

Publication:

Intraoperative graft verification in coronary surgery

Authors:

Di Giammarco G et al.
University of Chieti-Pescara, Clinica Cardiocirurgica,
Chieti, Italy
J Cardiovasc Med 2017, May;18(5):295-304
doi: [10.2459/JCM.0000000000000401](https://doi.org/10.2459/JCM.0000000000000401)

**Abstract**

Transit-time flow measurement (TTFM) is a reliable method to check the graft function intraoperatively in coronary surgery. The given parameters are Mean Graft Flow (MGF); Pulsatility Index (PI) and Insufficiency Ratio (%BF).

Some cutoffs of these parameters have been identified as predictors for unfair 1-y clinical outcome: mean graft flow (MGF) less than 20 ml/min and high pulsatility index greater than 5.

Other cutoffs have been found as related to postoperative angiography: MGF 15 ml/min or less and pulsatility index at least 3 (sensitivity 94%; specificity 61%); MGF less than 15 ml/

min and pulsatility index greater than 3 for left coronary artery.

Pulsatility index greater than 5 for right coronary artery (sensitivity 96%; specificity 77%); MGF 15 ml/min or less and pulsatility index at least 5.1 left coronary artery (sensitivity 98%; specificity 26%).

Hence, with the need to improve the diagnostic accuracy of TTFM, a high-resolution epicardial coronary ultrasound module has been added to graft flow evaluation providing 2D ultrasound imaging (either in short-axis or long-axis) and color-flow mapping, allowing an accurate morphological

evaluation of body graft and anastomosis. An intraoperative method aimed to verify coronary grafts should be easy to handle, not time consuming, minimally invasive, easily meaningful and relatively cheap; in addition, it should offer objective parameters more than qualitative criteria.

We herein report the results of our experience with intraoperative graft verification with TTFM and high-resolution imaging along with a systematic review of the literature in this field with the aim to provide a road map to be followed.

Medistim comments

DiGiammarco has extensive experience with the use of Medistim VeriQ C™ and MiraQ™ systems, combining TTFM and ultrasound imaging for intraoperative guidance and quality assessment during CABG.

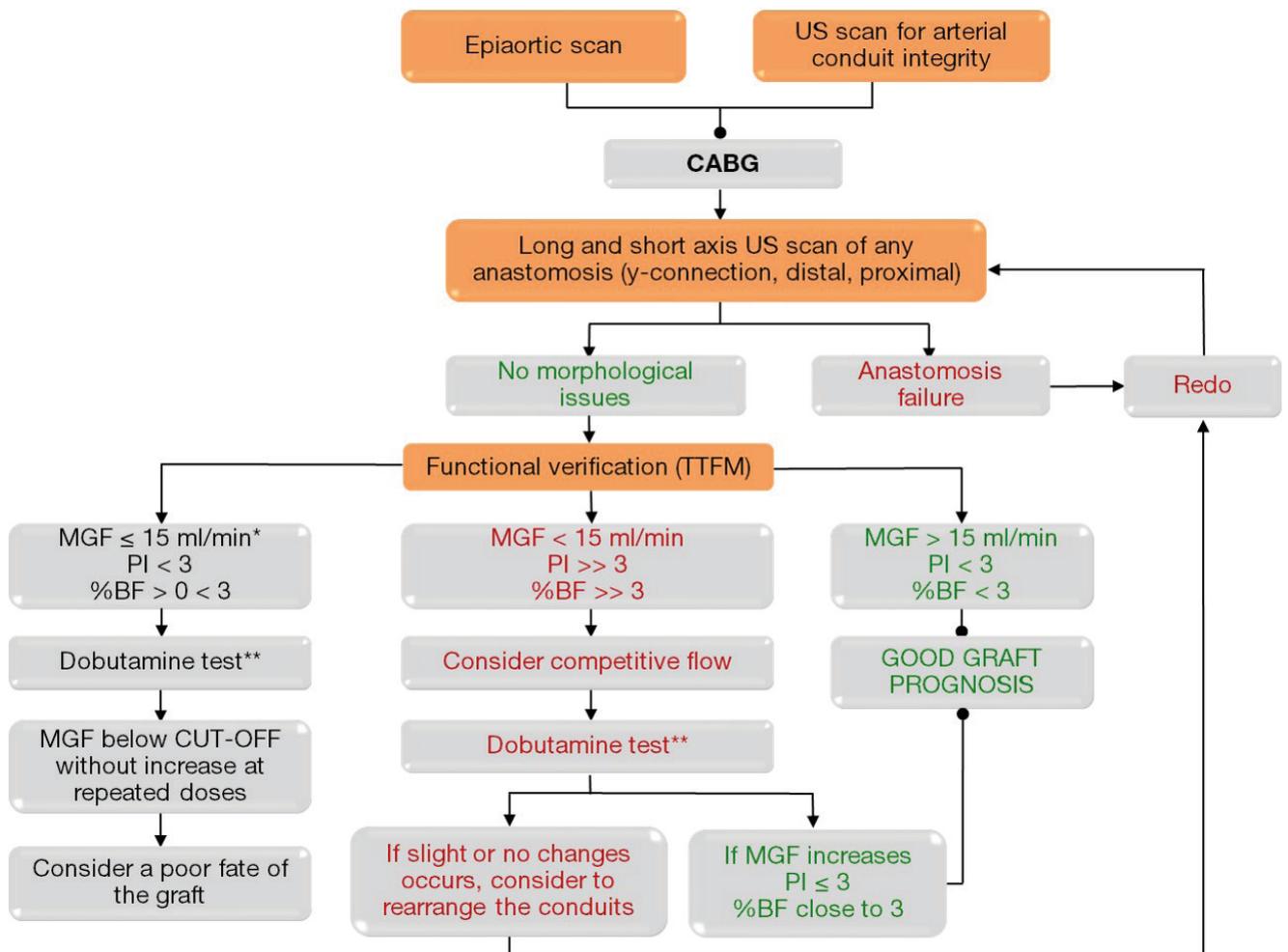
The authors have designed an intraoperative graft verification flowchart, showing how they use TTFM and intraoperative ultrasound imaging to make clinical decisions through the different steps of the operation. These steps start with ultrasound of the aorta and the coronary targets. Contrary to other surgeons, DiGiammarco then performs ultrasound of the anastomoses before flow evaluation with TTFM.

There is a lot to learn from this publication and it makes it easy for the reader to get access to the most relevant literature for TTFM during CABG. It is one of the first systematic reviews evaluating the combination of TTFM and ultrasound imaging.

Based on the existing large amount of published information and their own experience, the authors identified the following benefits from combining TTFM with imaging:

- Clinically useful graft verification procedure
- Individual improvement by self-educating
- Proof of a job correctly done during training of surgeons

Intraoperative graft verification flowchart



* OR = 21.2 for mid term failure

** JTVC 2003, 126(4):1076-9

JTVC 2006, 132(3):468-74