



Case Report

Ultrasound-guided airway blocks using a curvilinear probe[☆]



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Received 14 September 2015; revised 2 April 2016; accepted 24 April 2016

Keywords:

Difficult airway;
Awake intubation;
Superior laryngeal
nerve block;
Translaryngeal injection;
Ultrasound-guidance

Abstract We describe a novel technique of real-time ultrasound-guided superior laryngeal nerve and translaryngeal blocks in 4 patients with anticipated difficult airways. All patients had altered neck anatomy, and 1 had a prior unsuccessful awake fiberoptic bronchoscopic intubation. For block performance, an 11-mm broadband curved array transducer with a scanning frequency between 8 and 5 MHz (Sonosite, Bothell, WA) was used for anatomical structure identification, needle guidance toward each superior laryngeal nerve and through the cricothyroid membrane, and deposition of local anesthetic in the appropriate location. This was followed by successful awake fiberoptic bronchoscopic endotracheal intubation in all cases. Published by Elsevier Inc.

1. Introduction

Awake fiberoptic bronchoscopic (FOB) intubation is an accepted standard for an anticipated difficult airway, and adequate airway anesthesia is paramount to success [1]. Insufficient blunting of airway reflexes is associated with patient discomfort, failed intubation, and possible loss of

airway. However, excessive use of local anesthetics (LA) increases the risk of systemic toxicity. Previous studies have shown that superior laryngeal nerve (SLN) and translaryngeal blocks allow airway anesthesia with lower doses of LA (approximately 240 mg of lidocaine) compared to topicalization techniques such as nebulization or sprays (approximately 920 mg of lidocaine) [2]. Palpation of the hyoid bone by grasping its posterior cornua between thumb and index finger is a prerequisite to perform landmark-guided SLN blocks. Obesity, abscesses, or postirradiation induration may make palpation of the hyoid bone difficult [3]. In addition, pressure on these structures may be highly uncomfortable for the patient. The hyoid bone, thyrohyoid membrane, superior laryngeal artery (SLA), SLN, and cricothyroid membrane are

[☆] Disclosures: The authors have no relevant financial or nonfinancial interests to disclose.

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easily visualized with ultrasound. We describe the use of real-time ultrasound-guided (USG) nerve blocks as an effective technique to anesthetize the airway for an awake FOB intubation in 4 patients with anticipated difficult airways and with distorted neck anatomy.

2. Case descriptions

2.1. Cases

In the first case, we describe a 59-year-old man (74.5 in, 102 kg) who presented to the emergency department with facial edema, dysphagia, and hoarseness. A computed tomography of his head and neck revealed a right submandibular and parapharyngeal abscess with significant airway swelling and distortion. The patient was urgently scheduled for neck exploration and abscess drainage. His medical history included a cervical fusion. Preoperative evaluation revealed limited neck extension and mouth opening with an oropharyngeal classification of IV secondary to trismus and a right-sided mass extending from his oral cavity to his neck (Fig. 1).

Three additional patients presented for either elective laryngoscopy or esophagoscopy. They were males between 72 and 78 years old, and their weight varied from 69 to 84 kg. All 3 had a history of neck radiation for squamous cell carcinoma of the pharynx. Preoperative evaluation revealed limited mouth opening and neck extension. Previous radiation therapy had resulted in severe neck induration, and laryngeal crepitus was absent.

After obtaining informed consent, the plan for airway management for each of the 4 patients was an awake FOB intubation with bilateral USG SLN and translaryngeal blocks for airway anesthesia. Fifty micrograms of fentanyl and 1 to 2 mg of midazolam were titrated intravenously for patient comfort.

2.2. USG SLN block

Patients were placed supine with their head turned away from the side to be blocked. An 11-mm broadband curved array transducer with a scanning frequency between 8 and 5 MHz (C11 probe) (SonoSite, Bothell, WA) was used to identify the hyoid bone and strap muscles (omohyoid, sternohyoid, and thyrohyoid) (Fig. 2a). Between the strap muscles and the thyrohyoid membrane, SLA and SLN were identified (Fig. 2b). After the neck was cleaned with chlorhexidine, a 25-G needle was introduced in-plane under ultrasound guidance inferior to the greater cornu of the hyoid bone in a caudal direction (Fig. 2c). After negative aspiration, 2 mL of 2% lidocaine was injected around the nerve in the potential space between the thyrohyoid membrane and the muscle. The above procedure was repeated contralaterally.

2.3. Translaryngeal injection of LA

A midsagittal view of the trachea and larynx at the level of the cricothyroid membrane was used to identify the air mucosal interface (Fig. 3a and b). Using in-plane visualization, a



Fig. 1 Patient with anticipated difficult airway. Patient with parapharyngeal and submandibular abscess with significant airway swelling and neck distortion.

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