Profuse bleeding from tracheoinnominate fistula in a major burn patient

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INTRODUCTION

Tracheostostomies are frequently required in major burns patients as they require ongoing operative management and ventilatory support. The innominate artery (brachiocephalic artery) is a branch of the aorta that lies anterior to the trachea. Rarely, tracheostomies have been reported to eroded the innominate artery.
Tracheoinnominate artery fistulae (TIF) have an incidence of 0.1-1% in patients with a tracheostomy and are usually fatal without prompt surgical intervention. Risk factors for TIF have been suggested by various publications and include infection, malnourishment and position/motion of the tracheal tube, high cuff pressures and radiation therapy Specifically, major burns patients inevitably suffer from infections and malnourishment by nature of their injuries (Grant, 2006.) Management may involve surgical control and repair or endovascular techniques.

CASE REPORT

We report a case of a 42 year-old spray painter who sustained 82% burns to his body when paint ignited. He was intubated at the scene and subsequently required a tracheostomy to maintain his airway. A percutaneous tracheostomy was performed by Intensivists ten days after the intubation, once the skin graft to his anterior neck was stable. The percutaneous tracheostomy was performed under bronchoscopy with the initial Trachoe Twist tracheal tube size 8 being placed. This tube had a persistent leak and required exchange the next day to a Size 9. Twenty eight days after the percutaneous tracheostomy was performed, the patient started to bleed profusely from the tracheostomy site and into his oral cavity, prompting a massive transfusion protocol.

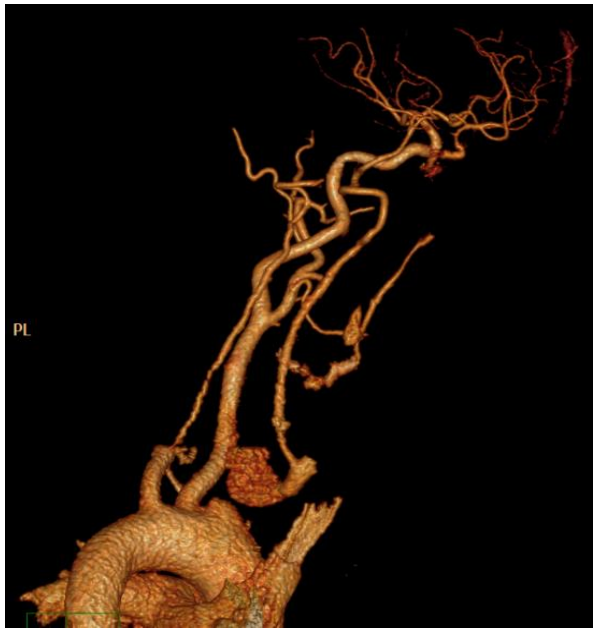

Image 1 – CTA – Demonstrating Innominate Artery ligation

The tracheostomy cuff was inflated in an attempt to tamponade the bleeding. Urgent ENT and Cardiothoracic reviews occurred and a Foley catheter was placed and the balloon inflated to gain compressive control of the bleeding with some success that enabled transport to the operating theatre.
The ENT team determined that the bleeding was subglottic and likely from innominate artery via direct laryngoscopy.
The Cardiothoracic team performed a sternotomy and the tracheoinominate artery fistula was subsequently identified and controlled by clamps while an oropharyngeal intubation was performed to secure the airway. Proximal and distal innominate vessel ligation was performed. The trachea was repaired with sutures and a thymic fat pad was mobilised anterior to the tracheal repair. Given the burn field and heavy contamination of the area the decision was made not to perform carotid bypass surgery by the involved Vascular team intraoperatively.

The postoperative CTA of the Aortic arch to Circle of Willis (Image 1) demonstrated obliteration of the right common carotid artery and retrograde flow from the left carotid circulation via the Circle of Willis. The right subclavian artery was opacified presumably from retrograde flow from the right vertebral artery. Due to the limited retrograde arterial blood supply to the patients right arm from the right vertebral artery, the patient is at risk of subclavian steal but there has been no clinical evidence of this. There is no evidence to date that the patient has suffered neurologically from the altered cerebral blood flow. The patient has been informed that in future there is to be no intravenous access on the right side.

Conclusion

To our knowledge, this is the first published case of a major burns patient to have developed and survived a tracheoinnominate artery fistula. The neurological safety of division of the innominate artery has been documented by case reports in the literature.
Unfavourable outcomes seem to be preceded by a significant neurological threat such as hypotension or in those that had existing left carotid artery stenosis. The younger population did not suffer neurological consequences from this isolated event likely due to the absence of significant atherosclerotic disease. Timely identification and surgical intervention were crucial to his survival.

References

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