

## LETTER TO THE EDITOR

### Comparison of bronchial anastomotic techniques in lung transplantation by 3D CT analysis

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Dear editor,

In the Article “*Comparison of Bronchial Anastomotic Techniques in Lung Transplantation by 3D CT Analysis*”, currently being analyzed for publication, the authors tackle a much studied subject in thoracic surgery, that of the technical aspects of the anastomosis of the airway in lung transplant operations. Ever since the first procedures carried out, still in the sixties, the airway anastomosis has been widely discussed<sup>1-4</sup>. Currently, it is accepted that an end-to-end anastomosis of the bronchus, in a sequential operation of both lungs, has the upper hand. Also, it is a consensus that the posterior, membranous, portion of the bronchi should be joined by means of a continuous suture<sup>1-4</sup>. However, in the anterior wall, the surgical team at InCor had a different approach from that used in most high-volume North American centers. We made use of interrupted stitches, rather than just using continuous suture as in the posterior wall, but switched to the more widespread method in May of 2016. The study aimed at comparing both techniques, and establishing whether there was any difference in them in terms of airway narrowing.

In order to accomplish that, the authors devised a method for using chest CT-scans, routinely taken three

months post-op for all patients, to determine whether there was a narrowing of the airway at the site of anastomosis. A software capable of reconstructing the bronchial tree in 3D and calculating the cross section area at a given point was used for the analysis. Taking into consideration the fact that the airway naturally narrows from proximal to distal, the authors compared the cross-section at the point of anastomosis with the average cross section areas at two sites: 5mm distal and 5mm proximal to the airway. Thus, they established the Anastomotic Index (AI).

The anastomotic index was the main focus of analysis. It was calculated for 79 bronchi from 39 patients. The first 20 patients operated consecutively after the switch of techniques were compared to further 20 patients selected to match the first patients in terms of age, sex, kind of operation (Unilateral vs Bilateral), disease that led to the transplant and surgeon who performed the procedure. Furthermore, the number of bronchi with an AI greater than 1, indicating enlargement of the airway was also compared. Lastly, the greatest ischemia time between the two lungs, the difference in size between donor and receptor and the pulmonary function of the patients at the time of the CT analyzed.

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A significant difference was found between the mean AI of the two groups (mean AI 0.98 vs 0.82,  $p < 0.001$ ), and also between the number of bronchi with an index greater than 1 (13 vs 1,  $p < 0.001$ ). Regarding the other aspects analyzed, no difference was found, whether it was in ischemia time (433min vs 469min,  $p=0,16$ ), difference in BMI (1.09 vs 1.13,  $p=0,53$ ) and height (1.036 vs 1.028,  $p=0,53$ ) between donor and receptor, and also in the difference between predicted and actual FEV1 (1.05 vs 0.80,  $p=0.19$ ).

In the article discussion, the authors conclude that

the use of interrupted stitches in the anterior bronchial wall is actually superior to the use of a continuous suture, because of the greater mean AI, but also due to the larger number of bronchi with an AI greater than 1, indicating that the former technique results in a mechanical widening of the airway, that may protect the patient from complications. This last feature is probably a consequence of better use of the normal size mismatch between donor and receptor, since the size difference in the two groups was the same. Also, as the adoption of an interrupted suturing technique implies no greater ischemic time, its use is feasible, and may result in benefit to the patients.

## REFERENCES

1. Samano MN, Minamoto H, Junqueira JJM, et al. Bronchial complications following lung transplantation. *Transplant. Proc.* 2009;41:921-6. doi: 10.1016/j.transproceed.2009.01.047.
2. Herrera JM, McNeil KD, Higgins RS, Coulden RA, Flower CD, Nashef SA, Wallwork J. Airway complications after lung transplantation: treatment and long-term outcome. *Ann Thorac Surg.* 2001;71:989-93; discussion 993-4. [https://doi.org/10.1016/S0003-4975\(00\)02127-5](https://doi.org/10.1016/S0003-4975(00)02127-5).
3. Weder W, Inci I, Korom S, Kestenholz PB, Hillinger S, Eich C, Irani S, Lardinois D. Airway complications after lung transplantation: risk factors, prevention and outcome. *Eur J Cardiothorac Surg.* 2009;35:293-8; discussion 298. doi: 10.1016/j.ejcts.2008.09.035.
4. Van De Wauwer C, Van Raemdonck D, Verleden GM, Dupont L, De Leyn P, Coosemans W, Naftoux P, Lerut T. Risk factors for airway complications within the first year after lung transplantation. *Eur J Cardiothorac Surg.* 2007;31:703-10. doi: 10.1016/j.ejcts.2007.01.025

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