

In the Internal thoracic artery, more diameter does not always mean more flow

To the Editor,

With great interest, I read the article by Chandran *et al.*^[1] and congratulate them for the quality of the study conducted on other possible methods to increase the flow of the internal thoracic artery (ITA) in coronary revascularization. In view of the authors' interest in this topic, I would like to make some comments in this regard.

Since the introduction of papaverine during ITA harvesting in 1971 by George E. Green,^[2] cardiac surgeons have attempted to find more effective methods of increasing the diameter, length, and flow of the artery. This research is on the same path as those efforts and its results show that vasodilation by sympatholysis does not seem to be the solution either.

It is generally believed that an increase in the diameter of ITA, by whatever means, will lead to an increase in its flow. However, in 2017 Satdhabudha and Noppawinyoowong demonstrated that native ITA flow (artery in situ) decreases almost half after harvesting, even with topical administration of papaverine for 5 min.^[3] The only explanation for this finding is that, in the particular case of ITA, the amount of its flow is determined by a more important factor than the diameter of the vessel.

It should not be forgotten that ITA is an exceptional vessel, fed by at least three arterial systems, receiving flows from different directions and with different intensities. In this anatomical scenario, an increase in the diameter of the artery by sympatholysis will not cause a significant increase in its antegrade flow, since at the same time, endoluminal resistance to that flow also increases (competition).

In this case, since the increase in flow is practically nil, endothelial nitric oxide (NO) production will not increase either and the expected vicious cycle leading to further dilation of the artery will not start. This physiological situation can perfectly explain the results of the study by Chandran *et al.*, specifically related to the flow of ITA.

Since 2015, I have introduced an effective method to increase the free flow of ITA in my hospital, which seems to have few limitations. It consists of occluding the distal end of the artery at the beginning of its preparation.^[4] By abolishing early-flow competition, higher NO production is obtained, mediated by an increase in ITA systolic flow, and improving the mentioned vicious circle.

We recently completed a randomized control trial (unpublished data), which compared the results of applying this method with the generally used skeletonization technique, also in two homogeneous groups of 50 patients. Differences in the diameter of the arteries were not measured, but there were very significant differences in the postharvest free flow, being higher in the group where the arteries were occluded distally at the beginning of their preparation (83 ± 24 Vs. 44 ± 15 ml/min; $P < 0.001$).

In addition, other interesting benefits related to mediastinal and sternal protection against future infectious complications are obtained.^[5]

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

Yoandy López de la Cruz

Department of Cardiovascular Surgery, Santa Clara Cardiac Center,
Santa Clara, Cuba

Address for correspondence: Dr. Yoandy López-de la Cruz,
“July 26” Ave., No. 306, Apt. 18, Santa Clara. Villa Clara, 50 200 Cuba.
E-mail: yoandylc@infomed.sld.cu

Submitted: 21-May-2020 **Accepted:** 21-Jun-2020
Published: 22-Jan-2021

REFERENCES

1. Chandran R, Sreedhar R, Gadhinglajkar S, Dash P, Karunakaran J, Pillai V. Combined effect of left stellate ganglion blockade and topical administration of papaverine on left internal thoracic artery blood flow in patients undergoing coronary revascularization. *Ann Card Anaesth* 2020;23:170-6.
2. López de la Cruz Y, Nafeh Abi-Rezk M, Betancourt Cervantes J. Internal mammary artery harvesting in cardiac surgery: An often mistold story. *CorSalud* 2020;12:64-76.
3. Satdhabudha O, Noppawinyoowong N. A randomized comparison of flow characteristics of semiskeletonized and pedicled internal thoracic artery preparations in coronary artery bypass. *J Cardiothorac Surg* 2017;12:28.

4. López-De la Cruz Y, Quintero Fleites YF. Proposal of a new method for the skeletonized internal mammary artery harvesting: Historical, anatomical and physiological fundaments. *CorSalud* 2018;10:230-41.
5. López-de la Cruz Y, Quintero-Fleites Y. Internal mammary artery harvesting with its distal end occluded. *Chin Med J (Engl)* 2019;132:1385-6.

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

Access this article online	
Quick Response Code:	Website: www.annals.in
	DOI: 10.4103/aca.ACA_118_20

How to cite this article: de la Cruz YL. In the internal thoracic artery, more diameter does not always mean more flow. *Ann Card Anaesth* 2021;24:125-6.
© 2021 Annals of Cardiac Anaesthesia | Published by Wolters Kluwer - Medknow