Esophageal perforation has been described following iatrogenic manipulation. In this report, we present an elderly lady admitted to the operative theater for laparoscopic cholecystectomy. Multiple intra-operative attempts to place a flexible orogastric tube were unsuccessful because of failure to advance.

Post-operatively, the patient developed sepsis and a right pleural effusion. She was transferred to the Intensive Care Unit and she was treated with antibiotics. Radiologic evaluation confirmed an esophago-pleural fistula. Surgical repair was urgently performed for closure of fistula and lung decortication. The patient recovered and was discharged home.

Introduction

Esophageal perforation is a serious complication of procedures performed on or around the esophagus and is mainly iatrogenic1,2. Esophageal perforation is most frequently encountered during endoscopic procedures3 but also during nasogastric tube placement4-9, endotracheal intubation10-14, stricture dilation15,16 and during the use of oesophageal bougies17. This complication has a poor prognosis with inadequate management3.

While providing anesthesia to surgical patients, anesthesists frequently insert esophageal dilators, nasogastric tubes or orogastric tubes/suction catheters. Such interventions may cause trauma to soft tissue structures. We describe a case of esophageal perforation secondary to the orogastric insertion of a simple 14 French suction catheter used routinely to deflate the stomach during laparoscopic cholecystectomy. To our knowledge, this is the first case report describing esophageal perforation following the insertion of a flexible orogastric 14Fr suction catheter in an adult patient undergoing laparoscopic cholecystectomy.

* MD, Assistant Professor of Anesthesiology, American University of Beirut Medical Center, Department of Anesthesiology, Beirut, Lebanon (Riad Solh 1107-2020).
** MD, Anesthesiology resident, Formerly of: American University of Beirut Medical Center, Department of Anesthesiology, Beirut Lebanon (Riad Solh 1107-2020). Current Department: St. Elizabeth's Medical Center, Department of Anesthesiology, Critical Care and Pain Medicine, 736 Cambridge Street, #213, Brighton, MA 02135.
*** Medicine III student, Bachelor degree in Biology, American University of Beirut Medical Center, Department of Anesthesiology, Beirut, Lebanon (Riad Solh 1107-2020).
**** MD, Assistant Professor of Clinical Medicine, American University of Beirut Medical Center, Department of Internal Medicine, Beirut, Lebanon (Riad Solh 1107-2020).

Corresponding author: Salah M. Zeineldine, MD, Assistant Professor of Clinical Medicine, American University of Beirut Medical Center, Department of Internal Medicine, Beirut, Lebanon (Riad Solh 1107-2020). Tel: +961-1-350 000 x 4706, Fax: +961-1-744 489. E-mail: sz01@aub.edu.lb
Case Report

A 79 year old, 70 kg lady known hypertensive and dyslipidemic presented for laparoscopic cholecystectomy and intraoperative cholangiogram secondary to an acute cholecystitis. The patient denied any symptoms or history of dysphagia, odynophagia, gastroesophageal reflux or chest pain. Difficult intubation was anticipated due to short neck and a glidescope assisted intubation was planned.

In the operating room, after lung denitrogenation with 100% oxygen, rapid sequence induction was performed using lidocaine 100 mg (1.5 mg/kg), propofol 140 mg (2 mg/kg) and succinylcholine 100 mg (1.5 mg/kg) intravenously. No bag ventilation was performed. The trachea was intubated by an endotracheal tube (ETT) size 8.0 using the Glidescope and a 10Fr intubating stylet (Unomedical). Several attempts to insert a well lubricated 14 Fr suction catheter failed (Bicakcilar, suction catheter w/ vakon connector ideal tip 4.7 mm x 600mm). The catheter would not advance even with an index finger inserted in the patient mouth guiding the catheter into the pharynx. After multiple attempts using the laryngoscope to have better visualization, the insertion of the orogastric tube was not successful. During the procedure, the surgeon noted that the stomach was inflated and insisted on the placement of an orogastric tube to suction the stomach. We elected then to place an ETT size 7.0 that we advanced in the esophagus and inserted the orogastric tube through it. The advancement of the catheter would always stop at the same level as previously tried with or without the laryngoscope attempts. The resistance upon the insertion of the catheter was encountered at a distance of about 25 cm from the lips. No forceful maneuvers were performed and no blood was recovered over the suction catheter. We decided to abort the placement of the orogastric tube and the surgeon was advised so. His concern was a fully inflated stomach that he is showing us on the video camera. We explained that placement of orogastric tube was difficult, and will treat his concern by extubating the trachea when the patient is fully awake.

After the surgical procedure ended, extubation was uneventful. The patient was transferred to the recovery room. She was fully awake and asymptomatic.

On post-op day one, the patient complained of dry cough and dyspnea after her first meal. On physical exam, she had scattered wheezes and right field crakles. She was afebrile. Chest X ray (CXR) revealed opacification on the right lower and right middle fields. A diagnosis of pulmonary aspiration was suspected and Solumedrol, Combivent, pulmicort and Tazocin were started. The CXR improved in the afternoon. However, clinically the patient was getting worse the following day with progressive desaturation down to 90% and became hypotensive with systolic pressure of 80 mmHg. The patient was transferred to the intensive care unit and Tazocin was shifted to broad spectrum antibiotic coverage consisting of Meropenem, Levofloxacin and Metronidazole. The patient symptoms improved, however the cough and wheezes persisted. A CT chest was done on post op day 7 revealing an air pocket posterior to the carina in continuity with the right lower lobe. A diagnosis of esophageo-pleural fistula in the lower esophagus was suspected and was confirmed with Gastrograffin swallow. On post-op day 9, a thoracotomy for right lung decortication and closure of fistula was performed. The patient was kept intubated and extubation was done on the following day. Antibiotics were continued for 14 days post-op. The radiological findings on CXR resolved on post-op day 17.

A repeated gastrograffin swallow was performed on post-op day 20 showing an outpouching at the level of the fistula but no leak. Another gastrograffin swallow was performed on post-op day 27 showed no leak.

The patient was discharged from the hospital on post-op day 33.

Discussion

Perforation of the esophagus due to instrumentation in the adult is a rare yet potentially devastating event associated with high morbidity and mortality. The mortality has decreased from 38.7% in the 1970s to 8.3% today. The leading cause of
esophageal perforation is mainly iatrogenic with perforations at the thoracic level being the highest. Most of perforations occur during instrumentation of the esophagus i.e. endoscopy procedures, transesophageal echocardiography, esophageal varices sclerotherapy, stricture dilatation, using relatively large stiff probes (endoscope, TEE probe, Sengstaken-Blakemore (SB) tube, bougie). Several risk factors have been described for esophageal perforation such as pre-existing esophageal abnormalities (carcinoma, stricture, diverticuli) and cervical osteophytes. Esophagogastroduodenoscopy was the most commonly litigated procedure, followed by intubation and Nissen fundoplication. But there have been few reported cases of iatrogenic esophageal perforations by a flexible nasogastric tube occurring mainly in neonates or infants.

In our patient the perforation occurred after multiple attempts at inserting the orogastric suction catheter where the obstruction was faced at 25cm distal to the lips. The most common areas of instrumental esophageal perforation are the relatively narrow portions at the distal esophagus. The perforation is complicated by an inflammatory process and communication with the pleura in 80% of the cases. The thin mediastinal pleura is ruptured by the inflammatory process, producing contamination of the pleural space and a pleural effusion. Then, gastric contents and fluids are drawn into the pleural space by the negative intrathoracic pressure resulting in further inflammation and fluid sequestration, hypovolemia, and the early appearance of tachycardia and systemic sepsis. In our patient the CXR revealed opacifications which reflect consolidation of the lungs that is due to an accumulation of fluids that is most probably edema and inflammation. This explains the scattered wheezes and crackles that were heard on post op day one. In addition, esophageal perforation allows bacteria, usually polymicrobia flora to spread into the mediastinum and subphrenic space leading to mediastinitis. This explains the septic picture of our patient that was revealed by hypotension and progressive oxygen desaturation.

Literature showed a better outcome with primary surgical closure if diagnosed in less than 24 hours. However if delayed diagnosis beyond 48h was made, no patient with esophageal perforation should be deprived from surgical repair. Mortality is decreased in surgical repair versus conservative treatment, for that reason, our patient underwent thoracotomy for fistula closure and repair of esophageal tear.

In any patient with a recent history of esophageal instrumentation, the diagnosis of esophageal injury should be suspected in the presence of any of the symptoms encountered by our patient. Also, the absence of gastric content on naso/orogastric tube or the presence of blood on the catheter elicit a possible diagnosis of perforation. Nevertheless blood was not noted on the suction catheter in our case.

For the first 24 hours following the laparoscopic cholecystectomy, our patient’s only complain was pain over the incision and a mild shoulder pain attributed to the laparoscopic procedure. This pain was controlled by analgesics. She denied any complain or history of dysphagia, odynophagia, dysphonia or dyspnea. However, after her first meal she complained of sudden dry cough and severe dyspnea. Taking into consideration the fact that the patient was extubated with a distended stomach, pulmonary aspiration was the most probable diagnosis.

It was the persistence of the cough and dyspnea and the worsening of these symptoms following meals, along with a problematic naso/orogastric tube insertion that made the suspicion of esophageal perforation high. Because of the failure of insertion of the orogastric catheter and the occurrence of resistance at 25 cm from the lips, an intrathoracic esophageal injury in our case was suspected. The CT chest showed an air pocket adjacent to the carina in continuity with the right lower lobe. This prompted us to perform esophagogram to confirm the diagnosis of esophageal perforation.

The presence of underlying esophageal pathology could explain the difficulty in advancing the orogastric tube. As anesthesiologists we are the experts in inserting orogastric tubes or suction catheters, a maneuver that we perform almost every day in our practice. The advancement of the catheter was impossible past 25cm of the lips despite so many attempts. This could be
explained by a pre-existing esophageal pouch that the patient is unaware of or by an osteophytic compression of the esophagus due to the patient age, which made the advancement of the catheter impossible. Forcing the catheter insertion through multiple attempts lead to the perforation. On another note, the deviation from our current practice of inserting a suction catheter through an ETT placed in the esophagus is a very rare maneuver that we perform in extreme situations. This also could be the reason of the perforation.

**Conclusion**

The lesson taken from this case report is not to force the advancement of an orogastric/nasogstric suction catheter especially when different techniques and multiple attempts fail. The other lesson taken is to have a very high threshold inserting an ETT in the esophagus to facilitate the suction catheter insertion by advancing the catheter through the ETT since this could also be a risk factor for esophageal perforation.
References


The key to

Lock-up

Postoperative Pain

Initial bolus
Inject 1 ampoule Tramal® 100 mg
i.v. or i.m. slowly over 2-3 minutes

Ways of administration after initial bolus

Infusion
Inject 2 ampoules Tramal®, each 100 mg, into 500 ml of infusion solution.
Infusion rate 12-24 mg Tramal® (16-
20 ml per minute or 30-60 ml/hr).

PCA
Subsequent increments of 20 mg
with a lock-out time of 5 minutes.

Injection
Usual dose 50 mg up to a total of 300 mg
except in special clinical conditions
which might necessitate daily doses up to 400 mg.
Further treatment with Tramal® boluses on demand.

If needed further doses of Tramal® 50 mg up to a total of 200 mg (including the initial bolus) within the first 60 min.

Follow-up

1-2 capsules every 4-6 hours
50 mg
100 mg
1 suppository every 4-6 hours

slow release
100 mg, 150 mg, 200 mg
1 tablet every 12 hours

Intra-Operative

Loading Dose
2.5 - 3 mg/kg at wound closure

Post-Anaesthesia Care Unit

If intra-operative dose not given then:
BOLUS i.v.*
100 mg over 2-3 mins

An intra-operative loading dose of Tramal® will reduce PONV rates

*If needed further doses of 50 mg up to a total of 200 mg (incl. the initial bolus) may be given within the first 60 min.

For patients with localized

BURNING

SHOOTING

STABBING

Neuropathic pain

WORKS WHERE IT HURTS
BRIDION—for optimal neuromuscular blockade management and improved recovery

Predictable and complete reversal

- 98% of BRIDION patients recovered to a TOF* ratio of 0.9 from reappearance of T₁ within 5 minutes
- 97% of BRIDION patients recovered to a TOF* ratio of 0.9 from 1 to 2 PTCs † within 5 minutes

Rapid reversal

- BRIDION rapidly reversed patients from reappearance of T₂ ‡ in 1.4 minutes
- BRIDION rapidly reversed patients from 1 to 2 PTCs † in 2.7 minutes

BRIDION is indicated for the reversal of neuromuscular blockade induced by rocuronium or vecuronium. In children and adolescents (aged 2-17 years), BRIDION is only recommended for routine reversal of moderate rocuronium-induced neuromuscular blockade.

Important safety information

BRIDION is not recommended in patients with severe renal impairment. Studies in patients with hepatic impairment have not been conducted and, therefore, patients with severe hepatic impairment should be treated with great caution. Cautions should be exercised when administering BRIDION to pregnant women as no clinical data on exposed pregnancies are available.

BRIDION has not been investigated in patients receiving rocuronium or vecuronium in the Intensive Care Unit (ICU) setting.

If neuromuscular blockade is required within 24 hours of BRIDION administration, a nondepolarizing neuromuscular blocking agent should be used instead of rocuronium or vecuronium. The most commonly reported adverse reactions were dysgeusia (metal or bitter taste) and anesthetic complications (movement, coughing, grunting, or sucking on the endotracheal tube). In patients treated with BRIDION, a few cases of awareness were reported. The relation to BRIDION was uncertain. In a few individuals, allergic-like reactions (ie, flushing, erythematous rash) following BRIDION were reported. Clinicians should be prepared for the possibility of allergic reactions and take the necessary precautions. In a trial of patients with a history of pulmonary complications, bronchospasm was reported in 2 patients and a causal relationship could not be fully excluded.

Volunteer studies have demonstrated a slight (13%-22%) and transient (<30 minutes) prolongation of the prothrombin time/activated partial thromboplastin time (PT/aPTT) with BRIDION; however, clinical studies have demonstrated no clinically relevant effect on peri- or postoperative bleeding complications with BRIDION alone or in combination with anticoagulants. As BRIDION has demonstrated an in vitro pharmacodynamic interaction with anticoagulants, caution should be exercised in patients on anticoagulation for a pre-existing or concomitant condition. This pharmacodynamic interaction is not clinically relevant for patients receiving routine postoperative prophylactic anticoagulation. Although formal interaction studies have not been conducted, no drug interactions were observed in clinical trials. Preclinical data suggest that clinically significant drug interactions are unlikely with the possible exceptions of toremifene, fusidic acid, and hormonal contraceptives.

† Train-of-four
‡ Post tetanic count
§ Second twitch


Please see summary of product characteristics for full prescribing information.
Pioneering Medical Technology

TAP Block And InfiltraLong
For Effective Treatment
Of Long And Deep Incisions

Sono Cannulas
For Single Shot UltraSound
Guided Nerve Blocks

SonoSystem And SonoLong Curl
For UltraSound Guided Nerve Blocks

Sprotte® 2.G
The New Generation
Dura Puncture In Minimum Time

SonoEye Ophthalmic Block
For Peribulbar And Retrobulbar
Blocks Under Ultrasonic Monitoring

www.mediline-lb.com Tel:+961 1 697500