Transient bilateral palsy of vocal folds after tonsillectomy in local anesthesia – case report

Przemijające obustronne porażenie fałdów głosowych jako powikłanie tonsillektomii w znieczuleniu miejscowym – opis przypadku

Robert Wendt, Krzysztof Jarosław Dalke, Piotr Tomasz Glamowski

Oddział Otolaryngologii Regionalnego Szpitala Specjalistycznego w Grudziądzu

Article history: Received: 15.01.2017 Accepted: 15.05.2017 Published: 30.09.2017

ABSTRACT: Vocal cord palsy as a result of tonsillectomy in local anesthesia is a very rare complication. In literature, there is only few publication describing this side effect of tonsillectomy. We present a case of 26 years old men who was classified for surgical removing of tonsils in local anesthesia using 1% lignocaine with 1:100 000 epinephrine. During the procedure respiratory failure with stridor was developed, examination using indirect laryngoscopy show bilateral vocal chord palsy. The authors present probably pathomechanism of this complication.

KEYWORDS: vocal fold paralysis, complication, tonsillectomy, lidocaine, local anesthesia

STRESZCZENIE: Porażenie fałdów głosowych na skutek znieczulenia miejscowego to bardzo rzadkie powikłanie tonsillektomii. W dostępnym piśmiennictwie istnieje niewiele doniesień na temat tego typu powikłania. Przedstawiono przypadek 26-letniego mężczyzny, u którego na skutek zastosowanego znieczulenia miejscowego roztworem 1% lignokainy z 1:100 000 epinefryny rozwinęła się ostra niewydolność oddechowa ze stridorem krtaniowym i obustronnym porażeniem fałdów głosowych. Autorzy podają możliwy patomechanizm opisanego zdarzenia.

SŁOWA KLUCZOWE: porażenie fałdów głosowych, powikłanie, tonsillektomia, lignokaina, znieczulenie miejscowe

INTRODUCTION

Removal of palatine tonsils is a common laryngological procedure. It is applied in both children and adults. It can be performed under general or local anesthesia. There are also indications for combining both methods in order to reduce postoperative pain.

We present a case of transient vocal fold paralysis resulting in acute respiratory failure as a complication of tonsillectomy under local anesthesia. Due to the fact that this is a rare case, we made an attempt to explain a possible pathophysiological mechanism based on the literature and our own knowledge.

CASE REPORT

A 26-year-old male patient was admitted to the Department of Otolaryngology due to chronic palatine tonsillitis with recurrent purulent pharyngitis. The patient denied any history of peritonsillar abscesses. No history of chronic diseases was found and the patient did not take any medications. He denied any change in voice timber, sleep apnea or tobacco use. He underwent appendectomy and reposition of a broken maxilla a few years earlier. On examination, large palatine tonsils exceeding the palatine pillars were noted. On indirect laryngoscopy, the epiglottis was normal, the vocal folds were symmetrical with normal mobility, the rima glottidis was wide and the piriform sinuses were free. The patient was qualified for tonsillectomy under local anesthesia.

At first, topical anesthesia with 10% lidocaine solution was applied, and then the mucosa of the posterior (superior pole) and anterior fold (superior pole, inferior pole and in the middle) were injected with 1% lidocaine with 1:100,000 epinephrine. Next, the solution was applied to the peritonsilar region – behind the capsule of the palatine tonsil. The procedure was performed on both sides and a total of 10-12 mL of the solution was administered on each side.

The procedure was conducted using the classic technique, i.e. after incision to the mucosa at the border with the capsule of the tonsil, the palatine tonsil itself was 'bluntly' dissected and the tonsil was resected at the inferior pole using the loop. Postoperatively, the patient reported breathlessness, and tachypnea and tachycardia were noted. On indirect laryngoscopy, paralysis of the right vocal fold with midline positioning was observed. After approximately 10 minutes, increasing dyspnea with laryngeal stridor was observed, and the next laryngoscopy revealed bilateral vocal fold paralysis with midline positioning and rima glottidis 4-5 mm wide. An anesthesiologist was called for intubation. After the anesthesiology team arrived, reduction of stridor was observed, the patient reported subjective improvement and the oxygen saturation was over 90%. The decision was made to transfer the patient to the ICU with possible intubation in case the respiratory failure worsened. After 2 hours of observation at the ICU, control indirect laryngoscopy was performed, which revealed normal mobility of both vocal folds. Later postoperative course was uncomplicated and the patient was discharged home in good general condition.

DISCUSSION

Tonsillectomy is one of the most common surgical procedures in laryngology. Absolute indications for palatine tonsil removal include tonsillar hypertrophy causing sleep apnea, suspicion of cancer, recurrent peritonsillar abscesses. Relative indications include chronic tonsillitis, recurrent tonsillitis (5-7 episodes per year), systemic complications resulting from chronic tonsillitis (in such case – as a removal of the infection source). The surgical technique includes palatine arch incision, after which the tonsil is removed together with its capsule from the surrounding tissue. [1][2]

The procedure is often conducted under local anesthesia, which brings benefits such as shorter convalescence period, continuous cardiovascular evaluation in a conscious patient, reduced intra- and postoperative bleeding, better postoperative pain control [3][4]. In the literature, the benefits are reported regarding peritonsillar space injection with lidocaine with epinephrine in general anesthesia, which improves postoperative course by reducing the need for analgesics and alleviating nausea [5]. In our department, tonsillectomy is routinely performed in adults under local anesthesia with lidocaine and epinephrine. Lidocaine is an amide derivative, which blocks nervous cell depolarization in response to stimuli and is characterized by moderate acting time (within the range of 30-60 minutes) compared to other local anesthetics such as ropivacaine (2-6 hours) or bupivacaine (ca. 4 hours). Local anesthesia in the case of tonsillectomy, includes initial topical anesthesia with 10% lidocaine spray, then submucosal injection of the anterior and posterior palatine arches and peritonsillar space is performed with 1% lidocaine with 1:100,000 epinephrine. Around 10ml of the solution is applied to each tonsil.

The most common complications of tonsillectomy include early / intraoperative hemorrhage, late / postoperative hemorrhage, nausea, vomiting, otalgia, headache, poor swallowing, teeth injury. Samuel C.L. Leong et al. reported a few 'atypical' complications after palatine tonsillectomy, however, they did not differentiate with respect to type of anesthesia or patient's age. Rare complications included e.g. subcutaneous emphysema of the neck, oral floor hematoma, jugular vein thrombosis, contortion of the atlanto-axial joint, Eagle syndrome [6].

In 2013, Bao Anh Do reported a case of a sudden breathlessness with right vocal fold paralysis during the biopsy of the palatine tonsil under local anesthesia in a 21-year-old female patient [7]. In 2001, N. Weksler et al. reported a case of a 5-year-old female patient, who preoperatively received bupivacaine solution to the peritonsillary space in order to reduce postoperative pain, then tonsillectomy under general anesthesia was performed; after extubation, an acute respiratory failure occurred with bilateral vocal fold paralysis confirmed by laryngoscopy. In both cases, vocal fold paralysis resolved spontaneously.

In order to understand pathophysiology of vocal fold paralysis in the case presented above, it is necessary to understand the anatomy of the middle pharynx and surrounding anatomical structures. Peripharyngeal space is an anatomical space filled with loose connective tissue that expands from the base of the skull to the greater horn of the hyoid. Its medial border constitutes the lateral wall of the pharynx, which is formed by the middle pharyngeal constrictor muscle. This structure includes nerves such as the vagus nerve, sympathetic trunk and lymph nodes. Motor innervation of the posterior cricoarytenoid muscle, which is responsible for adduction of vocal folds, stems from the vagus nerve via the recurrent laryngeal nerve.

The most probable mechanism of respiratory failure in the course of bilateral vocal fold paralysis was depolarization block of the motor fibers of the vagus nerve supplying muscles of the larynx. Undoubtedly, the previously described situation must have been caused by infiltration of lidocaine to the parapharyngeal space. The reason behind the translocation of the drug through muscles of the middle pharynx and its spreading throughout the parapharyngeal space is still an issue that needs to be explained. It might be suspected that the needle accidentally penetrated to the parapharyngeal space, however, this hypothesis is opposed by the fact that the paralysis was bilateral. Considering the long-standing experience of the surgeon and a lack of such complications thus far, this explanation seems unlikely. We suspect that the reason was translocation of fluid to the peritonsilar tissues caused by an increased pressure of the injected fluid. Additional manipulations during blunt dissection and hemostasis may have caused fluid shift to the parapharyngeal space. With such assumption, we need to consider the fact that the pharyngeal tissues and the periphyngeal connective tissue must have been loosely packed in an unusual manner, otherwise the complication described above would have been a much more common phenomenon.

CONCLUSIONS

Classic or coablation tonsillectomy is a widely performed and common otolaryngological procedure, which is often performed under local anesthesia without an anesthesiologist's assistance. One should always be prepared for developing acute respiratory failure caused by vocal fold paralysis, which can occur when the anesthetic infiltrates the parapharyngeal space. In the case presented above, intubation proved to be unnecessary, however, it should be suspected that application of a long-acting agent (e.g. bupivacaine or ropivacaine) would have required intubation.

Due to that reason, this procedure should only be performed at facilities having an anesthesiologist or an Intensive Care Unit.

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Word count: 15400 Tables: – Figures: – References: 9

Access the article online: DOI: 10.5604/01.3001.0010.4238

Table of content: http://otorhinolaryngologypl.com/resources/html/articlesList?issueId=10128

Corresponding author: Robert Wendt; e-mail: rwendt1988@gmail.com

Competing interests: The authors declare that they have no competing interests.

Cite this article as: Wendt R., Dalke K. J., Glamowski P. T.: Transient bilateral palsy of vocal cord after tonsillectomy in local anesthesia – case report; Pol Otorhino Rev 2017; 6(3): 25-28