

Figure 4. Overlap maps showing the extent of overlap among the models. The percentage of overlap at each voxel is indicated by the color scale. PV = portal vein.

FDM-type 3-D printer, are promising for use in the preoperative simulation of endovascular treatment.

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Covered Stent Implantation in the Treatment of Tracheal Rupture after Thyroidectomy



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Editor:

Tracheal rupture associated with thyroidectomy rarely occurs during the surgical procedure itself (1,2). The resulting leakage of air and its accumulation in the surrounding tissues causes extensive subcutaneous and mediastinal emphysema and severe dyspnea. It can also adversely affect the venous return to the heart. In addition, tracheal rupture may cause neck infection, which may lead to mediastinitis, mediastinal abscess, and death.

Tracheal rupture after thyroidectomy is usually repaired immediately by surgery. The surgical procedure is complex and extensive and may necessitate cardiopulmonary bypass. An implanted endotracheal stent offers an effective, direct, and less invasive means of sealing tracheal tears (3,4). We report two cases of tracheal rupture after thyroidectomy that were treated with implantation of a covered stent by an interventional approach. This report was approved by the institutional review board.

The first patient was a 79-year-old woman with a history of papillary thyroid carcinoma that was removed by thyroidectomy 6 years ago. She underwent radical neck dissection to excise recurrent neck nodules 2 years ago. She gradually developed worsening tracheal stenosis, for which an uncovered metallic stent was placed 2 months ago. The patient was referred to our hospital for extended radical neck dissection and recurrent laryngeal nerve exploration to treat locally recurrent bilateral thyroid carcinoma. The patient complained 2 days after the surgery of dyspnea with pain in the retrosternal area and neck. Computed tomography (CT) scan of the neck

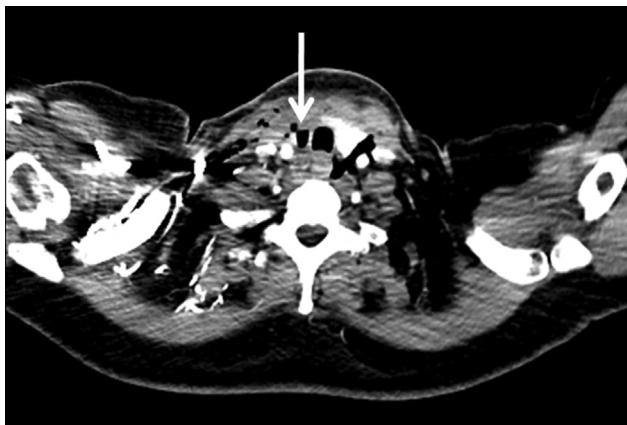


Figure 1. Preoperative CT image of the neck showing emphysematous area around the trachea (arrow).

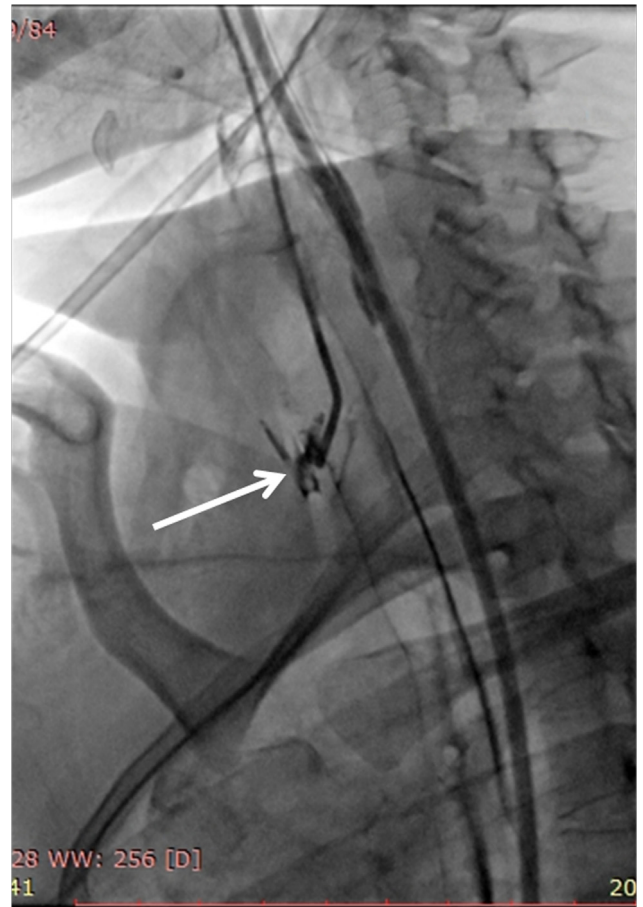


Figure 2. Intraoperative tracheography showing the site of tracheal rupture (arrow).

and chest demonstrated extensive subcutaneous and mediastinal emphysema. The patient underwent tracheal intubation to maintain the airway, but the symptoms continued to worsen gradually.

The procedure of stent implantation was performed with the patient supine using tetracaine spray and conscious sedation. Under fluoroscopic guidance, a 5-F catheter over a wire was introduced transorally into the trachea. A transcatheter injection of 5 mL of 2% lidocaine was given as local anesthesia. Then 3 mL of water-soluble iodinated contrast medium was injected to confirm the site and size of tracheal rupture. An interventional technique was employed to remove the previously implanted uncovered tracheal stent and replace it with a 20 mm × 60 mm covered stent (Sewoon Medical Co, Ltd, Seoul, Korea). Subcutaneous and mediastinal emphysema resolved completely 3 days after the operation. At 1 month after the operation, the tracheal rupture had healed, and the stent was removed by the interventional radiologist. The patient showed no recurrence of tumor and tracheal rupture during a 35-month follow-up.

The second patient was a 39-year-old woman with solid nodules in the right thyroid lobe who underwent right

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