

Laryngeal Granuloma Post Elective Tonsillectomy

Fergal Kavanagh^{1*}, Orla Young¹, Colm Fahy² and Michael Callaghan³

¹Department of Otolaryngology, Head and Neck Surgery, University Hospital Galway, Ireland

²Department of Otolaryngology, Galway Clinic, Doughiska, Ireland

³Department of Anaesthesia, University Hospital Galway, Ireland

ARTICLE INFO

Article history:

Received: 15 February 2018

Accepted: 15 May 2018

Published: 16 May 2018

Keywords:

Laryngeal granuloma;

TIVA;

THRIVE;

Tonsillectomy

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J Case Rep Clin Med

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Citation this article: Kavanagh F, Young O, Fahy C, Callaghan M. Laryngeal Granuloma Post Elective Tonsillectomy. J Case Rep Clin Med. 2018; 2(1):116.

ABSTRACT

SC, a healthy 16 year old female presented with worsening dysphonia 4 weeks after an uneventful elective tonsillectomy for recurrent tonsillitis.

Her dysphonia was persistent since her operation progressing to almost complete aphonia. Oral cavity and neck examination were unremarkable. Flexible nasoendoscopy demonstrated bilateral large fleshy masses partially occluding the posterior glottis preventing adduction of the vocal cords.

She was anaesthetised electively using a Total Intravenous Anaesthesia Technique (TIVA) and apnoeic oxygenation with high flow nasal oxygen. The POINT (Peri-Operative Insufflatory Nasal Therapy) system, (Armstrong Medical, Coleraine, UK) was used at a flow rate of 80 litres/minute with an FiO₂ of 1.0 and Transnasal Humidified Rapid-Insufflation Ventilatory Exchange (THRIVE) without intubation. The polyps were excised trans-orally by micro dissection. Clinically her dysphonia instantly resolved.

Background

Post intubation laryngeal granuloma is an uncommon complication with an estimated incidence of 1: 800 to 1: 20,000 and typically occur following prolonged periods of intubation [1]. We report a case of bilateral laryngeal granulomas after an intubation time of 30 minutes, resected successfully with the aid of high flow nasal oxygen and tubeless total intravenous anaesthesia.

Case Presentation

A healthy 16 year old female underwent a tonsillectomy for recurrent tonsillitis. Her intra operative course was uneventful. Of note, direct laryngoscopy was performed with a size 3 Macintosh blade, a Cormac and Lehane grade 1 view was documented and her trachea was intubated with a Mallinckrodt size 7.0 cuffed endotracheal tube. Anaesthesia was maintained with sevoflurane in oxygen and air, and a coblation tonsillectomy was performed. Total procedure duration was 30 minutes. She was extubated 'awake' and her immediate post operative course was uneventful.

The patient experienced dysphonia within the first post operative week. This was persistent and progressive, leading to almost complete aphonia with no relieving factors. She reported no dyspnoea or other relevant symptoms.

She had no medical or surgical history. She did not have any risk factors for laryngeal injury. She was not taking any medications and no drug allergies.

Correspondence:

Fergal Kavanagh,
Department of Otolaryngology,
Head and Neck Surgery,
University Hospital Galway,
Newcastle, Galway, Ireland,
Email: fergalkavanagh@rcsi.ie

She was a second level school student who lived with her parents. She was a non smoker and did not consume alcohol.

Physical examination was unremarkable; she had no stridor or respiratory distress. Her oral cavity was remarkable only for healed tonsillar beds and cervical examination was non contributory. Flexible nasoendoscopy revealed bilateral fleshy masses which were occluding the posterior glottis (Figure 1). These were identified as bilateral laryngeal granulomas and she was scheduled for a microlaryngoscopy and excision of same.



Figure 1: Intraoperative image demonstrating smooth fleshy granuloma occluding the posterior glottis.

Treatment

Considerations for anaesthesia and surgery were the need for adequate surgical access to the glottis and the desire to avoid intubation with a PVC tracheal tube which likely precipitated the original granuloma formation. In view of this apnoeic oxygenation with high flow nasal oxygen and total intravenous anaesthesia was used. The POINT (Peri-Operative Insufflators Nasal Therapy) system , (Armstrong Medical, Coleraine, UK) was used at a flow rate of 80 litres/minute with an FiO₂ of 1.0. This relatively new technique allows oxygenation without respiratory movements and some carbon dioxide clearance and is best termed hypoventilatory mass flow.

The vocal cord granulomas arose from the vocal cord processes bilaterally and were successfully resected using a cold steel technique via a transoral approach and microscope (Figure 2).



Figure 2: Intraoperative image demonstrating the cold steel dissection of laryngeal granuloma.

1. Outcome and follow-up

She experienced a complete resolution of her dysphonia and was discharged 4 hours post operatively. Outpatient follows up at 4 weeks and 3 months confirmed her voice was of normal quality and flexible nasoendoscopy was normal. The histology of her vocal cord granuloma was that of polypoidal ulcerated fragments with acute and chronic granulation tissue (Figure 3).



Figure 3: Incidence of ranging from 0.01% to 3.5%.

Discussion

Phonatory symptoms post short periods of intubation are common but tend to be limited and resolve within 24-48 hours. Suspicion of injury to the vocal cord must be raised when they persist for greater than 48 hours [2]. Injuries to the larynx that can occur post intubation can include laryngeal oedema [3], haematoma, lacerations of the mucosa and muscle, subluxation of the cartilages and damage to the nerves and more rarely perforation of the trachea and oesophagus.

In a series of 167 intubated patients 54 (32%) of patients complained of hoarseness but the majority of patient's symptoms resolved within 5 days. 2 patients in the study remained hoarse for 54 and 99 days respectively were found to have vocal cord granuloma which responded to conservative treatment measures [4]. Contact ulcer granuloma is a late complication of tracheal intubation and should be suspected in those with prolonged symptoms. They are benign entities that are generally located in the posterior third of the vocal fold. First reported in 1932 by Clausen [5] the current evidence would suggest a reported incidence of ranging from 0.01% to 3.5% [6]. Classically the aetiology includes vocal abuse, gastrooesophageal reflux disease and post-intubation [7]. Granuloma as a cause of dysphonia after a short period of intubation is rare though and currently there are only a handful of cases in the literature. They are more likely to occur in cases of prolonged intubation, in women because the larynx in females is anatomically smaller and with the use of large endotracheal tubes and over inflated cuffs [8]. Preventative strategies involve avoiding of eliminating aetiological factors.

The mechanisms underlying their development are; vocal cord mucosa damage during intubation and extubation, frictional forces between the vocal cord and the endotracheal tube, over sized endotracheal tubes and the continuous cuff pressure during intubation. These processes cause an inflammatory cascade in the mucus membrane the severity of which tends to be exacerbated by long intubation times and increased cuff pressures [9]. The degree of trauma caused by

intubation is well documented with studies from the 1970s showing extensive epithelial damage occurring as a result of intubation and the presence of the endotracheal tube. In one study the post mortem specimens of the larynx of patients who were intubated for resuscitation purposes were examined and methylene blue was used to assess the degree of damage. Trauma was extensive in all ten specimens and most commonly occurred posteriorly over the cricoids plate and the vocal processes of the arytenoids [10]. If the lesion extends to the basal layer, restitution and integritum is no longer possible and a granuloma develops [11].

Learning Points

- In our current case, the intubation was uneventful and for a short period of time with an appropriately sized endotracheal tube and cuff pressure with minimal movement of the head and neck during the surgery or extubation. It is therefore likely that the vocal cord ulcer was caused by friction with the tube during extubation damaging the vocal cord mucosa. This case highlights that although vocal cord granulomas are an uncommon complication of tracheal intubation.
- However they should be considered in those with a persisting voice change even in those with a very short history of intubation.
- Patients should be informed that while hoarseness post intubation is common if it persists for longer than 7 days specialist otolaryngology opinion should be sought.

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