We report a case of an otherwise healthy 59-year-old male who experienced tracheoesophageal fistula and grade IV subglottic stenosis after percutaneous dilation tracheostomy following polytrauma. Although percutaneous tracheostomy is considered safe, complications are often performed in the intensive care unit setting. While subglottic stenosis and tracheoesophageal fistula are known complications of percutaneous tracheostomy, this report is the first that discusses a patient who experienced both complications simultaneously. The purpose of this report is to discuss potential serious complications of percutaneous tracheostomy and their management, and to review the literature on percutaneous tracheostomy complications.

**CASE REPORT**

The otolaryngology-head and neck surgery (OHNS) service was consulted to evaluate a 59-year-old gentleman who had suffered polytrauma from a high speed motorcycle collision. He had been in the intensive care unit for 7 days and was failing to wean from the ventilator, so bedside percutaneous dilation tracheostomy was performed. On postoperative day 11 he underwent a modified barium swallow study (MBSS) to evaluate dysphagia. The study was concerning for tracheoesophageal (TE) fistula. The patient was taken to the operating room for rigid bronchoscopy and esophagoscopy. He was noted to have a very small TE fistula approximately 2-3cm inferior to the glottis. His endoscopic examination was also notable for diffuse subglottic edema and free floating cartilaginous components which were removed from the airway. The patient was made NPO in hopes of closure of fistula by secondary intention.

After three weeks, the patient was reassessed by the OHNS service. Of note, he could not tolerate capping of tracheostomy, and was unable to phonate with tracheostomy occlusion. Bronchoscopy was performed revealing partially healed TE fistula and Cotton-Myer grade IV subglottic stenosis extending from 2cm below the glottis to 1.5cm above the tracheostoma. Definitive repair was planned in collaboration with the thoracic surgery service. The patient underwent cricotracheal resection with primary anastomosis and hyoid release as well as sternohyoid muscle flap closure of the TE fistula. On postoperative day 4, he was noted to have stridor and respiratory distress and so direct laryngoscopy and bronchoscopy was performed. Examination of the airway revealed supraglottic edema and an intact tracheal anastomosis. The patient did well on a course of steroids. Grillo stitches were removed on postoperative day 11. Repeat modified barium swallow study showed no evidence of TE fistula. He was subsequently discharged home on hospital day 100.

**DISCUSSION**

There is a paucity of literature studying complication rates of percutaneous dilatation tracheostomy. Overall complication rates of PDT reported in several small retrospective cohort studies range from 0-25%, which is consistent with complication rates for open tracheostomy. The rate of tracheoesophageal fistula is less than 1% in all tracheostomies, both percutaneous and open. Tracheal stenosis is generally not severe, and may occur in up to 27% of PDT. In the largest cohort of PDT studied to date, of 3,162 procedures there were no cases of tracheoesophageal fistula and only 5 cases of tracheal stenosis requiring operative intervention. There are concerns that the modified Seldinger technique of PDT may lead to complications due to blind placement of the tracheostomy tube. Studies comparing PDT with and without bronchoscopy show no statistically significant increase in risk of airway complications if bronchoscopy is not performed. In the present case, flexible bronchoscopy was performed by the primary team during the initial procedure and placement of tracheostomy cannula into the airway was confirmed with direct visualization. While the overall and major complication rates of PDT discussed in the literature are low suggesting that PDT is a safe procedure, the clinician must practice vigilance for signs of complication such as dysphagia, increased secretions, and failure to tolerate capping. In the event of concern for a complication, there must be a low threshold for examination of the airway under anesthesia in the operating room to both assess the severity and extent of injury as well direct further treatment modalities.

**CONCLUSION**

Percutaneous dilation tracheostomy is a commonly performed procedure with very low complication rates, but caution is needed as there is a potential for severe complications including tracheoesophageal fistula and subglottic stenosis. Diagnosis and management of these severe sequelae of PDT requires complex surgical decision making and serial evaluation of the upper aerodigestive tract. In cases that require airway reconstruction, a multidisciplinary approach and attentive follow up is necessary.