

Avoidance of Laryngeal Injuries during Gastric Intubation

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تجنب إصابة الحنجرة عند إدخال الأنبوب الغذائي إلى المعدة

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ABSTRACT: Gastric intubation is a common and simple procedure that is often performed on patients who are sedated or anaesthetised. If the gastric tube (GT) is inserted blindly while the patient is unconscious, this procedure may result in easily preventable complications such as laryngeal trauma. We present an interesting case where the blind placement of a orogastric tube (OGT) in an anaesthetised 52-year-old female patient at Sultan Qaboos University Hospital in Oman resulted in significant arytenoid trauma. This led to delayed tracheal extubation. The movement of the GT from the oropharyngeal area to the upper oesophageal sphincter can be visualised and controlled with the use of Magill forceps and a laryngoscope. Therefore, this report highlights the need for GT insertion procedures to be performed under direct vision in patients who are unconscious (due to sedation, anaesthesia or an inherent condition) in order to prevent trauma to the laryngeal structures.

Keywords: Gastrointestinal Intubation; Laryngoscopy, complications; Case Report; Oman.

المخلص: إدخال أنبوب إلى المعدة هو إجراء شائع وغير معقد وغالبا ما يتم تنفيذه على المرضى تحت التخدير أو تحت تأثير المسكنات. إدخال الأنبوب بطريقة عمياء عندما يكون المريض غائبا عن الوعي ممكن أن يؤدي إلى مضاعفات يمكن الوقاية منها بسهولة مثل إصابة الحنجرة. نقدم هنا حالة مثيرة للاهتمام حيث تم إدخال أنبوب أنفي-معوي بطريقة عمياء إلى معدة مريضة تحت التخدير تبلغ 52 عاما مما أدى إلى إصابة كبيرة في الغضروف الطرجهالي قيء دموي وتأخر نزاع الأنبوب الرغامى. من الممكن متابعة حركة الجهاز الهضمي من منطقة الفم والبلعوم إلى العضلة العاصرة المريئية العليا والسيطرة عليها مع استخدام ملقط ميغل والمنظار. لهذا نبرز في هذا التقرير الحاجة إلى إدخال أنابيب الجهاز الهضمي تحت الرؤية المباشرة بالمنظار للمرضى الغائبين عن الوعي (بسبب التخدير أو المسكنات أو أسباب أخرى) لمنع إصابات الحنجرة.

مفتاح الكلمات: تنبيب الجهاز الهضمي؛ تنظير الحنجرة؛ مضاعفات؛ تقرير الحالة؛ سلطنة عمان.

THE INSERTION OF A GASTRIC TUBE (GT) is a common day-to-day procedure in medical practice.¹⁻⁴ A GT is usually inserted to provide a patient with enteral nutrition, to administer medicines and, in some cases, to decompress the stomach.¹⁻⁵ Normally, a GT is inserted usually inserted blindly in a patient. It is a seemingly simple procedure but can sometimes result in serious complications in unconscious patients.^{1,2,6} This case report highlights an incident where a patient experienced laryngeal injuries due to the blind insertion of an orogastric tube (OGT). As the patient was anaesthetised, she could not respond to the impact on her larynx. The authors propose a simple solution to make this procedure less traumatic for unconscious patients. Consent for the write-up and publication of this paper was obtained from the patient.

Case Report

A 52-year-old woman was referred to the Sultan Qaboos University Hospital in Muscat, Oman, for the

coiling of a right carotico-ophthalmic aneurysm. She had been diagnosed with bronchial asthma as well as renal *calculi* (there were two *calculi* on the right side measuring approximately 10 x 5 mm and 4 x 7 mm in size). She was taking salbutamol (two puffs twice daily) which she had been prescribed for bronchial asthma. She was also on several other medications which could have predisposed her to gastrointestinal (GI) bleeding, such as clopidogrel (75 mg twice daily), aspirin (81 mg once daily), nimodipine (30 mg every four hours) and diclofenac (75 mg as required).

There were no signs or symptoms suggestive of reflux oesophagitis, such as heartburn, dyspepsia, chest pain, hoarseness, sore throat, cough or the onset of asthma by heartburn. Moreover, there were no positive risk factors for reflux oesophagitis, including obesity, smoking, alcohol consumption, specific food habits, pregnancy, diabetes, a prior vagotomy or surgery, or an intake of anticholinergic, nitrate and bisphosphonate medications. The patient took diclofenac infrequently for knee pain. She had bronchial asthma but it was seasonal and was not

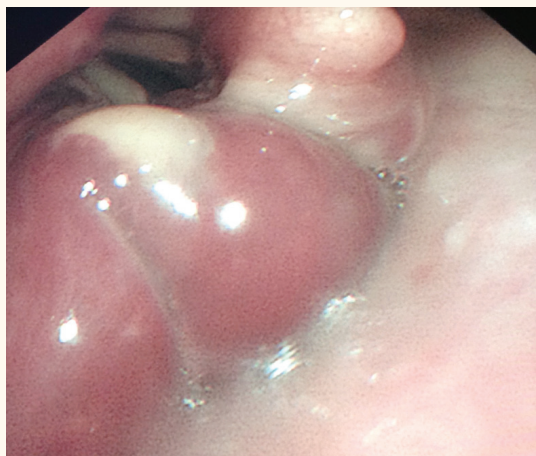


Figure 1: An arytenoid oedema with normal vocal cords.

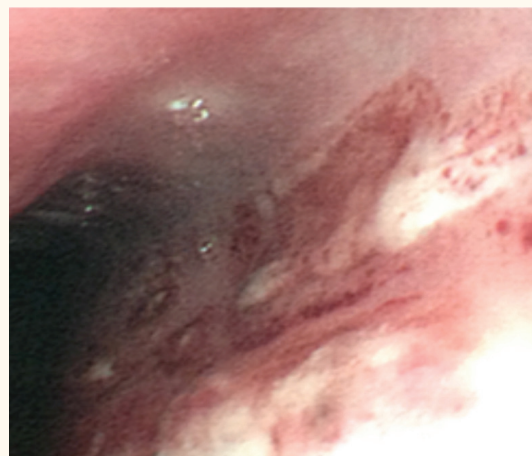


Figure 2: Superficial erosion of the patient's upper oesophagus.

precipitated by heartburn.

Routine investigations for this patient, such as a complete blood count, renal function test and coagulation profile, were found to be within the normal limits.

The aneurysm coiling was scheduled in the catheterisation laboratory under general anaesthesia. The patient's airway was graded as class 1 using the Mallampati score with normal neck movements, a thyromental distance of more than 6 cm and normal teeth. The anaesthesia was induced with propofol (2.5 mg/kg), fentanyl (2 mcg/kg) and rocuronium (0.8 mg/kg). The laryngeal view via the laryngoscopy was considered to be grade 1 using the Cormack-Lehane classification system. All of the laryngeal structures appeared normal without any oedema or bruising. The laryngoscopy was done in a smooth manner. The oral, cuffed endotracheal size 7 tube was placed in a single attempt which took approximately 10 seconds. The anaesthesia was maintained with an air-oxygen mixture of sevoflurane and morphine (0.15 mg/kg). While the patient was on the operating table, it was noted that she had not taken her usual medication that morning or the day before. This omission occurred while she was being transferred from her previous hospital to the Sultan Qaboos University Hospital. Consequently, the radiologist decided to administer aspirin and clopidogrel to facilitate the coiling procedure, after the induction of anaesthesia through the GT.

On the first placement attempt, the GT (tube size 18 FG, Pennine Healthcare, Derby, UK) was lubricated and inserted through the oral cavity. The GT was manoeuvred beyond the tongue but encountered resistance further on. The tube was rotated 60–90 degrees and further insertion was attempted with external pressure on the lateral side of the patient's neck. However, the GT could not be

inserted any further. As the GT had not been frozen prior to insertion, it became more malleable when it was inserted in the patient's oral cavity which meant that further insertion was not possible. Hence, the tube was removed and replaced by another GT of the same type. On this second attempt, the blind insertion of the GT was successful. The placement of the OGT was confirmed by a fluoroscopy and the procedure was completed uneventfully. However, while suctioning the oral cavity, fresh blood was aspirated and a laryngoscopy was consequently done to determine the cause. Oedema and swelling of the laryngeal inlet and laryngopharynx was noted, but the source of bleeding could not be identified. The patient was started on intravenous dexamethasone (8 mg three times daily). At the end of the procedure, it was decided to postpone the extubation and the patient was transferred to the Intensive Care Unit (ICU) for a planned extubation. This was performed after a few hours of steroid administration and a leak test.

Following the extubation, the patient had two episodes of haematemesis in the ICU, losing approximately 100 mL of blood each time. She did not experience any episodes of *epistaxis*. Blood grouping and cross-matching were done. A gastroenterologist was immediately consulted and an omeprazole infusion (8 mg/hour) was started as a preliminary measure. An upper GI endoscopy was performed twice to diagnose the cause of the bleeding. The GI endoscopy revealed an oedematous, bruised pharyngeal mucosa and an oedematous upper airway [Figure 1], multiple superficial erosions in the oesophageal wall [Figure 2] and a superficial ulcer just below the upper oesophageal sphincter. There was a small ulcer with an adherent clot on the gastric wall [Figure 3], which was dislodged through flushing and suctioning.



Figure 3: A small gastric ulcer with an adherent clot.

The patient's clinical condition and routine chest and abdominal X-rays were within normal limits and did not reveal any features indicating perforation of the GI passage. The patient was kept nil per os (fasting) and under observation in the ICU for the following 24 hours. Within this period, her respiratory status did not worsen and there were no more episodes of haematemesis. Her vital signs remained stable during her stay in the ICU. The patient experienced no swelling of the neck, fever, stridor or dysphagia during the postoperative period. She did not require a blood transfusion, although her serial complete blood count showed a slight decrease in haemoglobin percentage (from 12% to 11.2%). After some time, the patient was transferred to the general ward and subsequently discharged to her referring primary care hospital.

Discussion

The placement of a GT is an invasive procedure that is routinely performed blindly by many healthcare workers,² although there are several reports of serious complications caused by blind insertion.^{1,6,7} Blind GT insertion is a simple procedure when performed in conscious patients because muscle tone and swallowing guides the tube to the appropriate path with the patient's cooperation. In anaesthetised patients, no resistance is offered by the adjacent tissues for guidance and therefore, there is a high chance of deviation from the desired path.¹ The predisposing factors for such a complication include repeated attempts at insertion, a difficult insertion, abnormal anatomy, altered mental status and an insertion in anaesthetised patients.^{1,2,4}

The following complications have been reported due to GT placement: trauma to the pharynx and larynx;³⁻⁵ oesophageal and gastric perforation;^{4,7}

broncho-pulmonary placement; pneumothoracic placement,^{4,6} and placement in the brain parenchyma.^{1,2,4} Gentle force can also cause the accidental iatrogenic insertion of a foreign body between the muscle layers, with the formation of a false passage along the line of insertion.⁸ In a case series of 57 patients, 32% of the patients had oedema of the arytenoids following a GT insertion.⁵ This highlights the high incidence of this uncommonly reported entity.

The patient very rapidly developed arytenoid oedema, indicating that this was the result of a direct trauma rather than due to pressure from the GT against her adjacent laryngeal structures. However, a laryngoscopy can also cause its own complications if it is not performed correctly such as sympathetic stimulation if the patient is not sufficiently sedated.⁹ Nevertheless, these problems can occur with any invasive procedure that causes pain; even trauma to the larynx by the blind insertion of a gastric tube can cause pain and sympathetic stimulation. In addition, laryngoscopies may also result in injuries to the tongue and teeth. A large retrospective study found a 0.04–0.05% incidence of dental trauma during the perianaesthetic period in unconscious patients who had had at least one laryngoscopy for an endotracheal intubation.¹⁰ Moreover, there are fewer requirements for lifting the larynx in order to visualise the oesophageal opening when it is lying posterior. As such, it is more easily visualised than the larynx which is anterior.

In the case of the current patient, the arytenoid oedema [Figure 1] can be explained by trauma during the OGT placement.^{2,3,7} The haematemesis was also believed to have been caused by an injury to the upper GI tract during the OGT placement.² The patient was predisposed to bleeding diathesis as a result of her medications which included clopidogrel (75 mg twice daily) and aspirin (81 mg once daily). Yamada *et al.* observed that dual antiplatelet medications can reduce the rate of thromboembolic complications during a coil embolisation for an unruptured cerebral aneurysm.¹¹ Dual antiplatelets could have predisposed the current patient to a GI bleed although evidence shows that the incidence of GI bleeds with dual antiplatelets is low (2.7%).¹¹ A previous history of GI bleeding is the most important and independent predictor for a patient's likelihood of GI bleeding while on antiplatelets.¹² The patient was also prescribed nimodipine due to the cerebral vasodilatory action of this medication. As per the US Food and Drug Administration, the incidence of a GI bleeding in patients taking nimodipine is less than 1%.¹³ In addition, the patient was prescribed diclofenac, which she was taking infrequently for knee pain. This may have predisposed the patient to

GI bleeding in a dose-dependent manner as the risk increases with a higher dosage and sustained-release preparations. A recent meta-analysis has shown that diclofenac's relative risk for causing an upper GI bleed is between 3 to 3.6.¹⁴ Although the patient had missed her final dose of antiplatelet medication the night before the procedure, she still should have been considered a high-risk case for blind insertion of an OGT. This is because anti-platelet medications, especially clopidogrel, have a long duration of action and the time elapsed was not sufficient to prevent bleeding in case of trauma. In the case of this patient, the GT should have been inserted under direct vision, using a laryngoscope and Magill forceps to minimise any trauma.

The endotracheal intubation was performed in the first attempt. The laryngoscopic view was scored as grade 1 using the Cormack-Lehane classification system and there was no evidence of trauma. Therefore, the possibility of laryngeal trauma secondary to intubation was ruled out. As such, the only possible cause of the laryngeal oedema and upper GI tract injuries was direct trauma from the OGT insertion.⁷ Arytenoid dislocation can occur even with an atraumatic intubation, but was ruled out by the absence of painful swallowing, hoarseness of voice or any other respiratory problems.

Episodes of trauma to the upper airway during insertion often go unrecognised, as tests are geared only to confirm the final position of the GT. Trauma to the airway increases the chances of a delayed tracheal extubation. Furthermore, prolonged periods of tracheal intubation and ventilation increase the chances of related complications, such as ventilator-associated pneumonia, hypoxia, deep vein thrombosis and ICU delirium. Morbidity due to an airway trauma is an unnecessary and preventable consequence of the blind placement of a GT.

Conclusion

The insertion of a GT should be attempted orally under direct laryngoscopic vision in sedated or anaesthetised patients. This is especially true for high-risk patients who are on antiplatelet or antithrombotic medications as they have a greater likelihood of bleeding. To maintain quality of care, the utmost precautions should be taken while performing such minor interventions. Consequently, it is recommended that this procedure be performed under the guidance of a gentle laryngoscopy in order to minimise the chances of airway trauma.

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