



## CASE REPORT

# A Rare Case of *Actinomyces odontolyticus* Infection after Injection Laryngoplasty with Deflux

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## Abstract

**Background:** *Actinomyces odontolyticus* is a gram-positive, anaerobic bacteria that is part of the normal oral commensal flora. It has been previously demonstrated to be a rare cause of endogenous bacterial infections in humans. In the current case report, we present a rare case of vocal cord infection caused by *Actinomyces odontolyticus* after injection laryngoplasty with Deflux in an otherwise healthy male patient.

**Case presentation:** A 61-year-old healthy male was taken to the operating theater for injection laryngoplasty for age-related bilateral vocal cord atrophy. He had previously tolerated a short-acting injectable with favourable results and was interested in trying Deflux, a longer-lasting dextranomer/hyaluronic derivative with documented success in Urology literature, but which hasn't been routinely used in the airway. Three days after the procedure, the patient presented to clinic with worsening hoarseness and stridor. Nasopharyngoscopy demonstrated profuse, but distinctly unilateral left supraglottic and glottic edema, despite bilateral injection. It was initially treated conservatively with oral prednisone and antibiotics. Although the supraglottic edema resolved, the patient had persistent inflammation and edema of the left vocal cord. He was taken to the operating theater for surgical exploration, where incision and drainage yielded thick, purulent discharge. Final cultures grew *Actinomyces odontolyticus*. Following surgery, the left vocal cord healed well, but had persistent hypomobility and decreased pliability of the mucosal cover secondary to scarring from the infection.

**Conclusion:** Infection with *Actinomyces* is a rare clinical entity with few reports of laryngeal involvement in the literature. This case highlights the unique diagnostic challenge of vocal cord infection and prompts consideration and recognition of *Actinomyces* as a potential etiology.

## Keywords

*Actinomyces*, *Actinomyces odontolyticus*, Injection laryngoplasty, Vocal cord infection

## Background

*Actinomyces* are gram-positive, facultative anaerobes that are part of the normal commensal flora of the human oral cavity, gastrointestinal tract and vaginal mucosa. Over 30 different species of *Actinomyces* have been identified [1]. Although generally considered to have a low potential for virulence, previously studies have demonstrated *Actinomyces* species to be a rare cause of infection when the normal mucosal barrier has been disrupted [1,2].

*Actinomyces odontolyticus* is a species that was originally isolated from dental caries by Batty in 1958 [3]. Pathogenicity of this organism is rarely encountered, but clinical infections attributed to *Actinomyces odontolyticus* include cutaneous and cervicofacial infections, bacteremia, thoracopulmonary infection, and localized abscesses in various organs [4-7]. Infection with *Actinomyces* rarely involves the larynx and there are only a small number of case reports in the literature of primary laryngeal actinomycosis caused specifically by *Actinomyces odontolyticus* [8,9]. Here in, we report a case of unilateral vocal cord infection by *Actinomyces odontolyticus* following injection laryngoplasty with Deflux in a healthy, 61-year-old male patient.

## Case Presentation

A 61-year-old healthy male patient presented to the voice airway clinic in April 2016 with a longstanding history of hoarseness and vocal fatigue. Flexible nasopharyngoscopy and stroboscopy was performed which demonstrated marked bilateral vocal cord atrophy, resulting in a significant mid membranous gap and persistent leaking of air consistent with presbylarynx. Given the patient's functional voice issues, he was interested in a trial of augmentation and underwent bilateral vocal cord injection laryngoplasty in clinic with a short-acting injectable, Perlane (Q-Med, Uppsala, Sweden). The patient tolerated the procedure well with good post-procedural functional results and no complications.

Following successful augmentation, the patient was interested in trying a longer lasting treatment. After a discussion about the different treatment options available the patient was interested in proceeding with a longer lasting injectable; Deflux (Q-Med, Uppsala, Sweden) which is a relatively newer product that consists of a viscous gel of dextranomer microspheres in a carrier gel of hyaluronic acid to allow for longer duration of action [10]. In August 2019, the patient was taken to the operating theatre for bilateral injection laryngoplasty with Deflux under general anesthetic. A total of 0.3 mL of Deflux was injected into the left vocal cord and 0.4 mL into the right vocal cord with good result and the patient was discharged home following surgery with no issues. Three days after the injection however, the patient presented to the voice airway clinic with worsening post-operative hoarseness and stridor. Nasopharyngoscopy was performed which demonstrated profuse, but distinctly unilateral left supraglottic and glottic edema and significant hypomobility of the left vocal cord, despite bilateral injection. Following examination, the patient was treated conservatively with a tapering dose of oral prednisone and ten-day course of amoxicillin-clavulanate.

At follow-up in 2 weeks, the supraglottic edema had resolved but there was persistent inflammation and edema of the left true vocal cord, resulting in persistent hypomobility of the cord secondary to mass effect. Surgical exploration via direct laryngoscopy was advised at that time, but was initially declined by the patient, who preferred ongoing conservative management. Over the following eight weeks, the patient was treated with multiple extended courses of prednisone and a 1-month course of antibiotic therapy. Initially his symptoms improved but worsened again once prednisone was tapered. Following this, the patient was treated with direct injection of 2 mg of dexamethasone into the left vocal fold under endoscopic guidance, which again only provided temporary relief.

After failed conservative management, the patient was taken to the operating theater for micro laryngoscopy and evaluation under anesthesia in November 2019.

During examination the left vocal cord was found to be tense and edematous. Given its appearance, a generous incision was made lateral to left vocal cord with a sickle knife, revealing an encapsulated abscess. An incision into the abscess yielded thick, purulent discharge that was swabbed and sent for culture and sensitivity. Final cultures grew *Actinomyces odontolyticus*. Following surgery, the patient was placed on a one-month course of amoxicillin-clavulanate and metronidazole.

On serial follow-up, the left vocal cord healed well. However, there was persistent mild hypomobility of the left vocal cord and decreased pliability of the mucosal cover, which was felt to be secondary to scarring from the infection. No further intervention was taken and overall the patient recovered well.

## Discussion and Conclusions

Injection laryngoplasty is a minimally invasive surgical technique for augmentation and medialization of the vocal fold to decrease glottic insufficiency caused by vocal cord paralysis or atrophy [11]. With advancements in technology and delivery, it is becoming increasingly popular as the first line management for vocal cord augmentation with few risks and complications [12,13]. There are a wide variety of fillers currently available on the market for vocal cord augmentation including hyaluronic acid, autologous fat, carboxymethylcellulose, micronized acellular dermal matrix, and calcium hydroxylapatite [11]. Hyaluronic acid-based fillers are particularly attractive filler as they are found in the extracellular matrix of all mammalian species and theoretically have lower immunogenic risk [14]. Deflux is a relatively newer dextranomer/hyaluronic acid copolymer that is used primarily as a long-term bulking agent in pediatric urology for treatment of vesicoureteral reflux [10,15]. Deflux had previously shown initial promise in animal studies for treating vocal fold insufficiency and is particularly appealing given its longer duration of action compared to other available fillers [16,17].

*Actinomyces* are gram-positive, facultative anaerobes that are part of the normal commensal flora of the human oral cavity. Previously, they have been demonstrated to have a low degree of pathogenicity and generally only cause infection if the mucosal barrier has been disrupted [1,2]. In the current case study, we report a patient who developed a unilateral vocal cord abscess due to *Actinomyces odontolyticus* following injection laryngoplasty. Infection is a rare complication of this procedure, and review of the literature yielded only three cases of laryngeal abscess following injection laryngoplasty [18-20]. In our patient, it is presumed that the portal of entry for the organism was through the needle at the time of injection.

Although the patient was ultimately found to have a laryngeal abscess, there were a number of diagnostic challenges. The presence of distinctly unilateral left su-

praglottic and glottic edema, despite bilateral injection, was unusual. It was also challenging initially to discern whether the inflammatory response was due to an infectious component or an immunologic reaction to the injectable substance. In the end, the patient's lack of improvement with conservative management and surgical exploration in the operating theater lead to the correct diagnosis and management.

While rare, we would therefore like to caution clinicians about *Actinomyces odontolyticus* as a potential etiology of infection in the head and neck, especially when there is a clinical history of mucosal damage. To the best of our knowledge, this is the first report of laryngeal infection with *Actinomyces odontolyticus* following injection laryngoplasty. Incision and drainage of the infected vocal cord in combination with long-term antibiotic therapy was an effective treatment modality.

## List of Abbreviations

None.

## Declarations

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Not applicable.

### Author's contributions

Case management and treatment was done by TB. KM and JM were involved with all aspects of this research including data collection, literature review and preparation of the manuscript. TB revised the manuscript and gave final approval for publication. All authors read and approved the final case report.

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### Availability of data and materials

Data sharing not applicable to this article as no datasets were generated or analyzed during the current study.

### Ethics approval and consent to participate

Not applicable.

### Consent for publication

Consent for publication was obtained for this study.

### Competing interests

The authors declare that they have no competing interests.

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