Vocal fold (VF) varices are abnormal, dilated blood vessels and generally are considered to be fragile and prone to rupture. The potassium titanyl phosphate (KTP) laser has a wavelength of 532 nm and is well absorbed by hemoglobin. Therefore, minimal damage takes place to the epithelium of the VFs when the KTP laser is used correctly to treat vascular abnormalities. Several studies describe the benefits of the KTP laser in the treatment of VF varices. However, its effects on the true VF in the early postoperative period have not been described well.

A 25-year-old female private music teacher presented to our voice center with difficulties controlling her upper-mid range and with vocal fatigue. She was found to have muscle tension dysphonia, reflux laryngitis, Reinke edema, left VF hypomobility, left VF scarring, bilateral striking zone fullness, bilateral SF stiffness, and a left perpendicular VF varix that engorged with phonation (Figure 1A). She subsequently underwent direct laryngoscopy, bilateral injection of 5-fluorouracil, and KTP vaporization of a left VF varix. The laser was held about 4 mm away from the VF and set at 4 W, 0.1 seconds, single pulse. The vessel turned black, and there was no sign of hemorrhage or adjacent tissue injury. On postoperative day 1, this patient exhibited mild edema of the left true VF, resolution of the perpendicular varix, and slight subepithelial blush anterosuperiorly around an area of laser use (Figure 1B). This patient was instructed to speak gently and continue voice therapy. On postoperative day 8, we observed a larger blush consistent with extravasation of blood from the left true VF on rigid videoendoscopy. Although this appeared similar to VF hemorrhage at first glance, these findings were in a thin distribution and lateral to the vibratory margin (Figure 2A). Six weeks postoperatively, there was complete resolution of the edema and extravasation (Figure 2B). The patient indicated that her voice had improved and required less effort. Her upper-mid range was more consistent, and she resumed to her normal singing and teaching. She was also working with our voice team.

Varices are often treated because they can disrupt the fine microvascular structure of the superficial lamina propria, leading to distortion of the mucosal wave and potentially to the development of other disorders such as hemorrhagic polyps or hematoma. We treat them usually only if they have hemorrhaged, caused dysphonia, engorge during phonation, or form a

Figure 1. A, Preoperative videostroboscopy image demonstrating a perpendicular varix on the left true vocal fold above and lateral to the vibratory margin and smaller varices anterolaterally. B, Videostroboscopy image on postoperative day 1 demonstrating mild edema of the left true vocal fold, resolution of the perpendicular varix, and slight anterolateral blush.
VF mass. The current literature only reports the effects of KTP laser vaporization 2 weeks to 14 months postoperatively. Additionally, only disappearance of varices and changes in the mucosal wave and amplitude were reported. In the delayed postoperative period, the VFs usually are well healed and do not reveal any visible abnormalities on videostroboscopy.

We introduce specific videostroboscopy findings in the early postoperative period while providing a specific timeline of what to expect after KTP vaporization of true VF varices. We examine our patients on the first postoperative day routinely. In the immediate postoperative period, one often sees VF edema. Approximately 1 week postoperatively, the appearance of submucosal extravasation of blood on the VF is common, and the appearance can be worse than shown in this case and may appear as early as the first day after surgery. We have never seen more extensive hemorrhage develop, even though we do not prescribe absolute voice rest as we do for patients with acute VF hemorrhage. A normal or near normal, well-healed VF should be expected by 6 weeks after surgery in most patients.

Declaration of Conflicting Interests
The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding
The author(s) received no financial support for the research, authorship, and/or publication of this article.

References
1. Tang CG, Askin G, Christos PJ, Sulica L. Vocal fold varices and risk of hemorrhage. Laryngoscope. 2016;126(5):1163-1168.
2. Hirano S, Yamashita M, Kitamura M, Takagita S. Photocoagulation of microvascular and hemorrhagic lesions of the vocal fold with the KTP laser. Ann Otol Rhinol Laryngol. 2016;115(4):253-259.
3. Zeitels SM, Akst LM, Bums JA, Hillman RE, Broadhurst MS, Anderson RR. Pulsed angiolytic laser treatment of ectasias and varices in singers. Ann Otol Rhinol Laryngol. 2006;115(8):571-580.
4. Xie X, Young J, Kost K, McGregor M. KTP 532 nm laser for laryngeal lesions. A systematic review. J Voice. 2013;27(2):245-249.
5. Hsiung MW, Kang BH, Su WF, Pai L, Wang HW. Clearing microvascular lesions of the true vocal fold with the KTP/532 laser. Ann Otol Rhinol Laryngol. 2003;112(6):534-539.

Figure 2. A, Videostroboscopy image on postoperative day 8 demonstrating a blush suggestive of extravasation of blood from the left true vocal fold varix. B, Six weeks postoperative videostroboscopy image demonstrating complete resolution of the previously seen edema and erythema.