like to congratulate the authors on their careful analysis of one of the largest single-center cohorts published on this important topic as well as providing excellent day-to-day patient care at the bedside.

References

1. Anderson JL, Doty JR. Bypass surgery after non-ST-segment elevation myocardial infarction better early than late? *JACC Cardiovasc Interv*. 2010;3:428-30.
2. Lee DC, Oz MC, Weinberg AD, Ting W. Appropriate timing of surgical intervention after transmural acute myocardial infarction. *J Thorac Cardiovasc Surg*. 2003;125:115-20.
3. Davierwala PM, Verevkin A, Leontyev S, Misfeld M, Borger MA, Mohr FW. Does timing of coronary artery bypass surgery affect early and long-term outcomes in patients with non-ST-segment-elevation myocardial infarction? *Circulation*. 2015;132:731-40.
4. Bianco V, Kilic A, Gleason TG, Aranda-Michel E, Wang Y, Navid F, et al. Timing of coronary artery bypass grafting after acute myocardial infarction may not influence mortality and readmissions. *J Thorac Cardiovasc Surg*. 2021;161:2056-64.e4.

See Article page 2056.

Commentary: Coronary artery bypass grafting after acute myocardial infarction: Sound clinical judgment still prevails

Katsuhiro Hosoyama, MD, PhD, and
Marc Ruel, MD, MPH

Katsuhiro Hosoyama, MD, PhD, and Marc Ruel, MD, MPH

CENTRAL MESSAGE

Contrary to long-held belief, this new study suggests that delaying surgical revascularization after acute myocardial infarction may not be desirable in all cases. However, further analyses will be required to confirm those conclusions.

Despite numerous studies having focused on the outcomes of coronary artery bypass grafting (CABG) in the setting of acute myocardial infarction (AMI)—denoting a greater operative risk for emergency CABG compared with elective CABG—the optimal timing of surgical revascularization after AMI remains controversial. In this article, Bianco and colleagues¹ report on a single-center, retrospective series that compared the short- and long-term outcomes of patients who underwent isolated CABG within 24 hours and after 24 hours from the onset of AMI. The interest of this study relates to its sizable cohort, comprising 2058 patients operated between 2011 and 2017, and the length of follow-up, with a median of approximately 2 years. The authors compared the clinical outcomes of 292 patients who underwent CABG <24 hours and 1766 patients who had CABG

≥24 hours after the onset of AMI. Although the perioperative mortality of unadjusted patient cohorts was significantly greater in the <24 hours group, there was no such difference after risk adjustment by propensity matching. The authors concluded that delaying surgical revascularization to increase patient stability after AMI may not always be beneficial.

The study has limitations that must be considered before this observation guides mainstream clinical practice. First, patients who underwent CABG within 24 hours were probably assumed to have greater mortality risk due to their increased level of acuity, resulting in confounding by indication through the selection of patients whose upfront risk may have been “worth it.” Although propensity matching

From the Division of Cardiac Surgery, University of Ottawa Heart Institute, Ottawa, Ontario, Canada.

Disclosures: Authors have nothing to disclose with regard to commercial support. Received for publication Dec 16, 2019; revisions received Dec 16, 2019; accepted for publication Dec 17, 2019; available ahead of print Jan 7, 2020.

Address for reprints: Marc Ruel, MD, MPH, Division of Cardiac Surgery, University of Ottawa Heart Institute, 40 Ruskin St, Ottawa, Ontario, Canada K1Y 4W7 (E-mail: mrue1@ottawaheart.ca).

J Thorac Cardiovasc Surg 2021;161:2068-9

0022-5223/\$36.00

Copyright © 2020 by The American Association for Thoracic Surgery

<https://doi.org/10.1016/j.jtcvs.2020.01.001>

can limit those differences, it cannot account for all potential confounders or treatment allocation biases. Conversely, a patient whose CABG was deferred by ≥ 24 hours may have had other comorbidities that halted emergency surgery.

In this study, the grading of how stable a patient was versus how much ischemia and territory at risk was present was not well defined, and failure to have done this makes comparison between the groups difficult. Surgeons often use this intricate balance to determine whether a given patient should undergo CABG now or wait for the clinical status to stabilize and the action of platelet inhibitors to abate.

The relevance of a 24-hour cutoff in this study also needs validation. Previous work by Lee and colleagues^{2,3} and Weiss and colleagues⁴ reported outcomes differences using cutoffs between 6 hours and 3 days post-AMI, respectively. Therefore, other subdivisions around the timing of revascularization could have revealed outcome differences in the present study. Further, patients who died before surgical revascularization or who eventually became too sick to undergo CABG were not captured.

In the future, novel approaches such as the use of serological markers including troponin and C-reactive protein may

help define the appropriate timing of surgical intervention.^{5,6} Until a randomized trial addressing this question takes place, sound clinical judgment and retrospective studies such as the present work will continue to form the rationale basis around defining the optimal timing of CABG after AMI.

References

1. Bianco V, Kilic A, Gleason TG, Aranda-Michel E, Wang Y, Navid F, et al. Timing of coronary artery bypass grafting after acute myocardial infarction may not influence mortality and readmissions. *J Thorac Cardiovasc Surg.* 2021;161:2056-64.e4.
2. Lee DC, Oz MC, Weinberg AD, Lin SX, Ting W. Optimal timing of revascularization: transmural versus nontransmural acute myocardial infarction. *Ann Thorac Surg.* 2001;71:1197-202; discussion 1202-4.
3. Lee DC, Oz MC, Weinberg AD, Ting W. Appropriate timing of surgical intervention after transmural acute myocardial infarction. *J Thorac Cardiovasc Surg.* 2003;125:115-9; discussion 119-20.
4. Weiss ES, Chang DD, Joyce DL, Nwakanma LU, Yuh DD. Optimal timing of coronary artery bypass after acute myocardial infarction: a review of California discharge data. *J Thorac Cardiovasc Surg.* 2008;135:503-11. 511.e1-3.
5. Beller JP, Hawkins RB, Mehaffey JH, LaPar DJ, Kron IL, Yarboro LT, et al. Does preoperative troponin level impact outcomes after coronary artery bypass grafting? *Ann Thorac Surg.* 2018;106:46-51.
6. Kosmidou I, Redfors B, Chen S, Crowley A, Lembo NJ, Karpaliotis D, et al. C-reactive protein and prognosis after percutaneous coronary intervention and bypass graft surgery for left main coronary artery disease: analysis from the EXCEL trial. *Am Heart J.* 2019;210:49-57.