OBJECTIVES:

Calcium hydroxylapatite has been used as a semi-permanent injectable filler for vocal cord insufficiency. In general, local inflammation is minimal, however, there has been a report of foreign body reaction. In this case, calcium hydroxylapatite was associated with the formation of a polyp, exacerbating dysphonia.

INTRODUCTION:

Voice disorders resulting from glottic insufficiency create a significant burden for patients1. Treatment options have ranged from voice therapy to invasive laryngeal surgery. Over the past century, however, vocal fold injection augmentation has come forward as a safe and efficacious means to treat unilateral vocal cord paralysis, paresis, and atrophy2. Through extensive investigations several injectable materials have been utilized in the effort to find an ideal biologically inert and permanent substance. Materials have included Teflon, silicone, fat, and fascia each with variable results. One particular injectable, calcium hydroxylapatite has demonstrated impressive results3.

As a biological agent, calcium hydroxylapatite is found in the microstructure of teeth and bones, offering rigidity and support. Its utility in orthopedic and head and neck reconstruction has been known for some time4. The combination of limited migration and causing only minimal inflammatory changes has made calcium hydroxylapatite suitable for injection laryngoplasty5. While seemingly well deserved, calcium hydroxylapatite's record is not pristine. Used as a cosmetic filler, calcium hydroxylapatite has been associated with nodule formation6. Tanna et al reported a single case of foreign body reaction to calcium hydroxylapatite related to vocal fold augmentation7. In this report, calcium hydroxylapatite is associated with vocal fold polyp formation after injection laryngoplasty.

CASE REPORT:

Our patient is a 62 year old non-smoking female who underwent calcium hydroxylapatite injection laryngoplasty for iatrogenic vocal cord paralysis secondary to thyroidectomy. Over course of eleven months the patient had persistent hoarseness. One variable injectable, calcium hydroxylapatite has demonstrated impressive results3.

While seemingly well deserved, calcium hydroxylapatite’s record is not pristine. Used as a cosmetic filler, calcium hydroxylapatite has been associated with nodule formation6. Tanna et al reported a single case of foreign body reaction to calcium hydroxylapatite related to vocal fold augmentation7. In this report, calcium hydroxylapatite is associated with vocal fold polyp formation after injection laryngoplasty.

DISCUSSION:

The biocompatibility of calcium hydroxylapatite has been heavily investigated for the past twenty five years8. Early research focused on bone and skull reconstruction. Recent use for vocal fold augmentation has opened a new biological environment for calcium hydroxylapatite implantation. The vocal apparatus represents biomechanics at its finest, with significant contribution to voice quality from the cartilaginous superstructure to the microscopic mucosal lining. The diligent work of Rosen et al has brought the safety and efficacy of calcium hydroxylapatite to the forefront of injection laryngoplasty literature9. Despite continuing studies, investigators have conceded that it is too early to see the full ramifications of calcium hydroxylapatite in vocal fold augmentation. One area of concern is the placement of the injection.

While considered safe, injection laryngoplasty has the potential for significant operator error, namely under correction, material extrusion, and subepithelial injection. The latter of these may contribute to the inflammatory response rarely witnessed in vocal fold injection. Migration of material within the subepithelial space may contribute to local inflammation, which may help to explain the polyp formation seen in this report and the foreign body reactions recorded elsewhere. Clinical trials in the unique vocal apparatus of humans are necessary to determine the inflammatory potential of calcium hydroxylapatite. Long term follow up of vocal fold insufficiency patients remains a study design challenge.

CONCLUSION:

Although generally minimal, injection laryngoplasty via calcium hydroxylapatite has been associated with foreign body reaction and in one rare case is polyp formation. It is necessary to continue long term evaluation of the local tissue effects of calcium hydroxylapatite as vocal fold augmentation technology strives toward the ideal substrate.

REFERENCES: