Short Communication

BIOMEDICAL Journal of Scientific & Technical Research

ISSN: 2574 -1241

DOI: 10.26717/BJSTR.2023.49.007731

Remimazolam for Sedation with Preserved Spontaneous Respiratory Intubation: Experience of Airway Management in an Obesity Patient with Severe Trauma

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ARTICLE INFO

Received: February 17, 2023

Published: February 28, 2023

Citation: Shijuan Zeng, Zhiming Zhang and Xia Chen. Remimazolam for Sedation with Preserved Spontaneous Respiratory Intubation: Experience of Airway Management in an Obesity Patient with Severe Trauma. Biomed J Sci & Tech Res 49(1)-2023. BJSTR. MS.ID.007731.

Introduction

A 28-year-old male, 180 cm tall, 120 kg, was admitted to the hospital with multiple body aches, hemorrhage, limited movement, and transiently altered consciousness for more than 1 hour after a motor vehicle accident. On physical examination, he had multiple skin contusions all over his body and hemorrhagic wounds on his face and the lateral aspect of his left knee. He had no recollection of the scene of the accident and had no memory of the scene of the accident. His medical history included usual good health, no history of immunizations, no history of allergies, no history of blood products, no history of AIDS, no history of tuberculosis, no history of surgery, no history of trauma, and only a history of asymptomatic hepatitis B and mild symptomatic stomach disease.

Ct Findings

1. Multiple pulmonary contusions of the right lung and lower lobe of the left lung, multiple rib fractures on the right side, fracture and dislocation of the right clavicle.

2. Soft tissues of the left knee and left lateral thigh, extensive soft tissue crush injuries in the lower part No obvious intracranial hematoma and skull fracture.

3. No obvious signs of fracture or dislocation of the skull. No obvious signs of fracture or dislocation in the maxillofacial region and localized swelling of facial soft tissues.

4. No noticeable traumatic changes in the entire abdomen.

5. No obvious signs of fracture or dislocation on plain radiographs of the left upper middle femur, left knee joint, and left upper middle tibiofibula.

There were no laboratory findings. He was diagnosed with

1. Left knee collateral ligament injury

2. Right clavicle fracture

3. Left lower extremity skin laceration (knee joint)

4. Concussion

5. Facial skin laceration

6. Multiple skin contusions all over the body.

Due to massive spontaneous bleeding from the wound, the patient was admitted to the emergency operating room for wound debridement and hemostasis. The patient was self-conscious on entering the operating room. Routine vital signs were as follows: T: 37°C P: 124 beats per minute R: 25 beats per minute BP: 116/67 mmHg; respiratory sounds were clear in both lungs, and no dry rales were heard. A large skin laceration with severe contusion of the surrounding skin and uneven edges was seen on the lateral side of the left knee, and a foreign body resembling sediment was left inside the wound. To measure invasive arterial blood pressure, the right radial artery was punctured and a catheter was left in place under

local anesthesia with 2% lidocaine 0.5 ml. The mouth was open to 2 fingers, the neck was well mobile, 2 maxillary incisors were lost due to this trauma, and black blood clots were visible in the oral cavity, which could not be accurately assessed by the Mallampati grading method.

Due to the patient's high body mass index of 37.4 and oral congestion, airway grading could not be achieved, and rapid induction of general anesthesia may present an emergency airway risk [1], while the presence of oral blood clots increased the risk of hemorrhagic aspiration. Based on the above, we prepared the patient for awake tracheal intubation [2]. The patient was given 100% oxygen through a face mask and the first dose of dexmedetomidine 40ug was pumped over 10 min [3,4]. analgesic strategy: intravenous ibuprofenone 2mg, sufentanil 10ug. Lidocaine spray was sprayed into the nasal and oropharyngeal cavities and the patient was instructed to cough, repeated three times with the expectation of achieving adequate surface anesthesia [5]. The airway is explored through the nasal cavity using a fiberoptic bronchoscope (lubricate the fiberoptic bronchoscope with paraffin oil). The bronchoscope was passed smoothly through the left nasal chanal into the oropharyngeal cavity.

The fiberoptic bronchoscope was unable to explore the structures in the patient's oropharyngeal cavity because the patient's oropharyngeal cavity was covered with a blood clot, and it was difficult to distinguish the epiglottis from the vocal cords [6]. After repeated attempts at nasal intubation, the patient became irritable and was unable to cooperate with continued awake tracheal intubation. A variation of remedial intubation was used: natural breathing video-laryngoscopic tracheal intubation was preserved under adequate sedation. After 5 minutes of 100% oxygen inhalation from the mask, the sedative drug Remimazolam 18 mg was slowly administered intravenously (over 1 minute). After the patient falls asleep, the oral cavity is exposed with the visual laryngoscope and lidocaine is sequentially sprayed until the pharyngeal cavity is completely sprayed.

When the oropharyngeal cavity was exposed with the visual laryngoscope, under adequate sedation, the patient showed no movement and good spontaneous breathing, and the epiglottis and vocal folds were visible on the laryngoscope. Adequate anesthesia was given (sufentanil 40ug, rocuronium 50mg rapidly intravenously) and endotracheal intubation was successfully completed with a mild choking response in the endotracheally intubated patient. Intraoperatively, the patient's vital signs and hemodynamics were stable, and the operation went smoothly and safely returned to the ICU. on postoperative follow-up, the patient recovered well with no significant discomfort.

Discussion

For lower extremity surgery, if there are no contraindications, we usually have the option of spinal block or nerve block anesthesia to complete the procedure. Spinal block and nerve block anesthesia require postural placement [7,8], and this patient was unable to cooperate with postural placement due to trauma and obesity from multiple fractures throughout the body. The patient had a large area of trauma to the left leg, and simple nerve block anesthesia was not adequate. General anesthesia would have been a more appropriate option. However, obese patients are significant difficulty in airway management under general anesthesia, and a professional preoperative assessment and appropriate choice of anesthesia plan are prerequisites to ensure patient life safety. Class III and IV obese patients undergoing general anesthesia are at risk for a difficult airway [1], and the implementation of rapid induction of general anesthesia will risk an emergency airway.

For a predictable difficult airway, our most common technical strategy is awake tracheal intubation – fiberoptic-guided nasal tracheal intubation. Fiberoptic-guided nasal tracheal intubation failed in this case because of patient's mouth was bleeding, result in a the unclear view of fiberoptic in the oropharyngeal cavity structures, and making it difficult to find the epiglottis and vocal cords. As there were reported, even some hospitals in the rural county of China, operating rooms are not equipped with a fiberoptics. They are not able to use fiberoptic guidance nasal tracheal intubation. In such cases, visual laryngoscopic tracheal intubation was performed with preserve spontaneous breathing in sedation status. First, the choice of anesthetic drugs is critical [9,10]. Our commonly used anesthetic sedation drugs are midazolam, propofol, etomidate, dexmedetomidine, and a new drug, Remimazolam benzoate, which has been marketed in recent years.

Propofol and etomidate carry the risk of respiratory depression. Although the respiratory depression of dexmedetomidine is minimal, there is a lack of reports of amnesia in patients using dexmedetomidine alone, and there is a risk of psychiatric effects in patients undergoing laryngoscopic tracheal intubation. Midazolam has minimal respiratory depressant effects, but the drug has a long duration of action and poor control [10]. Remimazolam benzoate is a benzodiazepine sedative-hypnotic, short-acting GABAA receptor agonist with small respiratory depression, hydrolyzed in vivo by nonspecific esterases, no pharmacological activity of the metabolite zolpidem propionic acid, rapid onset of action [11], short recovery time from sedation, rapidly reversible by flumazenil, good safety and controllability, and theoretically a more perfect sedative drug for tracheal intubation to preserve voluntary breathing [12-14].

Secondly, good local anesthesia of the oropharyngeal cavity and airway is also the focus [2]. The laryngoscope enters the oropharyngeal cavity to expose the vocal cords to produce strong stimulation of the pharynx, and simple general anesthetic sedative drugs cannot completely suppress the pharyngeal reflex. Patients undergoing emergency surgery should have a full stomch [15,16], and strong pharyngeal stimulation can induce vomiting and misaspiration, with the risk of laryngospasm and body movement, and the teeth cannot be closed to cooperate with intubation [15].

Conclusion

Airway management is the key and difficult part of general anesthesia. The strengthening of the preoperative assessment of the patient's airway will avoid the occurrence of an emergency-airway, development of a reasonable and practical anesthetic plan, including appropriate techniques and anesthetics, could reduce the anesthesia relating risks dramatically in obesity patients with difficult airways.

Acknowledgements and Funding

This work was supported by Hunan Provincial Science and Technology Plan Project Funding (grant number 2020SK50303), Hunan Medical Association Medical Research Fund Grant Project (grant number 2021109101425) and Perioperative Analgesia and Sedation Research Project of Bethune foundation (grant number: BCF-RF-WSQZTZJ-202011-065).

Competing Interests

There were no competing interests declared by the authors.

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ISSN: 2574-1241

DOI: 10.26717/BJSTR.2023.49.007731

Xia Chen. Biomed J Sci & Tech Res