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Airway management in morbidly obese with cervical instability using awake insertion of supra glottic device and Aintree intubation catheter

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Abstract

We report airway management of a morbidly obese with possible difficult mask ventilation and previous cervical fixation, posted for bariatric surgery under general anesthesia. We achieved insertion of the supra glottic device (SGD) under conscious sedation. Endotracheal intubation was further facilitated using Aintree intubation catheter (AIC) and flexible endoscope assisted intubation via the SGD. Consent from the patient and the IEC approval was obtained prior topublication. We reviewed evidence-based anaesthetic concerns and described our airway management. Our aim was to maintaining continuous oxygenation and achieve a secure airway with minimal neck move-ment. This further guides anesthesia practitioners caring for the obese patients withanticipated
difficulty in mask ventilation and additionalrisks and need for continuous oxygenation.

Keywords: Obese, bariatric, difficult airway, mask ventilation, BMI, neck circumference, Aintree, Cervical instability

Introduction

The obese sub-population is at increased risk of airway related adverse events, due to greater pre-valence of difficult mask ventilation, increased risk of aspiration, compromised oxygen reserves with reduced safe apnea time together may prove disastrous in the setting of limited mobility of cervical joint [1-4]. Though endotracheal intubation is the ideal choice for securing airway to facilitate bariatric surgery, patient with large neck and previous cervical fixation would clearly pose challenges to mask ventilation. Supraglottic devices have established themselves as rescue devices offering several advantages to the obese and are associated with less head and neck movement. We describe airway management technique in a morbidly obese, adult male patient with previous history of fracture C1-C2 and C2-C3 and fixation, posted for laparoscopic bariatric surgery under general anesthesia (Figure 1). There is high possibility of airway compromise in the setting of limited safe apnea time, DMV and instability of cervical spine [5,6]. The concerns with airway management for this patient were limitation of head and neck movement, large neck, presence of moderate OSA and high possibility of DMV and difficult intubation[7-11]

Case Report

We used a novel technique awake insertion of supraglottic device as a conduit and Aintree intuba-tion catheter (AIC; Cook Critical Care, Bloomington, IN, USA) via flexible intubation video endos-cope (FIVE 4 mm); Karl Storz, to facilitate endotracheal intubation (SGD-AIC-FIVE). The primary objective of the AIC technique was to achieve airway intubation without compromising on oxygenation and movement of the cervical joints. Written informed consentfrom the patient and the IEC approval was obtained prior to the procedure and for publication. All the three anesthesiologists involved in this case are experienced in anaesthetising morbidly obese patients and in using AIC through the SGD. Patient was subjected to a thorough preoperative assessment and laboratory studies. On primary assessment; patient was hypertensive, asthmatic, had a neck circumference of 48 cm, BMI of 40 kg/m2, STOPBANG score of 5/8, room air SpO2 of 99% and Mallampati score (MPS) of grade IV. The mouth opening about was 3 cm in inter-incisional distance and the thyromental distance was 5 cm. The laboratory parameters, echocardiography and chest x-ray were unremarkable. The planned procedure was explained to the patient. Pantoprazole 40 mg was given orally the previous night and on the morning of surgery. We planned to maintain airway and insert the SGD under conscious sedation, confirm ventilation using EtCO2, induce general anesthesia and proceed as per the flowchart (Figure 2,3). The cricothyroid membrane was identified and marked using an ultrasound prior to initiating any sedation.The anesthesia team was prepared to perform a surgical airway in a "cannot intubate, cannot oxygenate" scenario. An otolaryngologist was on standby in the operation theater with blade size 15 and size 6.5 endotracheal tube to perform surgical

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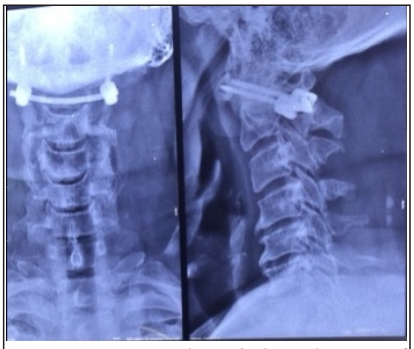

Figure 1: Depicts the radiological image of patients head and neck

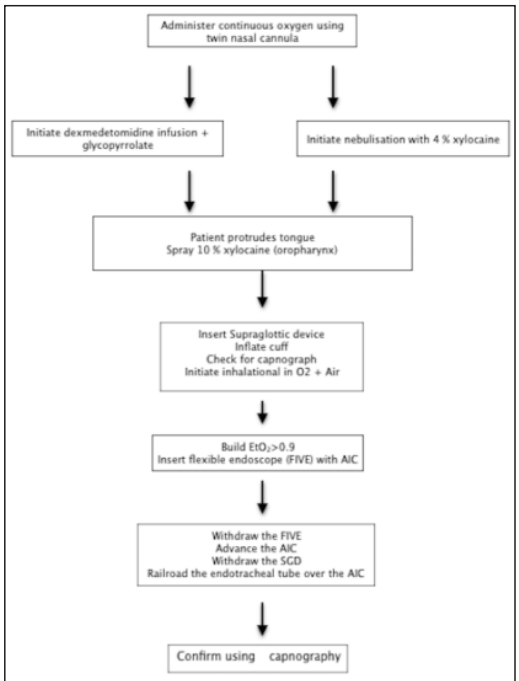

Figure 2: Airway management plan for awake insertion of supra glottic device (SGD) and intubation facilitated via the Aintree intubation catheter (AIC) using flexible intubation video endoscope (FIVE).

Figure 3: Depicts the picture of the supraglottic device (SGD) inserted under conscious sedation and with continuous paraoxygenation

cricithyroidectomy in emer-gency. On the OT table RAMP was maintained and the oropharynx was sprayed with 10% xylocaine. The optimum height of the RAMP was decided using scale-ampoule assembly [10]. Continuous oxygenation was maintained using 15l/min oxygen flows with twin nasal cannula in the preoperative period through out till the trachea was intubated. The steps followed to achieve endotracheal intubation are as per Figure 2. Patient was positioned on RAMP (rapid airway management position) in the immediate preoperative period. Glycopyrrolate 0.2 mg bolus was administered and sedation was initiated using dexmedetomidine 1.5 mcg/kg/hr. He was wheeled in to the operation theater (OT) after about 15 minutes of initiating dexmedetomidine. Sedation was monitored as per Ramsay sedation scale (RSS). At RSS of 5, pa-tient was following verbal commands and allowed smooth insertion of the supraglottic device. The further steps are as per figure 2. Patient's vital parameters were monitored continuously, ever since he arrived in the preoperative area. ProSeal laryngeal mask airway size 4 was inserted into the oropharynx and its placement was con-firmed using capnography Figure 3. Following the confirmation, appropriate induction dose of pro-pofol and atracuriumbesylate (Ideal body weight) were administered. Anaesthesia was maintained with sevoflurane and oxygen. Lungs wereventilated with FiO2 of 1.0 and PEEP of 10 mm Hg to achieve an end-tidal oxygen > 0.9. A gastric drain was used to decompress the stomach. Intubation of the trachea was facilitated using AIC loaded over 4mm, flexible endoscope of Karl Storz, through the supra glottic device. The Aintree intubating catheter (AIC) (Cook® Medical Inc., Bloomington, IN, USA) has a fixed length of 56 cm and 4.8 mm diameter lumen. The technique of using AIC and enabling fiberoptic-guided intubation through a laryngeal mask airway (LMA) has been suggested when conventional attempts at tracheal intubation face challenge (Figure 4). 12-15 The patient had no recall of the procedure and allowed smooth insertion of the SGD. Following this and induction of anesthesia, intubation of trachea could be achieved in 20 seconds. No adverse events were observed during this period. The minimum saturation achieved during this period was 99 percent.

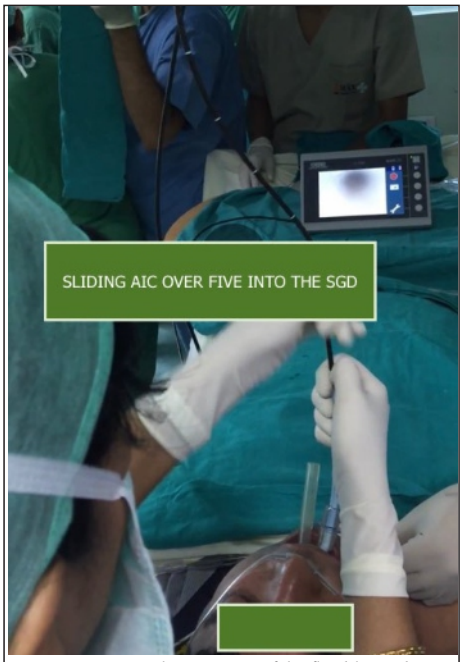

Figure 4: Depicts the insertion of the flexible intubation video endoscope (FIVE) with the AIC (Aintree intubation catheter) over it and the assembly is further inserted through the supraglottic device (SGD). The FIVE is advanced till the carina is visualised. Thereafter the AIC is advanced and the SGD is pulled out with a gentle pressure over the AIC to prevent its outward slippage.

Discussion

Endotracheal intubation is ideal choice for securing airway to facilitate bariatric surgery. The preo-perative concerns in this case were, anticipated difficult mask ventilation and restriction to neck movement. Considering the previous surgery on cervical vertebrae was a concern prior to intuba-tion. We planned an Aintree (AIC) guided intubation through laryngeal mask airway [14-16]. Patients with previous cervical spine/cord injury may be encountered for both elective and emer-gency airway management. Previous cervical spine injury and limited range of motion are a chal-lenge to the anesthesiologists. It is advisable to consider alternative technique while maintaining neutral position and minimizing neck motion. Inability to flex the neck and extend the head increases risk for failure of tracheal intubation using direct laryngoscopy. Risk of neurologic injury while securing airway with conventional methods is also a concern to the anaesthesiologist.Patients who have undergone previous cervical spine surgery need a special consideration with respect to minimising the movement during laryngoscopy and intubation to pre-empt any hazard to the spinal cord. These patients may require urgent or emergent airway intervention for airway protection, hypoxia, hypoventilation, or hypotension that may be a consequence of spinal cord injury. It is

imperative for the caregivers to be familiar with possible techniques to minimise the risk of spinal cord injury dur-ing airway management. This patient was morbidly obese, had a large neck circumference, possible obstructive sleep apnea and other risk factors to suggest a potential difficult mask ventilation and the presence of fixed neck at C1 and C2 compound the challenges many fold. The concerns of airway compromise during procedural sedation and induction of general anesthesia magnify several folds in the morbidly obese. The present case report aims to highlight the preferable technique for intubation and securing airway in such a scenario. Several practitioners might consider awakefiberoptic assisted intubation (FOAI) as their first line of management, however, FOAI has been shown to take longer duration, more airway manipulations and is associated with more airway related complications. Airway col-lapse is very common in the obese even with mild sedation. With onset of induction making the mask ventilation very challenging and at times impossible. Dexmedetomidine has been successfully used to facilitate FOB and to ensure sedoanalgesia (sedation with analgesia) in such patients. We combined the SGD insertion with flexible endoscope assisted intubation to ensure complete control of the airway. Following successful insertion of SGD,plane of anesthesia could be deepened and muscle relaxant administered. It also enabled us to administer appropriate PEEP, thereby allowing prolongation of apnea time during tracheal intubation using AIC [9,10]. Patients with a high BMI have a high risk for OSA. It is imperative to be mindful of the repercus-sions of undiagnosed obstructive sleep apnea. It might be associated with airway obstruction, an independent risk factor for impossible mask ventilation[1-3].This method allows for soft endotracheal intubation. In the present report, it was only performed on patients with a cervical spine problem. However, this method can be considered as a substitute or complementary for patients expected to have difficult airways due to other causes. To conclude the 'SGD-AIC-FIVE' technique with awake insertion of the SGD is safe and effective option for morbidly obese patients who might be difficult to mask ventilate and have concerns of limited or restricted neck extension after induction of anesthesia. This technique allows full control of airway with no compromise with neck mobility. Moreover, it enables build up of oxygen reserves while securing the airway.

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