Goudra ventilating bite block to reduce hypoxemia during endoscopic retrograde cholangiopancreatography

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ABSTRACT

We describe the airway management of a patient presenting for ERCP with a bite block that allows positive pressure ventilation.

Key words: *Airway, bite block, endoscopic retrograde cholangiopancreatography*

INTRODUCTION

In spite of decades of experience in the administration of both conscious sedation and propofol, hypoxemia due to hypoventilation continue to pose challenges during upper gastrointestinal endoscopy.[1,2] Oxygenation and ventilation inadequacies are the major cause of sedation related mortality during these procedures.[3,4] The challenges are — administration of reliable and high concentrations of oxygen, monitoring ventilation, and the ability to support patient's ventilation with the endoscope *in situ*.[5] These disadvantages severely limit the degree of conscious sedation the gastroenterologists can provide and the amount of propofol anesthesia providers can administer. For similar reasons, many anesthesiologists perform endotracheal intubation for endoscopic retrograde cholangiopancreatography (ERCP).[6] Advent of Sedasys can potentially compound these difficulties.[7] We have presented a case of ERCP, where a novel bite block use, addressed the above limitations in a safe and user-friendly manner.

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As illustrated in Figure 1, the bite block has a central aperture for introduction of endoscope through an air-tight, removable diaphragm. Two 15 French connectors provide interchangeable connection to a breathing system or allow insertion of a suction catheter. A soft flexible airway [Figure 2] is designed to be inserted after sedation (to suppress gag), although it can be assembled and inserted before sedation after topicalization. An inflatable cuff surrounding the device allows the creation of an air-tight seal.

CASE REPORT

A 42-year-old male with weighing 46 kg and height 160 cm was scheduled to undergo an ERCP with propofol mediated deep sedation. History included chronic alcoholism, cirrhosis, anemia, and malnutrition. He had a mallampatti class 2 airway, good mouth opening, full neck extension, and flexion. The presence of beard and moustache were noticeable.

The patient was requested to gently bite the bite block between incisors, in front of the anterior ribs [Figure 3]. Using the incorporated pins, the bite block was strapped around the head. The seal was inflated using a syringe without causing discomfort. A transport breathing system was connected to the upper 15 French opening, while the second opening remained closed with a soft seal. While the patient breathed with mouth, oxygen was administered at 10 L/min. Midazolam 3 mg, Fentanyl (25 mcg) was followed by 50 mg of propofol. When the patient was unresponsive, the ERCP endoscope was inserted through the opening in the soft silicone diaphragm. Slight positive pressure facilitated better visualization, by splinting open the soft-tissues. Positive pressure ventilation was provided temporarily with ease, after occluding the nose. A fresh gas flow of 5 L/min was maintained and pressure limiting valve was appropriately adjusted during the whole procedure. Deep sedation was maintained with intermitted propofol and fentanyl boluses. The procedure (stone extraction) was completed uneventfully in about 70 min. The patient was spontaneously ventilating during the procedure, as noticed by the bag movement and end tidal carbon dioxide tracing [Figure 4].

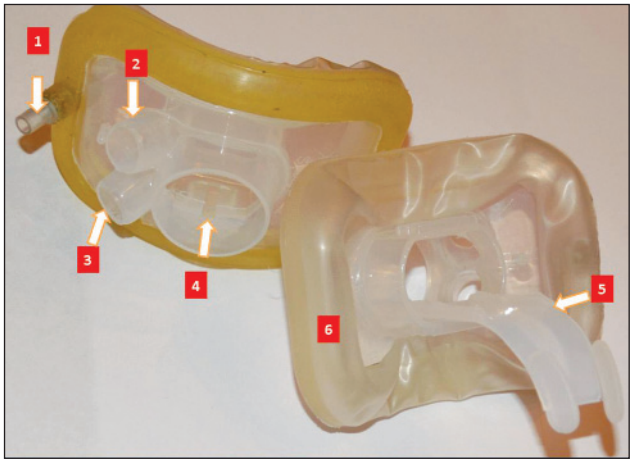

Figure 1: The Goudra bite block: (1) Port for cuff inflation, (2) 15 mm port for connecting to portable breathing system, (3) suction port (closed when not in use to create the air-tight seal), (4) wide snap-type groove for insertion of an airway, (5) airway inserted and in place, and (6) cuff for creating an air-tight seal

Figure 3: The endoscope inserted through the air-tight seal

DISCUSSION

Providing anesthesia for ERCP remains a challenge for anesthesia providers, with high rates of hypoxemia and related morbidity.[2] Excellent reviews are available on the anesthetic management of patients presenting for ERCP.[8] The choice of the airway is debatable.[6] In a recent retrospective analysis of 653 procedures, incidence of hypoxemia was reduced to insignificant levels with

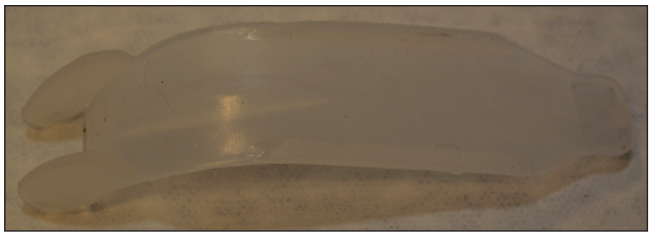

Figure 2: The special insertable Goudra airway with ridges at the front end to prevent both airway closure and assist in insertion of endoscope

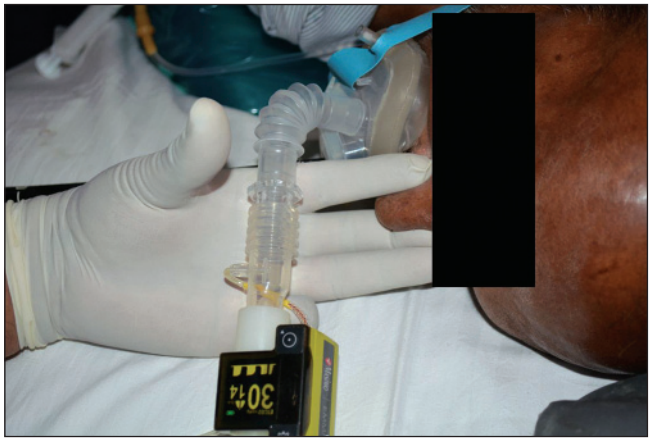

Figure 4: Endoscopic retrograde cholangiopancreatography is in progress with the scope inserted through the self-sealing diaphragm. Manual occlusion of the nose (a special clip is available) allows display of ETCO2 as shown in the Masimo portable capnometer

an improvized airway management.[9] However, such techniques are not easily adaptable and do not allow positive pressure ventilation, while the procedure in progress. Techniques like application of high frequency jet ventilation are too cumbersome for everyday practice.[10,11] Although endotracheal intubation remains the most reliable airway management strategy, an alternative means of positive pressure ventilation is desirable for EECP.

Goudra ventilating bite block has many advantages. Briefly:

1. This is the most practical airway of administering 100% oxygen at the laryngeal inlet.
2. The air-tight nature of the system (after nose occlusion), allows reliable end tidal carbon dioxide tracing and the breathing bag excursion is constantly reassuring. With the traditional bite block, due to an open airway, respiratory monitoring is challenging.[12]
3. Nose occlusion allows the creation of positive pressure in the posterior pharynx, thus allowing better visualization of posterior pharyngeal structures, by splinting open the soft-tissues.
4. More importantly, positive pressure ventilation can be provided, if necessary, after occlusion of the nose to prevent air leak. As most of the emergencies are oxygenation and ventilation related, this bite block can reduce such occurrences.
5. The insertion of the bite block or insertable airway does not require training, the later assists scope insertion.

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