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Successful Use of the Laryngeal Mask Airway during Anesthesia for Upper GI Endoscopy in Patients with Obstructive Sleep Apnea

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Abstract **Case Report**

Anesthetizing obstructive sleep apnea (OSA) patients during esophagogastroduodenoscopy (EGD) can be challenging because of their propensity to develop airway obstruction. The laryngeal mask airway (LMA) is very effective in relieving airway obstruction during anesthesia but is seldom used during EGD because of its potential to interfere with insertion of the scope. We present 9 cases that demonstrate that the LMA can be successfully used during anesthesia for EGD in OSA patients.

Keywords: Obstructive sleep apnea, esophagogastroduodenoscopy, anesthesia, laryngeal mask airway.

INTRODUCTION

The laryngeal mask airway (LMA) plays an important role in the management of patients with difficult airway including those with obstructive sleep apnea (OSA) [1-3]. The LMA, however, is seldom used during esophagogastroduodenoscopy (EGD) or upper endoscopic ultrasound (EUS) because of the assumption that its size will interfere with insertion of an endoscope. We present 9 OSA patients with the diagnosis of or with characteristics strongly suggestive of OSA who successfully underwent EDG/EUS using an LMA attached to a Mapleson D circuit. In the first 2 cases the LMA was used as a rescue measure to relieve severe tongue obstruction. Based upon the success of these 2 experiences, we used the LMA electively in the other 7 cases.

The following case reports describe how the traditional LMA placement technique can be modified to allow successful insertion of an endoscope next to an LMA placed to prevent tongue obstruction in OSA patients undergoing EGD.

Case-1

A 51-year old morbidly obese man was scheduled for EUS examination of a gastric nodule. The patient's medical history included hypertension and diabetes mellitus. He weighed 177 kg, had large neck circumference, BMI of 51 kg/m2, and Mallampati class-3 airway.

After applying the standard monitors (blood pressure, electrocardiogram, pulse oximetry, and capnography) oxygen was administered via a nasal cannula which also sampled expired CO2. Anesthesia was started with intravenous dexmedetomidine 100 mcg administered over 10 minutes which provided moderate sedation. Topical pharyngeal anesthesia was accomplished with 5 ml nebulized lidocaine 4%. The patient was then turned to the left lateral decubitus position and the endoscopy mouth guard was placed between his teeth. Propofol infusion was started at a rate of 100 mcg/kg/min. Propofol boluses (a total of 120 mg) were slowly administered until the depth of anesthesia was judged to be adequate for insertion of the endoscope. Initially an EGD endoscope was inserted to examine the nodule. During the brief examination the patient maintained spontaneous ventilation but experienced significant airway obstruction which was difficult to correct with forceful jaw thrust or by placing a nasal airway. When the patient's oxygen saturation decreased to 80% the endoscopist was asked to remove the endoscope and a size 5 LMA was inserted which effectively relieved the airway obstruction. The LMA was connected to a Mapleson D circuit which allowed positive pressure ventilation. When oxygen saturation

recovered the patient was allowed to breathe spontaneously. The Mapleson D circuit allowed the administration of 100% O2 and monitoring ventilation via CO2 sampling and observation of the reservoir bag's movement with respiration. After discussing different options with the endoscopy team it was decided to attempt inserting the EUS endoscope with the LMA in place. The LMA cuff was deflated completely and the LMA was withdrawn slightly. Insertion of the EUS scope was facilitated by generous lubrication of the endoscope. The ultrasound examination was completed successfully and revealed a hyperechoic lesion suggestive of a lipoma. The LMA was removed when the patient recovered from anesthesia.

Case-2

A 56 year old man who weighed 86 kg presented for EUS evaluation of an asymptomatic pancreatic head mass noted on recent imaging. The patient snored loudly in his sleep, had hypertension, and a 45 cm neck circumference; characteristics strongly suggestive of obstructive sleep apnea (OSA) [2]. After placing the endoscopy mouth guard anesthesia was started with propofol (a total of 250 mg). Soon after, the patient experienced significant airway obstruction that was not effectively relieved by maximal jaw thrust. The mouth guard was removed and a size 4 LMA was inserted which effectively relieved the tongue obstruction. The patient maintained effective spontaneous ventilation using a Mapleson D circuit. The LMA was deflated and was slightly withdrawn. A well lubricated EGD scope was then inserted and revealed a normal examination. A well lubricated EUS scope was then successfully inserted and fine-needle aspiration of the pancreatic head mass was performed through it. The LMA was removed when the patient was fully awake.

Cases 3-9

The Table-1 summarizes the demographics and the anesthesia management of 7 more patients who had the diagnosis or the characteristics of OSA. In each case, the patients were well pre-oxygenated using the Mapleson D circuit. Propofol 2-3 mg/kg was used for induction of anesthesia which was judged to be adequate when the jaw relaxed and the mouth was easy to open. Anesthesia was maintained with propofol 200 – 300 mcg/kg/min. The patients maintained spontaneous respiration throughout the case. Their EGD/EUS was successfully performed with a size 3 LMA in place (Figure-1). The smaller LMA was chosen to give the endoscope more room inside the mouth. If needed, the LMA cuff was deflated and the LMA was slightly withdrawn to facilitate insertion of the endoscope.

Table-1: Demographics and anesthesia management of the 9 reported patients.

Pt	Age	Sex	BMI	OSA Diagnosis	OSA Screen	ASA	LMA Size	Procedure	Duration (min)	Propofol Dose (mg)
1	51	M	51.48	-	+	4	5	EGD/EUS	18	See Text
2	56	M	31.02	-	+	3	4	EUS	24	750
3	62	F	30.41	+		3	3	EGD/CLN	33	750
4	61	M	43.41	+		3	3	EUS	21	670
5	35	F	39.89	+		3	3	EGD/CLN	50	1180
6	70	M	31.26	+		3	3	EGD	5	370
7	53	F	43.75	-	+	3	3	EUS	13	750
8	70	M	32.59	-	+	3	3	EGD	3	300
9	69	M	28.8	+		3	3	EGD/CLN	17	350

Fig-1: An obstructive sleep apnea (OSA) patient undergoing upper edoscopic ultrasound (EUS) examination under propofol anesthesia with a size 3 laryngeal mask airway (LMA) in place. The LMA is attached to a Mapleson D circuit.

DISCUSSION

Anesthesia for upper GI endoscopy in patients with OSA can be challenging because of the propensity of these patients for airway collapse, the fact that the anesthesiologist is sharing the airway with the endoscopist, and the potential for intense upper airway stimulation during insertion of the endoscope. General anesthesia with a secure airway, rather than deep sedation without a secure airway has been recommended for OSA patients undergoing procedures that may mechanically compromise the airway [2]. The short duration of upper GI endoscopic procedures and the fact that endotracheal intubation of patients with OSA can be difficult make it preferable if endotracheal intubation can be avoided during these procedures. The LMA is a very useful tool for management of patients with a difficult airway including those with OSA [1-3]. This report demonstrates that the LMA can be successfully used during upper GI endoscopy in OSA patients and that it can be effective in securing the airway during these procedures.

Conventionally, the LMA is not used in adults undergoing upper GI endoscopy since its cuff blocks the oropharynx and is expected to interfere with insertion of the scope. However, these cases demonstrated that insertion of an endoscope is possible next to an LMA. This can be facilitated by using a small LMA. In most of the presented cases we used size 3 LMA. Currently, we are increasingly using size 2.5 LMA which essentially functions as a cuffed oropharyngeal airway [4]. If needed, withdrawing the LMA or deflating its cuff would help during insertion of the endoscope as would lubricating the LMA and the endoscope.

Ensuring adequate depth of anesthesia is essential during airway instrumentation and is important during placement of the LMA. Close communication and cooperation between the endoscopy and the anesthesia teams are critical for the success of this technique.

An LMA with a dedicated port for insertion of a gastroscope (LMA®Gastro™) was specifically designed for use during upper GI endoscopy [5]. Its use in obese OSA patients, however, has not been studied [5]. The LMA®Gastro is larger and more rigid than a regular LMA. That could make it more difficult to insert than a regular LMA and potentially more traumatic.

CONCLUSIONS

The LMA can play a role in securing a clear airway in patients with OSA during upper GI endoscopy.

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