

## Predictors and outcomes of conversion to sternotomy in minimally invasive CABG

*Minimal invaziv KABG'de sternotomiye dönüşün öngördürücüleri ve sonuçları*

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Dear Editor,

I wish to congratulate Emre Yasar et al.<sup>[1]</sup> for sharing their experience with single and multi-vessel coronary artery bypass grafting (CABG) performed with minimally invasive techniques through the anterolateral thoracotomy. The authors reported 9.5% conversion rate to median sternotomy and found that intramyocardial left anterior descending (LAD) artery was the most common cause for conversion. Although conversion to sternotomy should not be seen as a major failure, it is undesirable by the patient and should be avoided, if possible.

The authors experienced most of the potential causes for conversions and divided the cases into two groups: early and late conversions. Most of these causes were related to the technical difficulties in the management of the unexpected findings (e.g., pleural and pericardial adhesions, single-lung ventilation not tolerated), management of the complications (e.g., ventricular perforation, aortic injury, left pulmonary artery injury, hypotension), and coronary grafting itself (e.g., intramyocardial LAD, small or diffuse calcified LAD, anastomosis dysfunction, anastomotic bleeding).

In this short text, I would like to discuss few issues that may help to avoid the conversion and may partially explain the low risk of conversion (<1%) in our own series based on the data from more than 600 consecutive patients with multi-vessel minimally invasive CABG done with cardioplegia and transthoracic clamp through the left anterior thoracotomy. The technique is

known as the total Coronary Revascularization via left anterior thoracotomy (TCRAT) and some data were published previously.<sup>[2-4]</sup>

From the theoretical point of view, conversions are provoked by technical difficulties. Thus, if surgeons can reduce the technical difficulties, most of the cases mentioned in the article<sup>[1]</sup> would not require a conversion to sternotomy, as conversion does not solve problem, but only reduces the technical difficulties during surgical correction.

Below I present the three technical tips that make the minimally invasive CABG less complicated and more straightforward.

First is the approach. In TCRAT-CABG, our preferred approach is an anterior, not an anterolateral, mini-thoracotomy. Anterior approach is the shortest way to all the coronary targets. Anterolateral approach does not provide any benefits during cardioplegia-based CABG, it only increases the distance to the coronary targets.

Second is the surgical condition convenient for surgeons resulting from the vacuum-assisted cardiopulmonary bypass (CPB), cardioplegia, and subsequent active venting through the aortic root. As a result, the surgeon obtains an empty cardioplegic heart not different from the sternotomy settings.

Third is the exposure maneuvers. Special techniques with tapes around the aorta, inferior vena cava (IVC) and left pulmonary veins (LPV) were developed by our group in 2017.<sup>[2]</sup> For LAD exposure, the surgeon

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pulls the IVC and LPV tapes out from the wound and mid-LAD comes very close to the skin level, usually 2 to 3 cm. For proximal LAD exposure, the surgeon may add the additional traction on the aortic tape, while for distal LAD exposure, the surgeon may add the additional traction on the left-sided pericardial stay suture.

Nevertheless, important issues have been raised and analyzed by the authors.<sup>[1]</sup> Conversion to sternotomy is not a drastic complication and should not stop surgeons from using the minimally invasive techniques in coronary artery bypass grafting.

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