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Minimal invasive extracorporeal circulation should become the standard practice in coronary revascularization surgery†

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We read with great interest the large-scale network meta-analysis by Kowalewski *et al*. comparing clinical outcomes of patients undergoing coronary artery bypass grafting (CABG) operated on using minimal invasive extracorporeal circulation (MiECC) or off-pump (OPCAB) with those undergoing surgery on conventional cardiopulmonary bypass (CPB) [1]. The authors actually integrated into single study two recently published meta-analysis comparing MiECC and OPCAB with conventional CPB, respectively [2, 3] into a single study.

According to the results of this study, MiECC and OPCAB are both strongly associated with improved perioperative outcomes following CABG when compared with CABG performed on conventional CPB. The authors conclude that MiECC may represent an attractive compromise between OPCAB and conventional CPB. After carefully reading the whole manuscript, it becomes evident that the role of MiECC is clearly undervalued. Detailed statistical analysis using the surface under the cumulative ranking probabilities indicated that MiECC represented the safer and more effective intervention regarding all-cause mortality and protection from myocardial infarction, cerebral stroke, postoperative atrial fibrillation and renal dysfunction when compared with OPCAB. Even though no significant statistical differences were demonstrated between MiECC and OPCAB, the superiority of MiECC is obvious by the hierarchy of treatments in the probability analysis, which ranked MiECC as the first treatment followed by OPCAB and conventional CPB. Thus, MiECC does not represent a compromise between OPCAB and conventional CPB, but an attractive dominant technique in CABG surgery.

These results are consistent with the largest published meta-analysis by Anastasiadis *et al*. comparing MiECC versus conventional CPB including a total of 2770 patients. A significant decrease in mortality was observed when MiECC was used, which was also associated with reduced risk of postoperative myocardial infarction and neurological events [4]. Similarly, another recent meta-analysis by Benedetto *et al*. compared MiECC versus OPCAB and resulted in comparable outcomes between these two surgical techniques [5]. As stated in the text, superiority of MiECC observed in the current network meta-analysis, when compared with OPCAB, could be attributed to the fact that MiECC offers the potential for complete revascularization, whereas OPCAB poses a challenge for unexperienced surgeons; especially when distal marginal branches on the lateral and/or posterior wall of the heart need revascularization. This is reflected by a significantly lower number of distal anastomoses performed in OPCAB when compared with conventional CPB.

Therefore, taking into consideration the literature published up to date, including the results of the current article, we advocate that MiECC should be integrated in the clinical practice guidelines as a state-of-the-art technique and become a standard practice for perfusion in coronary revascularization surgery.

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