Free Tissue Reconstruction of the Cervical Esophagus with Concurrent Sternotomy

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Background

- Reconstruction of the cervical esophagus is highly complex.
- While local pedicled muscle flaps may sufficiently address small esophageal defects, large defects in previously radiated tissue or those with substernal extension may require microvascular free tissue transfer.
- Clinical outcomes and post-operative complications in esophageal reconstruction, particularly in patients who require concurrent sternotomy, remain poorly characterized.

Methods

- Case series of 5 patients who underwent free flap reconstruction of cervical esophagus requiring concurrent sternotomy between 2013 and 2021.

Select Cases

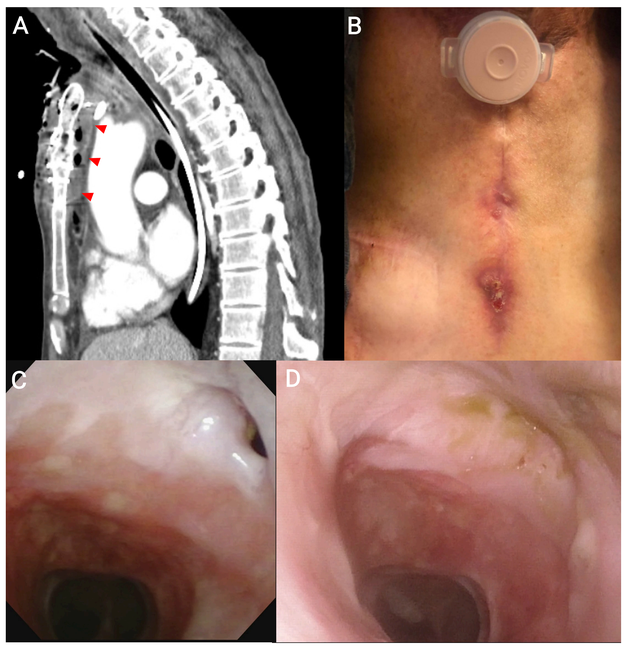

Figure 1. Case #1 – sternal osteomyelitis with tracheo-esophageal fistula (TEF) at inferior inset.

[A] On post-op day 20, the patient began experiencing progressive breakdown of sternotomy incision with exposure of manubrium. CT chest showed changes in the sternum concerning for osteomyelitis without further development of mediastinitis **[B]** The patient continued to experience intermittent polymicrobial superficial fluid collections at the sternotomy incision over the manubrium which were treated with a prolonged course of antibiotics. **[C]** At 2.5 months post-op, patient developed small TEF at the inferior aspect of the flap inset to trachea. **[D]** He underwent excision of fistula tract with augmentation of posterior tracheal wall with Prolaryn Gel, which resulted in closure of TEF 1 month later.

Results

Table 1. Patient and surgical characteristics

Case	Age / Sex	Indication for Reconstruction	Prior H&N Radiation	Prior H&N Surgery	Free Flap Type	Defect Size (cm)	Inset Ischemia Time (min)
1	62 M	**Total pharyngeal stenosis and tracheo-esophageal fistula** after hypopharynx SCC treatment	✓	✓	ALT	N/A	152
2	40 F	Medullary thyroid carcinoma with laryngeal and esophageal invasion; **total laryngo-pharyngectomy and cervical esophagectomy**	x	✓	ALT	10 x 10	216
3	79 M	Cervical esophageal SCC; **total laryngectomy and cervical esophagectomy**	✓	x	ALT	10 x 20	245
4	62 M	Cervical esophageal SCC; **total laryngo-pharyngectomy and cervical esophagectomy**	✓	x	ALT	10 x 20	193
5	64 M	Papillary thyroid carcinoma with laryngeal and esophageal invasion; **total laryngo-pharyngectomy and cervical esophagectomy**	x	x	RFF	9 x 15	120

Table 2. Post-operative complications

Case	Ablation or Flap-Related Complications	Sternotomy-Specific Complications	Mediastinitis	Partial or Total Flap Loss	Salivary Leak	Tracheo-Esophageal Fistula	Additional Surgical Intervention Required
1	Donor site hematoma	**POD #20**: sternotomy incision dehiscence with exposed bone at manubrium requiring IV antibiotics; no drainable fluid collection	x	x	x	✓	**Yes** - excision of fistula tract with posterior tracheal wall augmentation to facilitate closure
2	Chyle leak requiring exploration	None	x	x	x	x	None
3	None	**10 weeks post-op**: sternotomy incision dehiscence and osteomyelitis with sternoclavicular joint involvement	x	x	x	x	**Yes** - debridement of sternum and sternoclavicular joints, removal of superior sternal wires
4	None	None	x	x	x	x	None
5	Recipient site hematoma	**POD #23:** sternal osteomyelitis with mediastinitis	✓	x	x	x	**Yes** - evacuation of mediastinal purulence and sternal debridement; bilateral pectoralis major rotational flaps for dehiscence reconstruction

Figure 2. Case #5 – sternal osteomyelitis with mediastinitis.

On post-op day 23, this patient developed leukocytosis and intermittent episodes of atrial fibrillation with RVR. CT chest (above) showed sternal osteomyelitis with substernal collection and increasing pericardial effusion concerning for mediastinitis. Sternal debridement and mediastinal washout was performed with 100 cc of purulence evacuated and cultures indicating *Staphyloccocus aureus* as causative organism. He ultimately needed bilateral pectoralis major rotational flaps for sternotomy dehiscence reconstruction.

Discussion and Conclusions

- Sternotomy-related complications **can present in a delayed fashion**; all three patients who developed sternal osteomyelitis exhibited symptoms at >3 weeks post-operatively. Only one patient with sternal osteomyelitis presented with systemic signs of mediastinitis. **Close post-operative monitoring** of these patients in the outpatient setting may be necessary to identify early infectious signs.
- Two of the three patients who had sternotomy-related complications had **prior H&N radiation therapy,** which predisposes to poor wound healing.
- Even in the presence of sternotomy surgical site infection, **none** of the patients experienced **early anastomotic leaks or free flap compromise**.