

# Tracheal Mass from Iatrogenic Tracheal Injury Repair: A Case Report

Mark Weitzel, DO; Jillian Mattioni, DO; Matthew Nagorsky, DO

Hahnemann University Hospital, Philadelphia College of Osteopathic Medicine

## Abstract

A 90 year old Caucasian female with a past medical history of hypertension and asthma presented with increased shortness of breath with exertion and occasional hemoptysis. She also noted a remote history of partial thyroidectomy that resulted in a temporary tracheostomy secondary to unknown complications during the procedure. Flexible laryngoscopy in the office revealed an exophytic lesion involving the anterior trachea. Operative microscopic and telescopic visualization revealed a 4mm in diameter exophytic lesion. Excisional biopsy with laryngeal forceps and omniguide laser was performed. During laser excision of the lesion, a metallic fragment was visualized. Under direct visualization, the foreign body was grasped and removed which also removed the additional surrounding granulation tissue. The foreign body was a 2 cm long piece of wire with a knot in the middle. Techniques for repair of iatrogenic tracheal injury and the long term sequela are reviewed.

Key Words: Iatrogenic tracheal injury, laryngotracheal injury, tracheal repair, tracheal foreign body, hemoptysis, trachea lesion, trachea granulation

## Introduction

Laryngotracheal injuries can occur as a result of many different insults including but not limited to iatrogenic causes, trauma, infection, and foreign bodies. Iatrogenic injury most commonly occurs during a surgical procedure in the neck or during a difficult intubation. Statistically, women are more predisposed than men to iatrogenic laryngotracheal injury. (1) Guidelines for the repair of laryngotracheal injury have not been well established. The sequelae of the various techniques for repair also have not been detailed in the literature.

The following is a case report of 90 year old woman in follow up after a remote history of laryngotracheal repair. The consequences of her repair are discussed as well as the need for optimization of technique, management and monitoring.

## Case Report

The reported case is of a 90 year old female who presented to the clinic with complaints of dyspnea on exertion and occasional hemoptysis. She reported a past medical history of asthma, hypertension and laryngopharyngeal reflux. Her medications included prednisone and famotidine and she noted allergies to iodine, sepra, penicillin, ammoniated mercury, biacin, ciprofloxacin and indocin. She also stated that she underwent a partial thyroidectomy 18 years prior and during the surgery there was iatrogenic injury to her airway. Laryngotracheal reconstruction and tracheostomy placement were performed following the injury. She was eventually decannulated and she recounted no problems since this time.



Figure 1



Figure 2

On nasopharyngolaryngoscopy exam an exophytic lesion was noted involving the anterior trachea. CT scan was then obtained and revealed a defect of the lateral tracheal wall just below the subglottis, mild tracheal stenosis and a polypoid lesion projecting from the anterior tracheal wall (Figure 1, Figure 2). The decision was made to take the patient to the operating room for therapeutic biopsy of the lesion. In the operating room, a Dedo laryngoscope was used to note normal base of tongue, vallecula, epiglottis, aryepiglottic folds, piriform sinus and postcricoid area. The endolarynx was visualized and noted to be unremarkable. The scope was then advanced and positioned between the vocal folds. Under microscopic control, the subglottic space was visualized. A small exophytic lesion was identified 1.2 cm inferior to the anterior commissure. Rigid telescope was then advanced to visualize the lesion which appeared to be 4mm in diameter and exophytic. The distal trachea, carina and mainstem bronchi were examined and noted to be unremarkable. Under direct visualization, a biting laryngeal cup forceps was used to remove a generous amount of tissue from the lesion. The omniguide laser was then used to vaporize the remaining tissue. At this time, a metallic fragment was appreciated (Figure 3). Under direct visualization, the fragment was grasped with upbiting forceps and removed with gentle traction. Once removed, it was found to be a 2cm long piece of wire with a knot in the middle (Figure 4, Figure 5). Removing the wire also removed the additional tissue.

The pathology of the surrounding tissue was described as granulation tissue with marked acute and chronic inflammation (Figure 6). Upon follow up after resection of the lesion the patient has done well with resolution of hemoptysis and dyspnea. There has been no recurrence of the lesion to date and she remains asymptomatic.



Figure 3



Figure 4



Figure 5

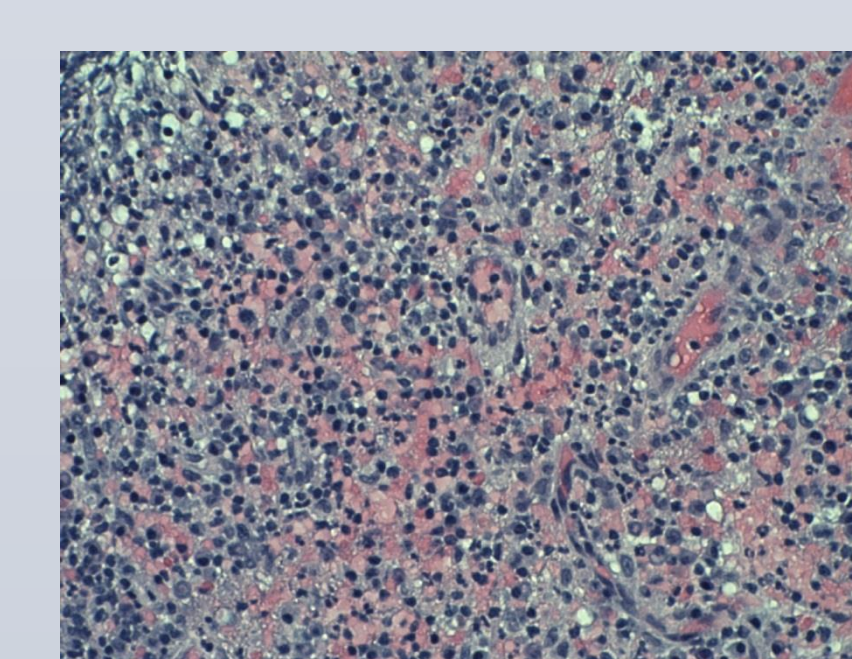


Figure 6

## Discussion

This case demonstrates the need for follow up monitoring after laryngotracheal injury and repair. Although no recommendations have been implemented, it has been suggested in the literature that patients should be monitored with repeat bronchoscopies to detect granulation tissue and relevant tracheal stenosis. (2) There is an obvious need for discussion on the timing and frequency of repeat bronchoscopies based on the findings in a previous exam and symptoms of the patient.

The patient reported in this case had a remote history of laryngotracheal repair and tracheostomy or a partial thyroidectomy but did not report any routine follow up. Additionally, she was not educated on the possible sequelae of her injury and repair including the development of granulation tissue and stenosis. Unfortunately, the assumption had been made at an outside institution that our patient was dyspneic due to asthma. As a result, she had been placed on chronic steroids which has a range of adverse effects on its own. The resolution of her dyspnea following removal of the tissue and foreign body supports the assumption that her dyspnea was at least partially if not completely due to the granulation tissue in her trachea causing stenosis. Consequently, this patient had been placed on chronic steroids unnecessarily.

Additionally, it is necessary to discuss that the iatrogenic injury in this case had been repaired with wire. Many alternative techniques for laryngotracheal iatrogenic injury management are described in the literature including absorbable suture, nonabsorbable suture and close observation. Another case report in the literature advocating against the use of wire, as our case does, describes a migrated orthopedic wire causing tracheoinnominate fistula. (4) It must be considered that using wire for repair not only has potential for airway complications but also for potentially devastating consequences to surrounding neurovascular structures. Additionally, a case report in Portugal argues against repair at all and rather advocates for close observation only in small tracheal injuries in order to avoid unnecessary complications from repair. (5) In this case, the patient had a bronchoscopy that demonstrated a small tracheal tear and was then successfully managed conservatively with antibiotics and close observation. (5) It is important to consider close observation as an alternative to repair as it avoids introducing a foreign body into the airway and therefore assumingly reduces the chances for granulation tissue and stenosis.

In parallel to iatrogenic injuries, a comprehensive article reviewed the management of penetrating tracheal injuries and several points were discussed that are relevant to this case. The first recommendation is that if repair is necessary, absorbable sutures should be placed with the knots outside the lumen. (6) Using absorbable sutures has been shown to decrease the formation of granulation tissue at the suture line and to prevent delayed expectoration of permanent sutures. (6) Based on a literature review, it is also recommended that tracheostomy only be implemented when a simple repair cannot be performed or intubation is impossible. (6) Although this article focuses on traumatic injury it most certainly can be applied to iatrogenic laryngotracheal injury which is also traumatic in nature. In the case reported, the extent of original tracheal injury is unknown but it seems reasonable that if only one wire suture had been used, there may not have been a necessity for tracheotomy.

## Conclusion

In conclusion, this case report and review of the literature on laryngotracheal tracheal injuries and repair advocates for the need for routine monitoring after repair. Additionally, there is a definite need for patient education on possible sequelae that can be misdiagnosed otherwise. This review also advocates against using wire if repair is necessary and instead absorbable sutures should be considered. Further investigation and review needs to be performed in order to establish concrete guidelines on the management of laryngotracheal injury including the need for repair and tracheostomy, the mechanism for repair and follow up care.

## References

1. Hofmann HS, Rettig G, Radke J, Neef H, Siber RE. "Iatrogenic ruptures of the tracheobronchial tree" Eur J Cardiothoracic Surg 2002, 21:649652
2. Barbetakis N, Samanidis G, Paliouras D, Lafaras C, Bichiniotis T, Tsilikas C. "Intraoperative tracheal reconstruction with bovine pericardial patch following iatrogenic rupture" Patient Safety in Surgery 20 Feb 2008; 2:4.
3. Bansal S, Dhingra S, Ghai B, Gupta A. "Metallic Stents for Proximal Tracheal Stenosis: Is It Worth the Risk?" Case Reports in Otolaryngology 24 June 2012, Volume 2012, Article ID 450304, 3 pages.
4. Wu YH, ChaoHan L, YauLuo C, Tseng YL. "Tracheoinnominate artery fistula caused by migration of a Kirschner wire" European Journal of Cardiothoracic Surgery 2009, 36: 214216.
5. Guerra MS, Miranda JA, Caiado A, Almeida J, Moura e Sa J, Leal F, Vouga L. "Iatrogenic tracheal rupture: A case report and indications for conservative management" Revista Portuguesa de Pneumologia 2006, 12: 7178.
6. Lyons JD, Feliciano DV, Wyrzykowski AD, Rozycki GS. "Modern Management of Penetrating Tracheal Injuries" The American Surgeon 2013, 79:188193