Tracheal laceration: A rare complication of median sternotomy

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The median sternotomy is the most commonly used incision for cardiac surgery. A median sternotomy provides the most advantageous access for most cardiac operations because it can be quickly performed and allows for surgical exploration. Few tracheal lacerations during median sternotomy have been reported. Because all tracheal lacerations are potentially life threatening, immediate surgical management is advised. I am reporting a case of tracheal laceration caused by a median sternotomy.

Clinical Summary

A 58-year-old woman was admitted for evaluation of dyspnea. Over the prior 2 years, she had increasingly frequent episodes of shortness of breath and a decreasing exercise tolerance. Atrial septal defect was diagnosed, and she was scheduled for a patch closure of the defect with an autologous pericardial patch by the cardiac surgical team. During the operation, a tracheal tube was inserted smoothly, and the tidal volume was set at 500 mL with a ventilatory rate of 12 breaths/minute by an anesthesiologist. After a blunt maneuver by a finger in the retrosternal lesion, an Acculan sternal saw (Aesculap, Tuttlingen, Germany) was used for the median sternotomy from the xiphoid to the manubrium of the sternum. As soon as the median sternotomy was complete, air bubbles could be seen coming from the trachea beside the back of the manubrium of the sternum under direct vision in the operating field. It seemed clear that the Acculan sternal saw had produced the tracheal laceration during the median sternotomy.

The general thoracic surgical team was called, and a 10-mm longitudinal laceration of the anterior wall of the trachea at the sixth and seventh tracheal rings was identified. First, the cuff was deflated and the endotracheal tube was cautiously passed through the tracheal laceration into the bifurcation of the trachea. The tracheal laceration was repaired with interrupted absorbable monofilament sutures, and mediastinal tissue was used to cover the suture line. After surgical repair, the tube was placed by bronchoscopy to lie above the location of the rupture and the cuff was inflated. An air leak was no longer present. The operation for the atrial septal defect was postponed at this time. The tracheal tube was removed after the operation, with no clinical signs of subcutaneous emphysema. The operation for the atrial septal defect was performed a week later. The postoperative courses

of the operations for both the tracheal laceration and the atrial septal defect were uneventful. During bronchoscopy performed on the 14th day after the tracheal operation, no signs of infection or anastomotic breakdown were evident. An endoscopic examination performed 6 months after the incident showed a regularly shaped tracheal wall.

Discussion

Iatrogenic tracheal injury is an unusual complication. Most of these iatrogenic injuries occur as a complication of orotracheal intubation, internal tracheal stenting, or operative procedures such as transhiatal blunt esophagectomy.¹ Tracheal lacerations during median sternotomy rarely occur but are potentially life threatening. An increasing number of reports of median sternotomy complications have appeared, and most of them indicate sternal dehiscence and infection.² Opening the sternum is one of the most critical phases of an operation because of the potential for injury to the underlying organs. Furthermore, repeat sternotomy is reported to be associated with cardiac laceration.³ Tracheal laceration as a result of sternotomy is rare, with only one report of tracheal injury resulting from sternotomy having been published.⁴

In reviewing lateral chest radiographs and computed tomographic scans, surgeons must take care if the sternum is elevated away from the mediastinal structures, creating a space behind the sternum. When dividing the sternum in cardiac operations, surgeons usually have to ask the anesthesiologist to deflate the lungs to avoid injury to the pleura and lungs. In this case, the chest radiographs and computed tomographic scans showed a normal tracheal deviation and a normal space behind the sternum, and the cardiac surgeon asked the anesthesiologist to deflate the lungs. The space behind the sternum was not obliterated by adhesions to the back of the sternum. Instead, the tracheal laceration was caused by the median sternotomy in this case, and the tracheal suture line was covered with a fatty pad to reduce the risk of infection.

Tracheal laceration is a possibility during median sternotomy. When a sternal saw is used for median sternotomy from the xiphoid to the manubrium of the sternum, the trachea beside the back of the manubrium of the sternum may be at risk of injury. To avoid injuring the trachea when performing a median sternotomy, the surgeon should be cautious to maintain control of the situation.

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