Case Report

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The Back Up Head Elevated Position Facilitates Tracheal Intubation in a Super-Super Obese Patient Undergoing Subtotal Gastrectomy: A Case Report

Yu-Shiuan Fu[1], Shung-Chun Chung[1], Hsiu-Jung Lin[1], Chia-Hsun You[1], Tien-Chou Soong[2], Li-Ren Yeh[1,]*

Due to the difficulty in performing tracheal intubation (TI) in patients with morbid obesity, a proper positioning of these patients is a critical step for successful TI using direct laryngoscopy. This study presented a patient with super-super obesity (BMI > 60 kg/m^2) scheduled for subtotal gastrectomy. We set a back-up head-elevated (BUHE) position for the patient to achieve a good glottic view for facilitating TI, which was successfully completed in the BUHE position. Thus, in super-super obese patients, BUHE may be the position of choice for TI.

Key words: back-up head-elevated position, subtotal gastrectomy, super-super obesity, tracheal intubation.

Introduction

According to the definition of the World Health Organization, obesity is defined as a body mass index (BMI) ≥ 30 kg/m^2. In addition, obesity is subcategorized into: grade 1 (BMI 30 to < 35 kg/m^2), grade 2 (BMI 35 to < 40 kg/m^2), and grade 3 (BMI ≥ 40 kg/m^2).[2] Furthermore, super obesity and super-super obesity (SSO) are defined as a BMI ≥ 50 kg/m^2 and a BMI ≥ 60 kg/m^2, respectively.[12] SSO is a known contributor to difficult airway management, particularly tracheal intubation (TI).[8] In view of the limited research addressing proper airway management in patients with SSO, this study investigated airway management in an adult patient with SSO scheduled for laparoscopic subtotal gastrectomy.

Case Report

Laparoscopic subtotal gastrectomy was planned for a 36-year-old man with SSO (weight = 200.9 kg and height = 177 cm. BMI: 63 kg/m^2). The patient had a history of fatty liver, hypertension and obstructive sleep apnea syndrome. Pre-operative examination showed that the patient had a short thick neck and belonged to Mallampati Class III. Oxygen saturation level on room air was between 92% and 95%.

The process of anesthesia began with the placement of a 20G cannula in the cephalic vein for intravenous infusion. Taking into con-

From the [1]Department of Anesthesiology, E-Da Cancer Hospital; [2]Department of General Surgery, E-Da DaChang Hospital, Kaohsiung, Taiwan.

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* Address reprint request and correspondence to: Li-Ren Yeh, No.32, Ln. 75, Chaoming Rd. Nanzi Dist., Kaohsiung, Taiwan.
Tel: 0971-503-369, E-mail: ed110880@edah.org.tw

sideration the potential difficulty encountered during TI, we prepared supraglottic airway devices, endotracheal tubes and laryngoscope blades, stylet, gum elastic bougie, fiberoptic bronchoscope and emergency tracheostomy kit of different size as rescue procedures of airway management before induction. Meanwhile, noninvasive monitoring, including blood pressure, electrocardiogram, and pulse oximetry, was set before induction. The patient was then positioned in a back-up head-elevated (BUHE) position for five minutes for pre-oxygenation with 100% oxygen (Fig. 1). The patient was administered an intravenous bolus of fentanyl 100 mg, lidocaine 60 mg, and propofol 150 mg for anesthesia induction. A bolus of rocuronium 100 mg was then administered to the patient to facilitate TI. Laryngoscopy using the McCoy laryngoscope blade (size 3) was first attempted while keeping the head in the BUHE position. With a glottic view of Cormack-Lehane grade

Fig. 1 Proper positioning of obese patients in a back-up head elevated position to facilitate tracheal intubation.

2, endotracheal intubation was performed successfully on the first attempt with a 7.5-mm-inner-diameter endotracheal tube. Correct tube placement was verified by auscultation and capnography. Using volume control mode, the respiration rate was set at 12 breaths per minute, the end-tidal CO_2 value was maintained at 35-40 mmHg. Mechanical ventilation was adjusted to keep a tidal volume of 4 mL/kg with a positive end-expiratory pressure (PEEP) of 7 cmH_2O. Anesthesia was maintained with 3% inhalational sevoflurane in an O_2/air mixture delivered at a rate of 2 L/min and intravenous rocuronium during the laparoscopic procedure.

Before the operation, the patient was placed in a supine position with the skin well prepared and draped with sterile procedure after bladder decompression. Two transverse 12 mm peri-umbilical skin incisions were made and a Veress needle was inserted for creation of pneumoperitoneum. A 5 mm Surgi-port was indwelled over the left midclavicular line. In addition, a long and narrow gastric tube was created with Endo-GIA. The wounds were sutured with 2-0 vicryl and 4-0 polysorb subcutically and covered with sterile gauzes.

At the end of the procedure, 400 mg sugammadex was administered intravenously to reverse neuromuscular blockade. There were no episodes of desaturation, severe hypotension/hypertension or arrhythmias during the procedure. The patient was transferred to the Intensive Care Unit after surgery, extubated after regaining conscionsness, and given 50% oxygen at 10 L/min through the Venturi mask. No reintubation was needed after the surgery.

Discussion

Difficulties encountered during laryngoscopy and TI can be attributed to obesity.[8-9] Difficult TI significantly contributes to the morbidity and mortality associated with general anesthesia.[9] Previous studies suggested that BUHE positioning could improve glottic views and reduce apnea time.[1] Athough some previous studies have addressed the issue of airway management during anesthesia in patients with SSO, the use of BUHE position to obtain a good glottic view for facilitating TI during anesthesia induction in this patient population has not been reported.

The elevated peak pressure and normal

plateau pressure in our patient suggested the presence of bronchospasm, secretions or obstruction. Excessive intra-abdominal pressure that decreases pulmonary volumes due to abdominal guarding from surgical stimulation in SSO patients under general anesthesia has previously been reported.[4-5] Our patient's condition was improved with the intravenous administration of rocuronium to reduce abdominal guarding. The administration of neuromuscular blockers has been shown to lower airway and intra-abdominal pressure.[3]

In general, patients with SSO are at high risk of aspiration and upper airway obstruction following tracheal extubation. Prompt recovery from anesthesia is important for reducing postoperative complication.[6] In this way, sugammadex plays an important role in fast-track bariatric anesthesia because it provides faster recovery from profound rocuronium-induced neuromuscular blockade than neostigmine dose for morbidly obese patients.[7]

The best clinical predictor of sleep apnea syndrome in the obese population is the severity of snoring which objectively reflects nocturnal breath cessation, and apnea attacks.[10] Therefore morbidly obese men are at extremely high risk for sleep apnea syndrome. For this reason, not only is the BUHE position useful in TI but it also facilitates mask ventilation.

Moreover, positioning of the surgical patient is an important part of anesthesia care. It can help prevent serious complications simply by paying attention to the physical and physiological consequences of positioning. In anesthetized patients, the best ventilation to the non-dependent lung zones is achieved by positive-pressure ventilation. In BUHE position, ventilation of the dependent lung is improved by displacement of the abdominal viscera downward from the diaphragm. During laparoscopic gastric banding surgery for the morbidly obese, it has been reported that a combination of PEEP of 10 cmH_2O and a head-up position could improve PaO_2 in the supine position but not PEEP alone.[11]

In conclusion, the use of BUHE position during anesthesia induction for SSO patients facilitated smooth preoxygenation, good glottic view, and successful TI. Our experience suggests that the BUHE position could be generally applied in patients with SSO for anesthesia induction.

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