

Full-circumferential tracheal replacement with cartilage-reinforced forearm free flaps in the real world

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Received: 24 December 2023; Accepted: 27 February 2024; Published online: 17 April 2024.

doi: 10.21037/med-23-72

View this article at: <https://dx.doi.org/10.21037/med-23-72>

Following an invited Editorial (1), we have recently reanalyzed the harm-benefit of full-circumferential tracheal replacements (FCTRs) for tracheal adenoid cystic carcinoma (ACC) by means of the widely used tracheal substitutes: silicone-stented aortic allografts and cartilage-reinforced forearm free flaps. While no 90-day mortality (in-hospital mortality) was shown in our world-first case series of FCTR with silicone-stented aortic allografts for salivary gland-type carcinoma performed from April 2005 to September 2007, we were concerned by the results in term of in-hospital mortality (n=6) after FCTR with cartilage-reinforced forearm free flaps for ACC performed at the Marie-Lannelongue Hospital (Le Plessis Robinson, France) (2). In a reply, the team of this Institution reported on its overall experience of 30 patients. The authors claimed that they have used this technique “with only four postoperative deaths at the very beginning (before 2013) of our experience”, “highlighting the presence of an important learning curve” (3).

With regard to this discrepancy (six versus four deceased patients in the postoperative period), we have pooled data from the five previously published articles by the Marie Lannelongue Hospital's team in the field since 2013 (4-8). The data analyzed are those of patients who underwent a FCTR for miscellaneous indications from August 2004 to December 2017 (4-7); and those of patients who subsequently

underwent a similar procedure for ACC between 2017 and 2019 (8). Patient numbers and causes of in-hospital mortality as stated by the authors are reported in *Table 1*.

It appears to us that the results of this in-depth literature review contradict the author's assertion: the in-hospital mortality in all indications was actually seven patients and increased during the second period (five deceased patients after 2013). The main life-threatening surgical complication was tracheal flap ischemia that was shown in 10% of patients: one case during the learning curve period which needed an additional free-flap replacement as salvage surgery (4) (the “Discussion” section), and two fatal cases from flap necrosis during the second period (8). Finally, with regard to the major in-hospital mortality shown after FCTR for tracheal ACC (a radiosensitive tumor), and the lack of reliability of current tracheal substitutes, the procedure should not be proposed as we have been stating for a decade (1,2,9). Since the FCTR with cartilage-reinforced forearm free flaps “should be considered experimental” as stated by Eisenberg and Hofstetter (10), we think our complete literature analysis useful to maintain the integrity of the surgical research.

To develop of a reliable substitute currently remains a challenge of the utmost importance. In this setting, we launch an experimental project of tracheal substitute based on a pedicled thoracic flap reinforced by synthetic

Table 1 Articles reported patients undergoing FCTR with cartilage-reinforced forearm free flaps

Article, year	Reported patients	Causes of in-hospital mortality (n=7)
Fabre <i>et al.</i> , 2013 (4)	12 patients	Respiratory infection and excessive bronchial congestion (n=2). The flaps remained viable and functional
Fabre <i>et al.</i> , 2015 (5)	5 additional patients	None
Etienne <i>et al.</i> , 2018 (6)	No additional patients	None
Mercier <i>et al.</i> , 2018 (7)	2 additional patients	Additional death: myocardial infarction (n=1)
Estephan <i>et al.</i> , 2023 (8)	Reported patients with ACCs from 2007 to 2019 (n=15) [†]	Additional deaths: tracheal flap necrosis (n=2), anastomotic fistula (n=1), stroke (n=1)

Causes of in-hospital mortality (as stated by the authors in five articles). [†], ten patients from 2007 to 2017; and five patients between 2017 and 2019. FCTR, full-circumferential tracheal replacement; ACC, adenoid cystic carcinoma.

biocompatible tracheal rings.

Acknowledgments

Funding: None.

Footnote

Provenance and Peer Review: This article was a standard submission to the journal. The article has undergone external peer review.

Peer Review File: Available at <https://med.amegroups.com/article/view/10.21037/med-23-72/prf>

Conflicts of Interest: The author has completed the ICMJE uniform disclosure form (available at <https://med.amegroups.com/article/view/10.21037/med-23-72/coif>). The author has no conflicts of interest to declare.

Ethical Statement: The author is accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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doi: 10.21037/med-23-72

Cite this article as: Wurtz A. Full-circumferential tracheal replacement with cartilage-reinforced forearm free flaps in the real world. *Mediastinum* 2024.