

References

1. Miyahara K, Matsuura A, Takemura H, Saito S, Sawaki S, Yoshioka T, et al. On-pump beating-heart coronary artery bypass grafting after acute myocardial infarction has lower mortality and morbidity. *J Thorac Cardiovasc Surg.* 2008;135:521-6.
2. Gudbjarnason S, Puri PS, Mathes P. Biochemical changes in non-infarcted heart muscle following myocardial infarction. *J Mol Cell Cardiol.* 1971;2:253-76.
3. Rubin SA, Fishbein MC, Swan HJ. Compensatory hypertrophy in the heart after myocardial infarction in the rat. *J Am Coll Cardiol.* 1983;1:1435-41.
4. Newman MA, Chen XZ, Rabinov M, Williams JF, Rosenfeldt FL. Sensitivity of the recently infarcted heart to cardioplegic arrest: beneficial effect of pretreatment with orotic acid. *J Thorac Cardiovasc Surg.* 1989;97:593-604.

doi:10.1016/j.jtcvs.2009.02.015

INTRAOPERATIVE CORONARY ANGIOGRAPHY: WITH OR WITHOUT ISCHEMIA?

To the Editor:

We read with interest the article by Kilian and coworkers¹ entitled "Intraoperative coronary angiography in the management of patients with acute aortic dissection and endocarditis." The authors describe the possibility of performing an intraoperative angiographic assessment of the coronary arteries in patients with potential contraindications to the conventional preoperative cardiac catheterization in the catheterization laboratory. In fact, in patients presenting with acute aortic dissection, the diagnosis is usually accomplished by means of computed tomographic scanning and transesophageal echocardiographic analysis, and the patient is immediately moved to the operating room for emergency surgical intervention. In such a setting, conventional cardiac catheterization is time consuming and could generate a harmful delay to intervention. Furthermore, patients with aortic valve endocarditis with vegetations are at high risk of embolization during cardiac catheterization.

We agree with the authors about the feasibility and efficacy of this diagnostic strategy, and we commonly use intraoperative coronary angiography (ICAN) in the following situations:

aortic endocarditis, acute aortic dissections, and mechanical complications of an acute myocardial infarction. The latter, like postinfarction ventricular free wall rupture, could be better managed with an on-pump beating heart operation to reduce the ischemia-reperfusion injury² caused by cardioplegic arrest in patients with recent or ongoing acute coronary syndromes. Nevertheless, we are a little concerned with the technique described in Kilian and coworkers' article.¹

The authors perform ICAN during cardioplegic arrest of the heart; this results in prolonged crossclamp time and, consequently, longer myocardial ischemia. This is particularly true if the coronary lesions are not easily detectable and several different projections are needed. Furthermore, this technique cannot be performed in patients undergoing an on-pump beating heart operation. Thus we strongly believe that ICAN should be carried out through a femoral artery access with the heart beating after aortic cross-clamp removal and before weaning from cardiopulmonary bypass (CPB) or decannulation. In particular, in patients undergoing operations on the aortic valve, the ascending aorta, or both, ICAN can be safely performed after that the procedure is completed and the aortic clamp is removed. If coronary lesions are found, off-pump coronary artery bypass or, if that is not possible, on-pump beating heart coronary artery bypass grafting can be performed, thus resulting in less myocardial ischemia, shorter CPB duration, or both. Furthermore, additional information other than the coronary mold could be obtained with the beating heart technique: speed of contrast washout, milking effects, and, most of all, a more physiologic view of the coronary anatomy.

In conclusion, we believe that performing ICAN with the heart beating has several advantages. First, it does not increase crossclamp and CPB times. Second, it can be performed without many interferences, such as

sternal retractors and aortic clamps. Third, it can be done during on-pump beating heart operations. Finally, it provides views similar to those obtained with a conventional study that, consequently, are more easily interpretable.

Augusto D'Onofrio, MD^a

Giovanni Domenico Cresce, MD^a

Luigi La Vecchia, MD^b

Alessandro Fabbri, MD^a

Divisions of Cardiac Surgery^a and Cardiology^b

San Bortolo Hospital
Vicenza, Italy

References

1. Kilian E, Beiras-Fernandez A, Bauerfeind D, Reichart B, Lamm P. Intraoperative coronary angiography in the management of patients with acute aortic dissection and endocarditis. *J Thorac Cardiovasc Surg.* 2008;136:792-3.
2. D'Onofrio A, Abbiate N, Magagna P, Fabbri A. Intraoperative coronary angiography in postinfarction ventricular free wall rupture: how technology can change diagnostic and therapeutic timing. *Interact Cardiovasc Thorac Surg.* 2008;7:733-5.

doi:10.1016/j.jtcvs.2008.12.047

Reply to the Editor:

We appreciate the response to our article "Intraoperative Coronary Angiography in the Management of Patients With Acute Aortic Dissection and Endocarditis" and thank D'Onofrio and colleagues for their interest in the described intraoperative angiographic technique. As mentioned in their Letter to the Editor, the authors discuss the prolongation of myocardial ischemia while performing intraoperative coronary angiography (ICA) during aortic crossclamping (ACC) instead of performing ICA after removal of the aortic clamp via a peripheral artery, as described in their case report² of a patient presenting with an ischemic rupture of the left ventricular lateral wall. We agree that ischemia should be reduced as much as possible and that performing ICA during the reperfusion period is a good alternative, but we wanted to avoid this approach for our patients.¹ We intended to intubate the coronary