Anesthetic Management of a Patient with Severe

Sadikova M.A. Andijan State Medical Institute

ABSTRACT

Anesthetic management of the treatment of patients with scar contracture of the neck is associated with many problems. In this case, a 38-year-old woman with severe cicatricial contracture on her face, neck, front of her chest, and shoulders underwent flap surgery. We attempted a fiberoptic orotracheal intubation using the Glide Scope. Video laryngoscopy was performed after surgical removal of cicatricial contracture under local anesthesia. We report the successful treatment of a patient with severe burn contracture, achieved by the joint efforts of surgeons and anesthesiologists.

Keywords: Acute fiberoptic intubation, burn contracture, videolaryngoscope.

In patients who develop post-burn cicatricial contractures of the neck, anesthetic management is associated with many problems, such as obstructed respiratory passage, limited venous access, lack of healthy tissue for observation, drug dependence, repeated use of anesthetics, a tendency to hypothermia and inaccurate assessment of blood loss [2]. Since airway difficulties are an important cause of major anesthesia-related illness and death, many alternatives to direct laryngoscopy need to be prepared in advance.

However, in patients with severe contracture, functional and anatomical distortions can lead to ineffective intubation. Therefore, careful planning of anesthesia is essential to avoid catastrophic outcomes. We report a case where a patient with severe burn contracture affecting the neck, face, anterior chest and both shoulders, endotracheal intubation was achieved through the joint efforts of surgeons and anesthetists.

Disease history

In 2018, a 38-year-old woman was hospitalized at the Andijan Regional Multidisciplinary Medical Center with severe scar contracture due to a flame burn to her neck and chest. After three reconstructive operations, his contracture worsened due to the development of extensive keloid scars. He developed severe cicatricial contractures on the neck, face, front of the chest, and shoulders, including the forearms. Severe chin-sternum contracture resulted in significant deformity. The chin, chest, and both shoulders were joined by keloid scars that impede flexion and neck bending. The cervico-chin and chin-sternum angles were completely obliterated by thick, rigid scars, and the anterior structures of the neck, including the larynx, trachea, and carotid arteries, were not identified or palpable (Fig. 1). An otolaryngologist was consulted to assess the state of the respiratory system. However, the endoscopic examination of the respirators could not be performed due to the narrow external nostrils and the small mouth opening. Preoperative radiography and computed tomography (CT) scans to assess the passage of the respirators and associated structures revealed a marked thickening of the soft tissue around the neck without deformity or stenosis of the upper respirators and trachea. Due to the limited opening of the mouth, we were unable to perform the modified Mallampati test (mMT). Ventilation through the face mask was difficult due to the almost fixed neck motion and mandibular immobility. For the same

reason, conventional laryngoscopic intubation was considered impossible.

Fig. 1. Photographs of the Patient on Admission. There are severe contractures of the mandible, the neck and the lower part of the face, with narrow nares and a small oral opening (microstomia) that were due to the facial and perioral contractures. The neck is held in flexion, and the mandible is regressed and fixed near the sternum, impossible for the patient to extend the neck or distract the mandible. The structure of anterior neck is unidentifiable and impalpable.

Since the diameter of the nostrils was about 0.5 cm, intubation of the patient through the nasal approach was also not possible. Therefore, we looked at several complementary techniques such as fiber optic bronchoscopy, laryngeal mask respirator, light stick or Glide Scope, a video laryngoscope that can be used simultaneously. On the eve of the operation, a peripheral intravenous catheter was placed. Atropine sulfate 0.1 mg was administered to the patient intramuscularly to reduce the secretion from the oral cavity immediately before transfer to the operating room. He was placed in the supine position on an operating table with a standard monitor. The first attempt at fiber-optic intubation while awake was performed after topical application of lidocaine spray to the oral cavity and pharynx. However, intubation was not possible due to significant restriction of the mouth opening. Surgical tracheostomy was also not possible because the thick scar did not allow identification of the neck anatomy. Therefore, it was decided to carry out an operation to eliminate contractures of the neck and mouth under the local anesthetic lidocaine (total 400 mg) in order to improve the opening of the mouth, freeing the lower jaw from scars. Systemic effects such as hypotension, bradycardia, arrhythmia and seizures were absent. The initial surgery to release the scars on the neck was performed with intermittent dosing of fentanyl (200 mcg total). Dissection of the scars of almost the entire circumference of the neck was sufficient to insert the blade of the laryngoscope (Fig. 2). Since it was impossible to identify the glossopharyngeal and superior laryngeal nerve even after the contractures were removed, …… it was not possible to perform a nerve block.

Following the application of a topical spray of lidocaine to the oral cavity and pharynx, orotracheal intubation of the cuffed tube (inner diameter 7.0 mm) was performed using fiber optic bronchoscopy under the Glide Scope (video laryngoscope guidance). There were no particular difficulties during intubation. Auscultation of the upper sections of both lungs confirmed the effectiveness of intubation.

After the operation, the patient underwent prolonged mechanical ventilation in the department of injury. He received a continuous infusion of midazolam for sedation. 4 hours after the operation, sedation was discontinued and extubation was performed. Spontaneous breathing was effective with good chest excursion. On the 2nd day after the operation, the patient was transferred to the general ward.

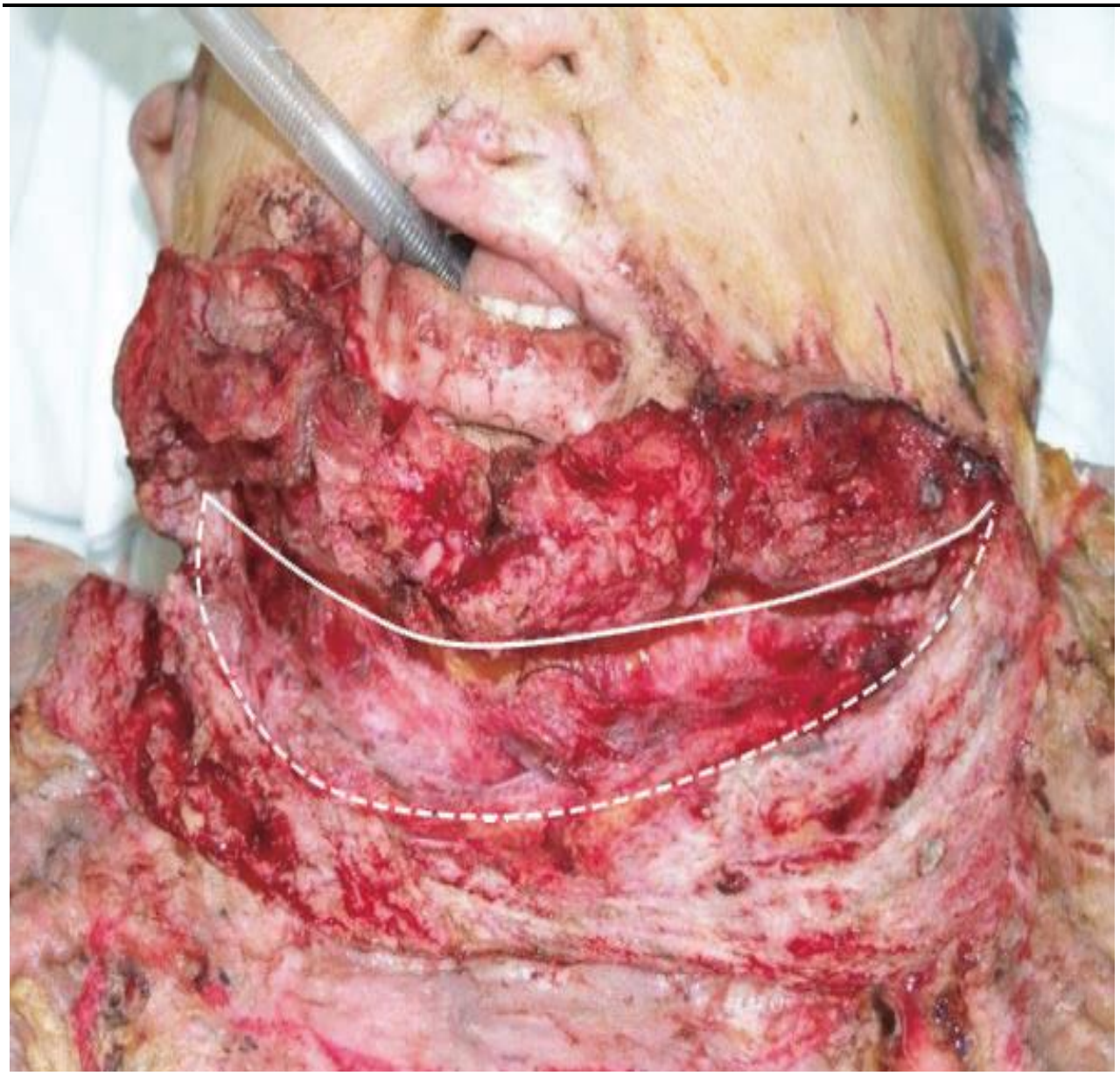

Fig. 2. Intubated state after release of the neck and mouth contractures. The solid line is drawn a transverse incision line under local anesthesia. And the part between a solid line and a dotted line is released area.; this requires dissecting nearly whole circumference of the neck, leaving a large, stellate wound involving the lower face, the neck, the upper chest.

Discussion

Anesthetic treatment of patients with severe post-burn neck contracture is associated with many complex problems. Respiratory patency difficulties are the most serious and the consequences can be catastrophic. Respiratory anamnesis pathways and physical examination should be performed prior to initiation of anesthetic care and respiratory management so that anesthesiologists can assess the degree of respiratory obstruction and prepare options for respiratory management. The American Society of Anesthesiologists' Working Group on the Treatment of Obstructed Respiratory has proposed several elements of a preoperative physical respiratory examination that may indicate the presence of rigid intubation during traditional oral laryngoscopy [3]. Many previous studies reported that the modified Mallampati test (mMT) most commonly used a single test to assess respiratory patency [4,5]. However, contracture of the perioral region is accompanied in most cases of submental-sternal contracture, and it has recently been

reported that mMT is not suitable for use alone in the clinical setting due to its low sensitivity and insufficient predictive value [5]. Therefore, other criteria are needed. There are currently no recommended guidelines for patients with burn scars, therefore, the implementation of respiratory patency, treatment of these patients is entirely dependent on the clinical judgment of an experienced anesthesiologist. Attempts have been made to classify patients with burn scars according to the degree of contracture and to assess the respiratory based on previous studies. Onah [6] proposed a classification system with four main numerical categories, which is based on the degree of flexion or extension of the contracted neck and its anatomical position. Difficulty intubation can be expected with types 2 and 3; especially in type 3, when the distance between the chin and the protrusion of the thyroid gland is sharply reduced. Common available substitutes for complex intubation are alternative laryngoscope blade, awake intubation, oral or nasal blind intubation, fiberoptic intubation, intubation stylet or tube changer, laryngeal mask airway (LMA) as an intubation channel, light guide, retrograde intubation, and invasive to the respiratory tract [7]. Extracorporeal membrane oxygenation (ECMO) remains the last method. In our case, due to strong contractures and microstomy, a direct visual examination of the oral cavity and pharynx was impossible. We excluded the LMA because a size 4 for an adult male was too large to fit through his mouth. We did not consider retrograde intubation or tracheostomy because the anterior structures of the neck, including the larynx, trachea, and carotid arteries, were not identified or palpable. A different approach was needed. Wong et al. [8] proposed several options for managing respiratory patency in contractures of the neck, face and anterior chest. These include: awake intubation with fiberoptic bronchoscopy, ventilation with a face mask followed by surgical scar release, then tracheal intubation, respiratory anesthesia with a laryngeal mask and scar release, then intubation, if necessary, respiratory intubation with a laryngeal mask, tracheostomy, or cricothyroidotomy and surgical scar removal under local anesthesia and ketamine, followed by intubation. We chose awake intubation with fiber optic bronchoscopy. On the first attempt, we were unable to insert the endotracheal tube into the patient's mouth because the opening was less than 1 cm wide. Surgical excision of the scar under local anesthesia for intubation was the only option when fiber optic intubation while awake failed. Because induction of anesthesia and initial respiratory control are potentially hazardous [2,9], careful planning for surgery and anesthesia is necessary. Ideally, the surgeon should be in the room during the induction of anesthesia, ready for emergency release of contractures, tracheotomy, or both. If intubation is difficult or impossible, rapid partial release from contractures can greatly facilitate intubation [9]. The use of ketamine in previous clinical cases has been reported [10]. However, fentanyl was administered intermittently to relieve pain. Removing the contractures required cutting nearly the entire circumference of the neck, leaving a large stellate wound on the lower face, neck, upper chest, and shoulders. The total amount of lidocaine used in local anesthesia was about 400 mg and fentanyl was about 200 mcg. Despite surgical intervention, the mouth opening was found to be insufficient for traditional intubation. We decided to perform awake intubation using fiberoptic bronchoscopy under the Glide Scope (video laryngoscope). In recent years, advances in optical technology have led to the development of several new indirect laryngoscopes, including the Glide Scope. (video laryngoscope) [11]. This device visualizes the laryngeal orifice using indirect mechanisms, eliminating the need to align the oral, pharyngeal and tracheal axes, potentially facilitating visualization of the larynx and subsequent tracheal intubation. It is autonomous and very similar in appearance and technique to a laryngoscope, which makes this clinical approach very affordable [12]. But this device has limitations associated with the difficulties arising in the advancement of the tracheal tube towards the video monitor [13]. These drawbacks can be eliminated by using fiber-optic bronchoscopy as a guide. Fiber optic bronchoscopy provides excellent visualization

of the glottis. Another important advantage of fiber optic technology is that the dynamics of endotracheal tube insertion can be monitored continuously on a screen until intubation is complete. If the endotracheal tube does not enter the trachea directly, it can be manipulated under visual guidance [14]. In general, fiberoptic bronchoscopy guided by a video laryngoscope is a good option for patients with ventilation or intubation difficulties. Thus, difficulty with intubation is easy to predict who has severe scar contracture on the face, neck, chest, and shoulders. Therefore, it is necessary to prepare an anesthesiologist for them. We propose two important points that are considered necessary to maintain an respiratory in patients with scar contractures. First, careful joint planning of surgeons and anesthesiologists; the surgeon must be present in the operating room during induction of anesthesia and be prepared for emergency release of contractures, tracheotomy, or both. Second, we propose awake fiber optic intubation under video laryngoscope guidance as an effective method for patients with anticipated intubation difficulties.

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