In 2011, he had a transurethral resection of the bladder which showed a bladder transitional cell carcinoma pT2G2. A cystectomy with a Studer ileal orthotopic neobladder was thus performed. In 2012, the patient presented a retroperitoneal node cancer recurrence, resulting in bilateral ureterohydronephrosis, for which two double-J ureteric stents were placed. Several lines of chemotherapy were attempted; unfortunately, the patient developed hepatic metastasis and pelvic metastatic nodes. Progressively, a necrotic mass developed on the upper side of the neobladder. The double-J stents were changed several times for recurrent UTI between October 2013 and April 2015 under GA and LMA without any complication.

In September 2015, a recurrent ureterohydronephrosis was observed despite optimal drainage with double J-stents, associated with a slight increase of the necrotic mass on the upper side of the neobladder, without any evidence of fistulae on a spontaneous contrast CT-scan.

In October, a new replacement of ureteric stent was performed due to a UTI caused by *Klebsiella Pneumoniae*, associated with a moderate renal impairment and a worsening general condition.

This procedure was carried out semi-urgently under GA, with classic LMA, after a fasting period of 8 hours. Induction of anesthesia was performed with Sufentanil 10µg, Propofol 100mg and maintenance of anesthesia was assured with oxygen in air 40% and Sevoflurane around 1.4%. Controlled ventilation was initiated with tidal volumes of 500ml and peak pressure of 15 cm H₂O. Thirty minutes after the initiation of cystoscopy, an important amount of light pink-tinted fluid regurgitated through the LMA, requiring urgent intubation. SpO₂ dropped to around 50%. Endotracheal aspiration didn't return anything. Under controlled ventilation (TV 8ml/kg, RR: 15/min, PEEP 10 cmH₂O and FiO₂ about 80%), gas exchange was partially corrected with saturation > 90-92%. A nasogastric tube was placed and brought back almost 3L of liquid similar to cystoscopy's rinsing liquid. Watery diarrhea occurred concomitantly. The procedure was aborted and the patient was admitted to the intensive care unit (ICU) ventilated with 50% FIO₂, without vasoactive drugs. An X-ray chest showed bilateral infiltrates. Adapted antibiotic therapy was administered after multiple bacteriological sampling for a seven day period. Extubation occurred 36 hours later and ICU stay lasted for 20 days.

A cystography highlighted an EVF as the underlying cause of inhalation during cystoscopy. CT-scan confirmed contrast medium passing from the neobladder into the small bowel through an anterior and superior fistula. (Fig. 1 and 2).

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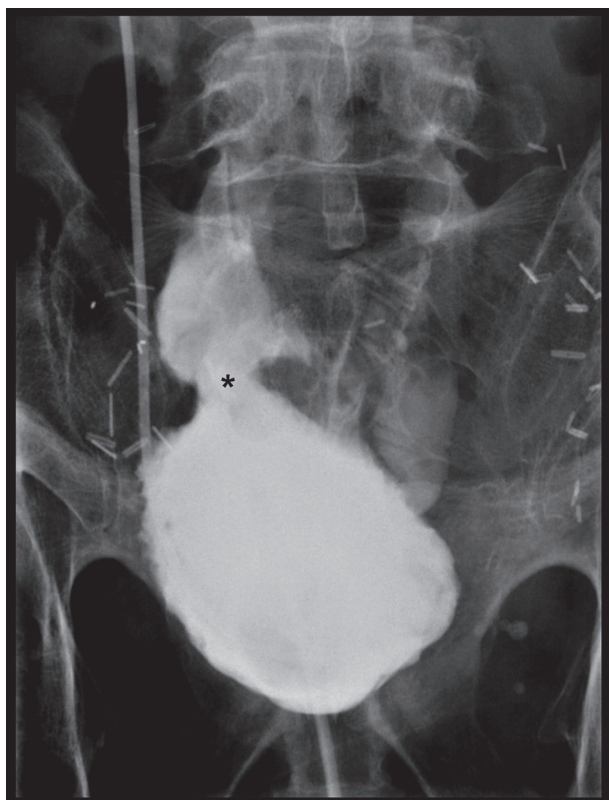


Fig. 1. — Retrograde cystography. (*Enterovesical fistula).

Considering that the patient was unfit for major intervention and because of an unresectable neoplastic process, medical treatment with neobladder drainage, bowel rest, and antibiotics was warranted.

The patient died a few weeks later from cancer progression.

DISCUSSION

We hereby report a case of pulmonary aspiration resulting from an undiagnosed EVF during a cystoscopy performed under GA and LMA. Massive reflux in the gut during cystoscopy procedure probably occurred due to a positive pressure irrigation passing through an unrecognized paucisymptomatic EVF, even if an iatrogenic perforation of the weakened bladder wall can't be excluded.

Airway management

Mechanical ventilation through a LMA has several advantages over tracheal intubation: sore throat, impairment of swallowing, postoperative hoarseness, and coughing are reduced, and disturbances in cardiovascular and respiratory function are less likely to occur. LMA is a good alternative to decrease intra-ocular pressure, and can also be useful in difficult airway management.

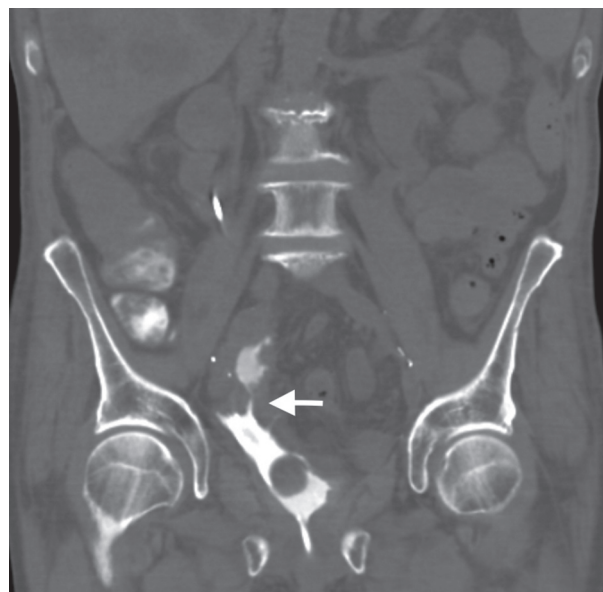


Fig. 2. — CT scan with coronal reconstruction showing enterovesical fistula (arrow).

However, LMA has some drawbacks, because it does not reliably protect the airway from gastric regurgitation, even if using the latest supraglottic airway device (SAD) : during positive pressure ventilation, gastric inflation can occur. Pulmonary aspiration is of first concern when considering SAD: it accounts for up to 5% of respiratory claims against anesthesiologists (1). The incidence of gastric inhalation with LMA is estimated at 0.02% (2). A recent review of more than 65,000 procedures under GA and positive pressure ventilation, comparing LMA and tracheal tube, used in well recognized indications, failed to detect any increased risk of aspiration (3). The overall incidence of aspiration was about 1:6571. Unplanned surgery and male sex were associated with an increased risk of aspiration.

The choice between LMA and tracheal intubation is often based on the practitioner's opinion and experience, not only on evidence. The reported risk factors for aspiration with LMA include esophagitis, gastric or duodenal ulcer, gastritis, pyloric stenosis, intestinal obstruction, hiatal hernia, reflux, obesity, past gastric surgery, peri-operative opioid use, prolonged anesthesia, pregnancy, low respiratory compliance, upper abdominal surgery and full stomach. Some anesthesiologists take into account diabetic gastroparesis and Parkinson's disease. Prone position, airway surgery and laparoscopic surgery can also benefit from LMA. However, due to a lack of data on its safety, LMA remains a relative contraindication in these peculiar situations.

In the case we hereby report, there were no recognized contraindications to the use of LMA with respect to the fact that no EVF was diagnosed preoperatively.

Entero-vesical fistula

EVF is a rare disease with a general incidence of 0.5 per 100,000 per year (4). It most frequently occurs as a consequence of advanced-stage inflammatory or malignant disease or due to traumatic or iatrogenic injuries. About 4-5% of EVF are appendico-vesical fistulae, and 20% are recto-vesical fistulae. In the literature, CARSON *et al.* reported a series of 100 cases, including 51 due to colonic diverticulitis, 16 due to colorectal cancer, 16 due to other causes (radiation necrosis, cervical cancer, iatrogenic perforation and tuberculosis), and 5 due to urinary bladder carcinoma (5).

In a more recent review, diverticulitis remains the commonest etiology accounting for 65-79% of cases, followed by cancer (10-20% of cases, mainly advanced-stage colon cancer) and Crohn's disease (5-7%). Rare causes include Meckel's diverticulum, pelvic actinomycosis, genitourinary coccidioidomycosis and appendicitis. Iatrogenic etiology may occur as a complication of general, vascular or urologic surgery, as well as chemotherapy or radiation therapy. Penetrating abdominal or pelvic injuries and foreign bodies are also rare causes of EVF (6).

The diagnosis is often delayed and challenging. Recurrent urinary tract infection (UTI) is commonly observed, as well as pneumaturia (66%), fecaluria (50%), and hematuria (22%) (7). The hallmark of EVF is Gouverneur's syndrome characterized by abdominal pain, pollakiuria, dysuria and tenesmus (7). Of course, symptoms associated with the underlying disease causing the fistula are also observed.

The diagnostic work-up of EVF includes computed tomography (with or without contrast medium), retrograde cystography and cystoscopy. Retrograde cystography highlights the fistulous tract in 66,6% of cases compared to 83,3% with a CT (8,9).

CT-scan is the most sensitive test, and has the advantage to delineate the extent of the local disease involvement, as well as distant metastasis in case of malignancy.

Cystoscopy examination sensitivity is about 78% (10), however, other authors observed that it failed to identify EVF in 54-65% of cases (11). The use of Tc-99m DTPA as a valuable method in diagnosing EVF has been reported (12). Other

investigations such as barium enema, colonoscopy are far less effective to diagnose EVF (20-35% and 8%, respectively) (13), except to determine the nature of the underlying bowel disease responsible for EVF. The "poppy seed test" represents an easy and inexpensive tool, because seeds remain largely undigested through the gastrointestinal tract, and may appear in urine within 48 hours following the intake of 50mg of poppy seeds in case of EVF. However, this test does not provide any detail about the location and the type of fistula.

In this particular case, symptoms retrospectively associated to EVF were recurrent UTI and diffuse abdominal pain. Preoperative CT-scan was performed without contrast agent opacification and did not raise the suspicion of any EVF.

CONCLUSION

This is, to our knowledge, the first reported case of gastric inhalation of rinsing liquids through an unrecognized EVF during a cystoscopy procedure performed under GA with LMA.

Based on the patient's medical records a high index of suspicion for EVF formation should have raised further radiological investigation preoperatively, even if the patient's symptoms were poor, and the procedure had to be performed semi-urgently.

Cautious direct endotracheal intubation should have probably been preferred in this particular case.

Good communication about patient's specificities and better team-work between anesthesiologists and surgeons may help to prevent such a rare complication. Caution must be kept with long lasting oncologic medical history, and should lead anesthesiologists to have an accurate benefit/risk analysis in their own anesthetic plan.

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