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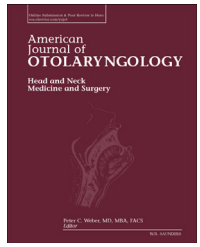

Higher risk of superficial injection during injection laryngoplasty in women☆,☆☆

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ABSTRACT

Purpose: To review our clinical experience with percutaneous injection laryngoplasty at a single institution over a three-year period, and to specifically assess the rate of unintentional injection into the superficial lamina propria (SLP) and compare with results found in the literature.

Materials and methods: Medical records were retrospectively reviewed to identify patients who underwent office-based injection laryngoplasty (OBIL) over a three-year period. Video documentation and the written notes of the procedures were reviewed to determine the rate of inadvertent placement of injectate into the SLP. A literature review was performed to identify other reports of this complication and contributing factors.

Results: 113 consecutive patients were identified who underwent OBIL in the study period. Of these, 100 patients had adequate records and follow-up available for this review. All patients underwent injection augmentation with bovine collagen using a percutaneous trans-membrane or trans-cartilaginous technique. 96 had improvement in their vocal quality and/or effort. Four patients, who were all women, had unintentional injection into the SLP with resultant no change in voice or worsened voice. All superficially placed injectates were managed conservatively.

Conclusions: Injection into the SLP is a well-recognized possible complication of OBIL. Our results suggest that this complication occurs more often in women than in men, perhaps due to differing laryngeal anatomy and size.

1. Introduction

Vocal fold injection laryngoplasty was first introduced by Bruening as a method to correct glottic insufficiency due to unilateral vocal fold paralysis [1,2]. The indications for this procedure have subsequently been expanded to treat a variety of vocal fold insufficiency states such as vocal cord atrophy, paresis, and scarring [3]. Older injection materials such as Teflon® (DuPont, Wilmington, DE) and silicone have been supplanted by a variety of materials such as bovine collagen (Zyplast; Inamed Aesthetics, Fremont, CA), hyaluronic acid based materials (Restylane®, Medicis Aesthetics, Scottsdale, AZ, and Juvederm®, Allergan, Irvine, CA), autologous fat, carboxymethylcellulose (Radiesse Voice Gel, Merz Aesthetics,

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Inc., Franksville, WI), micronized acellular dermal matrix (Cymetra®, Life Cell Corporation, Branchburg, NJ), and calcium hydroxylapatite (Radiesse Voice, Merz Aesthetics, Inc., Franksville, WI) [4–10].

While injection laryngoplasty has become one of the more commonly performed laryngeal procedures, it is not without risks. Documented complications include: local abscess formation, malposition/migration of the injectate, hypersensitivity reactions, and association with development of collagen vascular disease (the latter two specific for bovine collagen) [10–12]. In this clinical review, we aim to highlight an additional potential complication of the procedure: injection into the superficial layer of the lamina propria (SLP). In our experience with 100 patients over a three-year period, we have noted an increased propensity of this complication to occur in the female population. Based upon anatomical studies and observations, we believe that this may be due to the distinct anatomy of the female larynx.

2. Materials and Methods

Institutional Review Board approval from the University of California, Los Angeles, was obtained for this study. All injections were performed at a single institution by one surgeon (DKC) between 2006 and 2009. Medical records were reviewed to identify all consecutive patients who had undergone office-based injection laryngoplasty (OBIL). All consecutive patients who underwent injection augmentation during the study period were included, unless video documentation or medical records were inadequate or unavailable for review.

One hundred and thirteen patients were found to have undergone OBIL in the study period. No injections were performed in the operating room during this time frame, as is typical for this institution. 100 patients met the inclusion and exclusion criteria. All patients were injected awake and unsedated following application of topical anesthesia to the nasal cavities. Injections were performed via a trans-cartilaginous or trans-membranous percutaneous approach with bovine dermal collagen (Zyplast®; Inamed Aesthetics, Fremont, CA) using a 27 gauge needle, while the larynx was visualized via video nasolaryngoscopy. Video recordings of the injections were reviewed to assess for any superficial injection. This observation was made based on visualization of superficial extravasation of injectate with simultaneous blanching of the vocal fold surface with stiffening and disruption of the mucosal wave in this region, as noted on video recordings from the time of injection (Fig. 1). Medical records were also reviewed to check the remarks made at the time of injection, which included notation of whether the injection was superficial or not, whether voice improved, and if there were any immediate complications. A successful injection was defined by the reported subjective improvement in voice by the patient as well as by the clinician, based on a "yes" or "no" question response documented in the chart. Failure was defined as lack of any improvement of voice or the occurrence of a notable complication such as incorrect injectate placement.

The records of those patients who received superficial injection from OBIL were reviewed and compared. In addition,

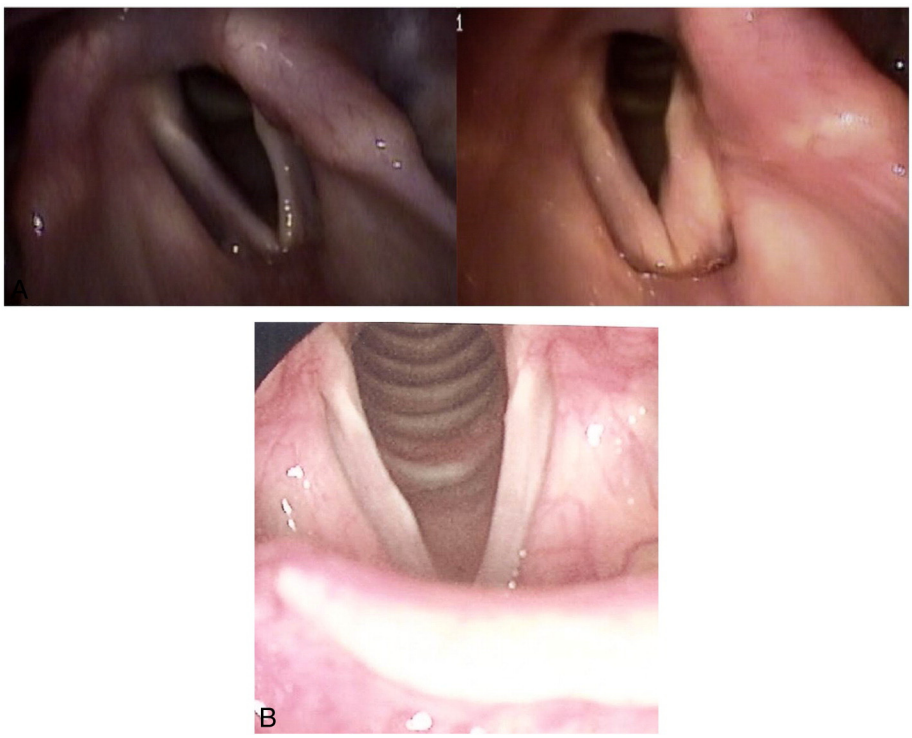

Fig. 1 – (A) Typical "before" and "after" appearance of a normal injection laryngoplasty. (B) Representative appearance of the larynx after injection into the superficial lamina propria of the right mid-membranous vocal fold.