



Tracheal and cricotracheal resections: see one, do none, centralize?

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In their retrospective single-center study, Marchant *et al.* described their outcome after tracheal and cricotracheal resections and reconstructions in detail (1). They report on the outcome of a heterogenous population of 44 patients; 21 patients with a stenosis based on malignancy and 23 with a benign origin. The authors achieved an overall success in 75% of patients, which was defined as no need for reoperations or postoperative intervention. Complications occurred in 20% of patients, with 13% being classified as Clavien Dindo grade IIIa or higher. Recurrent stenosis was rare (6.8% of patients). The overall outcome of the series by Marchant *et al.* is in line with previously reported data (2-4). However, the authors do report a higher rate of permanent tracheotomies (15.9%) and laryngeal recurrent nerve paralysis, which were more frequent in patients operated for a malignancy. This is in line with data on cricotracheal and tracheal resections in patients suffering from thyroid cancer (5), being linked to a more difficult dissection and tumor ingrowth. The authors decided to combine data on patients operated for benign and malignant diseases. While the reason for this combination is obviously the relatively small patient number per cohort, this decision has an impact on the described outcomes. Cricotracheal and tracheal resection and reconstructions are rare procedures. This is reflected by literature presenting only few articles on its outcomes. A recent survey in the Nordic countries, including 5 countries with a total population of 26 million, identified 15 centers which performed cricotracheal and tracheal resections (6).

The median annual number of tracheal operations, in both adults and children, per center was five (range 1–20) with six centers performing only one or two procedures per year. Given the procedural difficulty of cricotracheal and tracheal resections, its associated risk of complications and morbidity in conjunction with its rare prevalence, centralization may benefit both surgeons and patients. Moreover, since the largest series published to date performs only 20 procedures per year (7), cross-country collaboration and centralization is being advocated. On the other hand, its potential advantages are currently not supported by evidence comparing outcomes between (relative) high and low volume centers.

Marchant *et al.* hint at a low referral number in benign stenosis probably due to local treatment with tracheostomy or bronchoscopic interventions. Previous treatments with bronchoscopic dilations, laser therapy and especially stent placement might aggravate the inflammation occurring in benign stenosis. When tracheostomy is indicated in tracheal stenosis, it is important to place it in a diseased portion of the trachea. A less than ideal tracheostomy placement, might compromise patient outcome. We can fully agree with Marchant *et al.*, that the cause of the stenosis must not influence referral to tertiary, high volume centers, but that an early referral is needed for all patients.

The most common aetiology for benign tracheal stenosis is previous prolonged intubation and/or tracheostomy. In the past two years, COVID-19 dominated the life and

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healthcare systems globally. While most of the patients suffer from mild disease, 5% to 10% of the patients have a severe and life-threatening course where long-term ventilation and subsequent weaning with the aid of a tracheostomy have become standard of care. In June 2020 an expert opinion paper by the laryngotracheal stenosis committee of the European laryngological society, alerted physicians for the possible onset of laryngotracheal complications in these patients (8). The potential aetiology of tracheal complications in COVID-19 patients is plural, including the duration of invasive intubation, high cuff pressure, steroid use, micro-thrombosis and pronation manoeuvres (9-11). Therefore, a rise in tracheal stenosis is to be expected and has already been reported on, increasing the demand for adequate treatment of tracheal stenosis (11).

Given these circumstances, the data presented by Marchand *et al.* are deemed important. They demonstrate that in dedicated hands, cricotracheal and tracheal resection offers a good outcome with manageable complications, especially for those with a benign stenosis (2-4,12). As highlighted by these authors, but also by previous reports (2-4,6-8); the treatment of tracheal stenosis is complex, has a significant complication rate and requires an early referral and treatment by a dedicated multidisciplinary team.

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