Introduction

- Tracheoarterial fistula (TAF) is a very rare but serious complication of tracheostomy placement, occurring in <1% of surgical tracheostomies (1).
- Because the innominate artery overlies and crosses the anterior trachea, the majority of TAFs are trachea-innominate artery fistulas (TIF) (2).
- When massive hemorrhage from the tracheostomy site occurs, TAF must be considered and surgical treatment is necessary; however, the survival rate of these patients is only 14.3% (3).
- We present a pediatric patient who presented with a trachea-innominate fistula and the approach the anesthesia team took to treating the patient with this tracheostomy complication.

Case History & Intraoperative Management

- The patient was a 16-year-old female with a history of severe cerebral palsy, recurrent respiratory infections, and epilepsy who was tracheostomy and gastrostomy tube dependent. She presented from an outside hospital with copious bleeding from her tracheostomy site.
- She was rushed to the local hospital where she had cardiopulmonary arrest several times from hemorrhagic shock, resuscitation was performed, and she was transferred to our hospital.
- She was transfused three units of packed red blood cells and one unit of platelets before arrival.
- The ENT surgeons emergently took the patient to the operating room for exploration of the tracheostomy.
- We immediately activated mass transfusion protocol, and had blood products available before the patient came to the OR.
- Once the patient had the appropriate monitors placed, the ENT surgeon removed the tracheostomy tube.
- Immediately approximately one liter of blood gushed from the tracheostomy site and the patient’s mouth and nose.
- Direct laryngoscopy was performed and a 6.0 cuffed reinforced endotracheal tube was successfully placed.
- The patient immediately went into ventricular tachycardia, and ACLS ensued.
- ROSC occurred within a few minutes and the vascular surgeon was consulted.
- After sternotomy, the diagnosis of trachea-innominate artery fistula was made.

Discussion

- TIF is usually a short-term complication of tracheostomy placement, but in rare circumstances it can be a late complication.
- In 50% of cases, the fistula presents as a sentinel bleed, but in the remainder of patients, it presents as massive hemorrhage.
- The index of suspicion has to be high in order to correctly diagnose these patients because without prompt surgical intervention, mortality approaches 100%.
- Inflating the tracheostomy balloon stops the bleeding most of the time, but other maneuvers such as pressing the innominate artery against the sternum can also be used to stop the bleeding until surgical intervention can take place.
- Most commonly the innominate artery is ligated, but there has also been reports of successful angiographic intervention with stent placement in the pediatric population.
- Only one case report was found about a TIF in a pediatric patient that survived surgical intervention.
- Risk factors for TIF include long-term ventilation and high peak inspiratory peak pressures; also specifically in this patient who had severe cerebral palsy, other risk factors include the excessive movements of the neck and the presence of a high innominate artery that is often present in the pediatric population.
- Special consideration must be taken for the pediatric population with TIF because of the smaller blood volume and rapidity in which the blood can be lost leading to cardiopulmonary arrest.
- Every pediatric anesthesiologist should be aware of this rare tracheostomy complication and be prepared to effectively aid in the treatment of these patients in the operating room.

References