

## INTRODUCTION

- Vocal fold scar causes dysphonia due to fibrotic changes of the vocal fold mucosa, that disrupt the mucosal wave and interfere with glottic closure [1,2]
- Current treatments have shown modest results, with no generally accepted, universal standard treatment of vocal fold scar
- 5-FU is a well-known anti-metabolite used in systemic chemotherapy
- 5-FU is a pyrimidine analog that inhibits thymidylate synthase, causing the inhibition of fibroblasts by inducing apoptosis and inhibiting type I collagen production
- Intralesional injection of 5-FU in combination with steroids has been successful in treating hypertrophic scars and keloids on the body [3]. Its use in the larynx has not been reported.
- We present a case series of novel submucosal laryngeal injection of 5-FU in combination with triamcinolone for vocal fold scar
- Patients were injected with a mixture of 4.5 mL of 40 mg/mL of 5-FU and 0.5 mL of 50 mg/mL of triamcinolone submucosally into the vocal fold scar

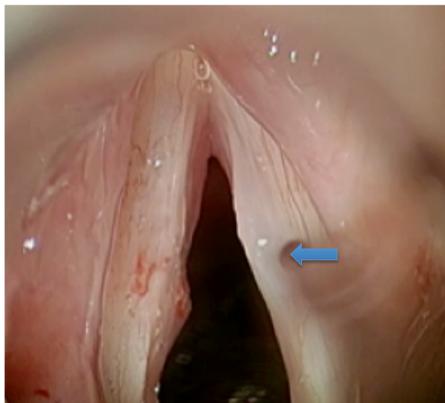


Figure 1. Example of intraoperative intralesional injection of 5-FU into the scar of the right true vocal fold. The blue arrow represents the site of the injection needle.

## CASE #1

- 34 F music therapist with hoarseness and loss of range for two years
- Outside ORL diagnosed “fibrosed tissue” of vocal folds; underwent 6 months of voice therapy with no improvement
- VHI (10/31/15): 27
- 12/7/15: MDL, VF injection of 5-FU/ triamcinolone
- Reported substantial voice improvement, with improved vocal fold pliability and decreased stiffness on videostroboscopy
- Two further 5-FU/triamcinolone injections in 2/2016 and 5/2016
- VHI (5/25/17): 17
- Type 1 thyroplasty in 8/2017 to address glottic insufficiency after vibratory function was optimized

## CASE #2

- 59 F voice teacher and performer with hoarseness and vocal fatigue with prolonged use of her voice
- Previously underwent excision of VF masses in 2001 and CO2 laser excision of VF mass in 2014
- VHI (10/26/15): 21
- 6/20/16, 7/6/17: MDL, 5-FU/triamcinolone injections
- VHI (4/11/17): 16
- Reported more clarity to her voice with improvements in her upper range post-op w/ less effort to sing
- Mucosal wave improved on stroboscopy
- VHI (6/6/2018): 5

## CASE #3

- 17 F high school theater performer with hoarseness
- VHI (3/7/17): 18
- 4/10/17: MDL, excision of bilateral VF masses with mini micro flap, dexamethasone injection
- 10/19/17, 1/22/18: MDL, bilateral 5-FU/ triamcinolone injection
- Also underwent KTP vaporization of left VF varicosities in 1/2018 at the time of injection
- VHI (3/15/18): 14
- After 5-FU, had increased pliability of her vocal folds and reported being satisfied with her voice post-op

## DISCUSSION

- Retrospective review: patients with 5-FU/ steroid injection had a 92% average reduction in lesion size (keloid) compared with 73% in the group treated with steroids alone [4]
- 5-FU thought to have a lower side effect profile without the hypopigmentation and telangiectasias seen with steroid use [5]
- Our cases apply these concepts to the treatment of scar in the airway
- In the current literature, 5-FU has only been studied in the airway for its use in laryngotracheal stenosis in rabbits and rats [6,7]
- In our study, in patients with vocal fold scar, post-operatively, patients experienced:
  - Improved voice quality and satisfaction with voice
  - Increased pliability and decreased stiffness on rigid videostroboscopy
  - Improved VHI scores
- Our experience with 14 additional patients yielded similar results
- No randomized trial with 5-FU/triamcinolone versus steroid alone versus no treatment has been performed, yet.

## CONCLUSION

- Submucosal laryngeal injection of 5-FU/ triamcinolone can be used to treat vocal fold scar
- Patients showed improved voice quality, increased satisfaction with voice, increased pliability and decreased stiffness on rigid videostroboscopy, as well as decreased VHI scores post-operatively
- Our case series suggests a need for a prospective, controlled study to assess the safety and efficacy of 5-FU for the treatment of vocal fold scar.

## REFERENCES

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