
Tracheostomy creation leading to innominate artery pseudoaneurysm: A case report

Sir,

Vascular injuries during tracheostomy are very rare but associated with significant mortality. Initially, open surgical repair was the only management of such injuries, but recently endovascular management of such injuries gives excellent results.

A 20-year-old male patient presented to the emergency with bleeding from the tracheostomy site for 2 days. He had a road traffic accident that occurred 15 days prior, following which he had sustained head injury with loss of consciousness. His GCS was 6 and CT brain showed a subdural hematoma that was managed conservatively. He was intubated in view of his poor GCS. A tracheostomy was done on the 7th day of admission in the ICU. Post procedure, the patient developed severe bleeding from the peritracheostomy site and was taken up for surgery due to uncontrolled haemorrhage. A mini-sternotomy was done and upon exploration an injury to the right innominate artery was observed. Primary vascular repair was done and haemostasis was achieved.

On postoperative day two, the patient again developed bleeding from the peri-tracheostomy site. CT angiogram showed a $7.3 \times 3.5 \times 3.4$ cm collection draining from the lesion in the superior mediastinum suggestive of pseudo aneurysm of the right innominate artery. Hence, the patient was referred to our centre for further management [Figure 1].

Upon examination, there was oozing from the peri-tubal area. The patient had a GCS of 10 with stable vital signs. In view of his recent surgery and physiological status, a plan was made to attempt an endovascular exclusion of the pseudoaneurysm.

After stabilisation, he was shifted to the angiography suite. A right brachial artery open access was taken and 8 French sheath was inserted. A hydrophilic 0.035 guide wire and a diagnostic flush catheter were used to approach the lesion. An angiogram was taken which showed extravasation of dye from the innominate artery. The lesion was crossed and a balloon-expandable stent graft of size 10×37 mm was deployed in the innominate artery taking care to preserve the origin of the right common carotid artery. A post deployment angiogram showed normal flow in the right brachiocephalic trunk. He was shifted to the intensive care unit and showed no more signs of bleeding [Figures 2 and 3].

Tracheostomy is a common procedure with a myriad of indications, which vary according to institutional guidelines. In one study, the incidence is approximately 10% in long-term ventilated patients.^[1,2]

Vascular complications of tracheostomy can be classified anywhere on a spectrum from minimal oozing to massive bleeding from tracheostomy tube erosion into a major artery. A meta-analysis by Dulguerov *et al.*, reported the rate of “minor, external haemorrhage” to be 193–253 per 10,000 patients undergoing tracheostomy.^[3] Delayed tracheal haemorrhage from tube erosion into a major artery is a feared complication of tracheostomy, and the classic type described is that of a trachea-innominate fistula. However, this complication occurs in less than 1–2% of patients and is related with significant mortality.^[4]

A thorough knowledge of the anatomy of the innominate artery and its relationship to the tracheostomy tube is essential. The innominate is the first branch of the aortic arch. It divides into the right common carotid and right subclavian artery, 3–4 cm lateral to the trachea, behind the right sterno-clavicular joint.^[5]

In our patient, there was an injury to the anterior part of the right innominate artery probably due to an anatomic anomaly coupled with a low tracheostomy. Surgical procedures are divided into either a ‘definitive repair’ including primary repair as direct suture, graft interposition and a bypass graft from the ascending aorta or a ‘damage control strategy’ with balloon tamponade, temporary shunting or ligation as options.^[6]

Since our patient already underwent an open repair and presented with secondary haemorrhage, we planned for an endovascular approach to the pseudoaneurysm. Covered stents are an acceptable option for treatment of vascular traumas and trachea-innominate fistulas, because placement is a minimally invasive procedure that offers rapid control of bleeding. Limitations can include lack of landing zones and making additional surgical bypasses necessary to maintain blood flow.^[7,8]

Awareness of the anatomy of the region should be paramount. Prompt recognition of any injury and immediate management helps to reduce mortality. Endovascular treatment is associated with significant reduction in mortality and morbidity with good results.

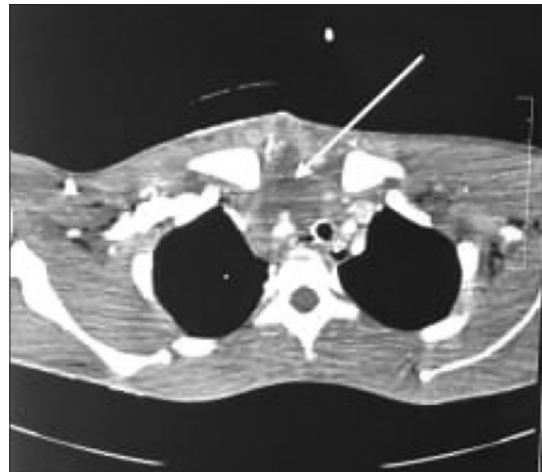


Figure 1: CT angiogram depicting a innominate artery pseudoaneurysm



Figure 2: Angiogram showing extraluminal appearance of contrast



Figure 3: Post stent graft deployment angiogram showing normal flow in innominate artery with no extraluminal contrast

Declaration of patient consent

The authors certify that they have obtained all

appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Financial support and sponsorship
Nil.

Conflicts of interest

There are no conflicts of interest.

Pranay Pawar, Naveen Rajendra, Jithin Jagan, Senthikumar Sukumar¹, Radhakrishnan Raju

Departments of Vascular Surgery and ¹Anaesthesiology, Sri Ramachandra Medical College, Chennai, Tamil Nadu, India

Address for correspondence:

Dr. Pranay Pawar,
Division of Vascular Surgery, Christian Medical College and Hospital,
Ludhiana - 141 008, Punjab, India.
E-mail: Pranay584@yahoo.co.in

Received: 04th September, 2019

Revision: 04th October, 2019

Accepted: 27th October, 2019

Publication: 04th February, 2020

REFERENCES

1. Cipriano A, Mao ML, Hon HH, Vazquez D, Stawicki SP, Sharpe RP, *et al.* An overview of complications associated with open and percutaneous tracheostomy procedures. *Int J Crit Illn Inj Sci* 2015;5:179.
2. Fischler L, Erhart S, Kleger GR, Frutiger A. Prevalence of tracheostomy in ICU patients. A nation-wide survey in

3. Switzerland. *Intensive Care Med* 2000;26:1428-33.
4. Dulguerov P, Gysin C, Perneger TV, Chevrolet JC. Percutaneous or surgical tracheostomy: A meta-analysis. *Crit Care Med* 1999;27:1617-25.
5. Epstein SK. Late complications of tracheostomy. *Respir Care* 2005;50:542-9.
6. Grant CA, Dempsey G, Harrison J, Jones T. Tracheo-innominate artery fistula after percutaneous tracheostomy: Three case reports and a clinical review. *Br J Anaesth* 2005;96:127-31.
7. Okada Y, Narumiya H, Ishii W, Ryoji I. Damage control management of innominate artery injury with tracheostomy. *Surg Case Rep* 2016;2:17.
8. Machado AD, Barroso MC. Endovascular management of tracheo-innominate artery fistula: A case report and literature review. *J Vasc Bras* 2018;17:348-52.
9. Deguchi JO, Furuya T, Tanaka N, Nobori M, Seki Y, Nomura Y, *et al.* Successful management of tracheo-innominate artery fistula with endovascular stent graft repair. *J Vasc Surg* 2001;33:1280-2.

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Access this article online	
Quick response code	Website: www.ijaweb.org
	DOI: 10.4103/ija.IJA_654_19

How to cite this article: Pawar P, Rajendra N, Jagan J, Sukumar S, Raju R. Tracheostomy creation leading to innominate artery pseudoaneurysm: A case report. *Indian J Anaesth* 2020;64:159-61.

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