### Case report:

# Tracheoinnominate Artery Fistula Post Tracheostomy: A case report and literature review

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## **Abstract**

Tracheostomy is a common procedure in otorhinolaryngology and it is not without its own complications. Tracheoinnominate artery fistula is one of the late complication of tracheostomy. It commonly results in fatality if not detected and treated early. Herein, we present a rare case of a patient with underlying nasopharyngeal carcinoma post radiotherapy, cryotherapy and salvage neck dissection with tracheoinnominate artery fistula as a consequence of tracheostomy who defied statistics and was successfully stented. Objective of this case report is to create awareness regarding the differential diagnosis of massive bleeding from tracheostomy and immediate life saving measures the can be undertakenin addition to theneed to be vigilant in a patient with multiple risk factors that predisposes to the occurrence of tracheoinnominate artery fistula.

**Keywords:** tracheostomy, tracheoinnominate artery fistula

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### Introduction

Tracheostomy is a surgical procedure whereby an incision is made over the cervical trachea to provide an alternative surgical airway. Tracheoinnominate artery fistula is a rare yet highly fatal complication of tracheostomy. The innominate artery arises from the arch of aorta and branches out to form the right subclavian artery and right common carotid artery. The fistula may occur from 3 days up to 6 weeks post surgery.1 Although its incidence is less than 1% this can lead to sudden massive bleeding resulting in mortality rate as high as 88%.<sup>2,3</sup> Multiple factors contribute to the formation of tracheoinnominate artery fistula and this includes but not limited to mucosal erosion secondary to tracheostomy tip positioning, prolonged ventilation and radiotherapy. We would like to present a patient whom had multiple risk factors that contribute to the development of tracheoinnominate artery fistula and underwent successful stenting.

# **Case Report**

A 54 Chinese gentleman presented to us with bilateral neck swelling of 2 months duration. He is a known case of nasopharyngeal carcinoma (NPC)diagnosed one year ago and completed radiotherapy and cryotherapy in a different centre. Further investigations in our centre showed recurrent metastatic NPC.He underwent salvage neck dissection and tracheostomy which was done for airway security in view of extensive neck fibrosis encountered intra-operatively as well as limited mouth opening and neck mobility that could pose a difficulty in securing airway should an emergency situation arises. The surgery was successful and he was discharged home well. 3 weeks post surgery, he presented to the emergency department with bleeding from tracheostomy site measuring half a cup. Flexible nasoendoscopy was performed but no source of bleeding can be identified. He was hemodynamically stable. One hour later, he developed massive haemorrhage from tracheostomy stoma amounting to 2 litres.

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<u>Correspondence to:</u> Amy Oon Li Ling. Department of Otorhinolaryngology, Hospital Kuala Lumpur, 23 Jalan Pahang, 53300 Kuala Lumpur, Wilayah Persekutuan, Malaysia. Email:amylingoon@gmail.com He was resuscitated and at the same time his double lumen uncuffed tracheostomy tube was promptly changed to a cuffed tracheostomy tube which arrested the bleeding.

An urgent Computed Tomography Angiogram (CTA) revealed tracheoinnominate fistula of the right brachiocephalic trunk with surrounding hematoma measuring 1.0cm x 1.6cm x 1.3cm with the balloon from tracheostomy tube acting as a tamponade. Taking into account the limited neck mobility coupled with extensive neck fibrosis and adhesions previously encountered, we decided for endovascular stenting as patient was haemodynamically stable as well. Stenting was successfully done by vascular team and patient was discharged home well.

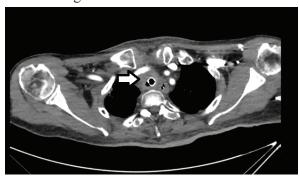


Figure 1 shows tracheostomy tube with surrounding tamponade.

### **Discussion**

Hemorrhage is a known complication for tracheostomy. Dulguerov et al. has reported cases of minor hemorrhage up to be 193-253 per 10,000 patients who underwent open tracheostomy.4 However, sudden massive bleeding from tracheostomy stoma should alert medical personnel the probability of tracheoinnominate artery fistula as a differential diagnosis. Jones et al. reported that 50% of massive bleeding which occur 48 hours and more after the surgery are attributed to tracheoinnominate artery fistula.<sup>5</sup> It carries an extremely poor prognosis with only a 25% chance of survival despite prompt and proper management.5A myriad of factors have been postulated to the formation of tracheoinnominate artery fistula. Among them includes malpositioned cannula cuff pressure, radiotherapy, low tracheostomy and prolonged intubation.¹Focus should be given in decreasing the risk of such complication post tracheostomy. Among them include maintaining recommended cuff pressure to prevent ischaemic necrosis and avoidance of low tracheostomy. Caregivers must avoid vigorous suctioning of tracheostomy tube as constant irritation of tracheal rings can lead to injury and formation of fistula.30-50% of patients with tracheoinnominate artery fistula have been reported to have some bleeding prior to onset of massive bleeding.<sup>6</sup>

Immediate method of haemostasis that can be employed includes digital compression against the sternum via a skin incision made over jugular notch. It has an 85% success rate.<sup>5,7</sup>Alternatively, bleeding can be controlled by changing patient's non cuff tracheostomy tube into a cuffed tracheostomy tube as done for our patient. Using the same principle, Jones et al. recommended placement of an endotracheal tube through the stoma with the cuff adjacent to the fistula for tamponade. This method has an 85% success rate<sup>5</sup>. However, chance of rebleeding is high and these methods only serve to buy time for imaging or further investigations and for stabilization of patient. Patient must be brought to operation theatre immediately for explorationshould from tracheoinnominate artery haemorrhage fistula are not controlled by these methods.

Surgery is the mainstay treatment of tracheoinnominate fistula.1 Ramesh al. concluded that the best surgical approach is via a right anterior thoracotomy and a separate neck incision for optimum isolation and ligation of blood vessel.8 This method is applicable for emergency situations whereby haemostasis is crucial and life saving. Despite that, survival remains low at less than 25%. Deguchi et al. is the first reported to have successfully treated a case of tracheaoinnominate artery fistula by endovascular stenting.9 Endovascular repair can be a safer and effective alternative to open surgical repair especially in cases with underlying multiple comorbids and difficult surgical approach.6

In conclusion, we would like to highlight the importance of prompt diagnosis of tracheoinnominate artery fistula during its acute presentation especially in patients with multiple risk factors. It is also equally critical that doctors are equipped with the knowledge of methods that can be employed to arrest tracheoinnominate artery fistula haemorrhage as swift action determines one's life and death.

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