Surgical Options in Tracheal Stenosis

Pieter van de Woestijne
Congenital Cardio-thoracic Surgeon
Pediatric Chest Center Sophia Children’s Hospital
Erasmus MC Rotterdam
Introduction
Anatomy of the Trachea
Ethiology tracheal stenosis

- Congenital
  - Complete rings
  - TE-fistulas
  - Compression
- Acquired
  - Trauma
  - Tumor
  - Intubation
  - Battery ingestion
- Associated lesions
  - Cardiac defects
  - Vascular
  - Genetics
Diagnosis

- X-ray
- CT scan
- Endoscopy
- Functional testing
- 3D printing
- Virtual reality
Surgical Options Tracheal Stenosis

- Resection, ETE anastomosis
- Patch plasty
- Sliding tracheoplasty
- Graft interposition
- Stenting
Resection and Anastomosis

- Relatively easy
- Short segments only
- Outgrowth satisfactory
- Tension on anastomosis
- Chin-sternal fixation
- External fixation
Patch plasty

- Which material?
- Support
- Infection
- Necrosis
- Malacia
Sliding Tracheoplasty

- Most used Technique
- Long segments
- Combination with patch
- Challenging cases
Sliding tracheoplasty
Graft Interposition

- Allograft vessel
- Cartilage graft
- Tracheal transplantation
  - Vascularization
  - Outgrowth
  - Sputum transport

The trachea: one of the most complex organs to transplant
Tissue engineering

Tissue-engineered trachea from a 3D-printed scaffold enhances whole-segment tracheal repair in a goat model

Dekai Xia, Dawei Jin, Qian Wang, Manchen Gao, Jialing Zhang, Hengyi Zhang, Jie Bai, Bei Feng, Maolin Chen, Yanhui Huang, Yumin Zhong, Nevin Witman, Wei Wang, Zhiwei Xu, Haibo Zhang, Meng Yin, Wei Fu... See fewer authors

First published: 22 February 2019 | https://doi.org/10.1002/term.2828 | Citations: 1

Pig tracheal patchy xenotransplantation in the dog

Tae-Ki Lee, Jong-Min Kim, Seok Hwa Choi

First published: 17 August 2018 | https://doi.org/10.1111/xen.12452
Tracheal Stenting

- Different types of stents
  - Metal
  - Silicon
  - Biodegradable
  - Self-expanding

- Outgrowth in children
- Necrosis
- Migration
- Infection
- Complementary to other techniques
- Bail out
Results

- 31 Patients 33 Procedures
  - Male 19
  - Children 18
  - Median age 8y

- Surgery
  - Partial resection 2
  - Patch plasty 2
  - End-to-end anastomosis 27
    - Sliding plasty 15
  - ECC needed 18

- Survival 94%
  - Complications 35%
Literature

- Postoperative mortality 6-14%
- Frequent balloondilation
- Bad outcome in bronchus stenosis, preop ECMO and preop malacia
- Quality of life comparable with controls
- Prolonged ventilation related to concomitant procedures, age and weight
- Hospital stay associated with preop ventilation and smaller airways
- Stenting bail out option


Summery

- Complete rings are rare but challenging
- Check for associated lesions and genetics
- Teamwork is needed, ENT, pulmonologist, pediatric cardiology, imaging, general surgery, ECMO, etc
- Sliding tracheoplasty best option also for long segment lesions
- Stenting sometimes necessary, restrictive in children
- Building experience by concentrating cases to dedicated teams
- Thank you!