Office-based treatment of vocal fold scarring with transcutaneous chordal steroid injections

Tetsuji Sanuki MD*, Eiji Yumoto MD, Yutaka Toya MD, Kohei Nishimoto MD, & Narihiro Kodama
Department of Otolaryngology Head & Neck Surgery, Graduate School of Medicine, Kumamoto University, Japan

Introduction

Vocal fold scarring still remains a therapeutic challenge, with most problematic issue being the histologic changes that are primarily responsible for altering the viscoelasticity of the vocal fold mucosa. Optimal treatment for vocal fold scarring has not yet been established. Local administrations of steroid directly into the larynx have been reported. Corticosteroid is one of the most potent inhibitors of inflammation in addition to promoting wound repair.

Office-based steroid injections of the vocal folds are not popular as a result of the perception that technically it is difficult with questionable benefit.

The aim of this study was to analyze the effects of office-based steroid injections for vocal fold scarring.

Methods and Materials

Patients

10 patients, 12 vocal folds with vocal fold scarring were enrolled for this study. They received suspension corticosteroid injections between May 2006 and August 2008 at the Department of Otolaryngology-Head and Neck Surgery, Kumamoto University Hospital. Postoperative follow-up periods ranged from 4 to 24 months (mean 10.2months). The sample group included 2 men and 8 women, with a mean age of 47.6 years (range 24-64 years).

Injection Procedure

All suspension corticosteroid (Triamcinolone acetonid) injections were performed transcutaneously to the vocal fold under local anesthesia. Transcutaneous chordal vocal fold injections were administrated through the cricothyroid membrane directly surrounding the vocal fold lamina propria using a disposable injection needle (Figure 1) under transnasal videostroboscopy monitoring (Figure 2). When reasonably sure of the tip location, a small amount of the liquid was injected to measure any changes in the vocal fold, specifically a slight whitish swelling.

The interval between injections was four weeks or longer. Injections were given from 2 to 5 times (mean 3.2 times). The mean volume of suspension steroid injected into each vocal fold was 0.46 mi (range 0.2-1.0 mi).

Objective Voice Evaluation

Acoustic analyses were performed prospectively before injection and at least 4 months after the final injection. For the acoustic analyses, the sustained vowel /a/ was recorded, and jitter, shimmer, and harmonics-to-noise ratio (HNR) were analyzed using SoundScope software (GW Instruments, Somerville, MA).

Subjective Voice Evaluation

Perceptual voice evaluations were conducted using GRBAS (Grade, Roughness, Breathiness, Asthenia, Strain) rating scale (0= normal; 1= slight disturbance; 2= moderate disturbance, 3= severe disturbance).

For videostroboscopy evaluation, each patient performed sustained /a/ or /i/ like phonations at his or her habitual pitch, which were recorded using a videostroboscope (VNL-1171K; Pentax, Tokyo). Stroboscopic images were assessed with the mucosal wave and glottal closure. We rated the mucosal waves of vocal fold vibration and the glottic closure independently using a four point grading scale (0= no wave, wide open; 1= marked decreased mucosal wave, large glottic gap; 2= slightly decreased mucosal wave, small glottic gap; 3= full wave, complete closure).

Results

Objective Parameters

Table 1 presents the demographics and voice analysis data. Statistical decrease was observed in Jitter, and a statistical increase was observed in HNR. The average Jitter decreased significantly from 1.94 ± 1.43 % to 0.87 ± 0.50 % over 4 months after the procedure (P<.05). The average HNR increased significantly from 9.21 ± 3.64 dB to 15.77 ± 2.67 dB after the procedure (P<.05).

Table 1 presents the demographics and voice analysis data. A statistical decrease was observed in Jitter, and a statistical increase was observed in HNR. The average Jitter decreased significantly from 1.94 ± 1.43 % to 0.87 ± 0.50 % over 4 months after the procedure (P<.05). The average HNR increased significantly from 9.21 ± 3.64 dB to 15.77 ± 2.67 dB after the procedure (P<.05).

Table 1

<table>
<thead>
<tr>
<th>Subjective Parameters</th>
</tr>
</thead>
</table>

The GRBAS scale also revealed an improvement in the overall grades of dysphonia (G) and Roughness (R) during the postoperative follow-up.

Stroboscopic analysis revealed that the average scores of mucosal wave and glottal closure significantly improved and remained stable after the procedure.

The average score of mucosal wave improved significantly from 1.44 to 2.59 at the over 4 month period (P <.05). The grade of glottal closure pattern improved significantly from 1.62 to 2.28 at the over 4 month period (P <.05).

Discussion

Vocal fold scarring occurs following injury or inflammation. Scarring may cause a deformity of the vocal fold edge, a disruption of the viscoelastic layered structure of the lamina propria, an increasing in stiffness of the vibratory structure, and glottis incompetence.

Steroid administration remains one of the most potent therapeutic interventions in upper airway diseases. Local injections of steroid give the laryngologist the option of administering a potent drug locally, thereby avoiding the systemic side effects of steroid administration.

Our study reveals that suspension corticosteroid injections confer statistically significant improvements in objective and subjective voice evaluation data. Although it is unrealistic to expect the scarred vocal fold to be restored to full vibratory capability, videostrobolaryngoscopic analysis should show improved vibratory amplitude and relative improvements in the mucosal wave once the stiffness subsides.

Possible complications of injected steroids include vocal atrophy and mucosal glandular atrophy. These side effects were not observed in this study.

Conclusions

Office-based steroid injections are a valuable adjunct in the management of vocal fold scarring.

Injection of steroid into the vocal folds may be performed safely under local anesthesia as an office procedure.

References