Novel Repair Technique of Transmural Tracheal Lacerations

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Objectives

1. Demonstrate a novel method to repair a full thickness tracheal wall laceration.
2. Discuss relationship of this new technique in regards to current accepted methods of treatment reported in the literature.
3. Learn that full thickness tracheal tears, although rare, are possible following routine tracheal balloon dilation.

Methods

- We review a patient’s case of symptomatic idiopathic tracheal stenosis. One year after initial dilation, balloon dilation was performed and a 7.5 centimeter full thickness tracheal laceration occurred.
- We report successful repair with a covered tracheobronchial stent and review the literature relating our repair to other accepted techniques.

Results

- Following tracheal balloon dilation, staying within recommended limits a transmural tracheal tear was identified revealing beating viscera.
- Using flexible endoscopy and fluoroscopic guidance the tear was measured to be 7.5 centimeters.
- An 8x20 mm silicone covered tracheobronchial stent was deployed into position to revitalize the area of tracheal disruption. The stent was then seated to the trachea with balloon dilation distally & proximally.
- The patient was taken for intra-operative computed tomography which demonstrated minimal air extravasation and no pneumothorax, thus the patient was extubated.
- The patient was observed in the step down unit for two days and discharged on hospital day three.
- The stent remained for two months at which point it was removed. The trachea was well healed with mild granulation tissue and a patent airway.
- The patient was free of symptoms for six months.
- Kim reviewed 124 cases of dilation and notes that many large and deep lacerations heal well over time, but prognosis and treatment for tracheal rupture is not well described.
- Treatment techniques include intubation and waiting, primary closure, and flap reconstruction.
- Our technique is advantageous because it can be done endoscopically at the time of surgery with excellent outcomes and less morbidity.
- Although covered stents are not designed to be air tight, the stent held positive pressure well for the duration of intubation.
- Stents should not be left excessively because of potential for granulation tissue.

Discussion

- Balloon dilation mucosal tears can lead to bleeding, pneumothorax, pneumomediastinum, or mediastinitis, but minor tears may help patency.
- Kim notes that many large and deep lacerations heal well over time, but prognosis and treatment for tracheal rupture is not well described.
- Treatment techniques include intubation and waiting, primary closure, and flap reconstruction.
- Our technique is advantageous because it can be done endoscopically at the time of surgery with excellent outcomes and less morbidity.
- Although covered stents are not designed to be air tight, the stent held positive pressure well for the duration of intubation.
- Stents should not be left excessively because of potential for granulation tissue.

Conclusions

- Endotracheal dilation is an established and safe method to restore airway patency.
- Superficial and even full thickness lacerations can occur, full thickness tears are not frequently described but can be life threatening.
- Deployment of an appropriate covered tracheobronchial stent at the time of surgery is a treatment option with low comorbidity.
- Close observation is necessary to ensure proper healing as this technique warrants further evaluation.

References