



**CLAMPLESS
FACILITATED
ANASTOMOSIS WITH
HEARTSTRING TO REDUCE
CEREBRAL DAMAGE
DURING OFF-PUMP
CORONARY BYPASS**



GRAFTING. DON'T FORGET IT: EASY TO USE!

To the Editor:

In their prospective randomized study, Halkos and colleagues¹ highlight a strategy to reduce the risk of cerebral embolism during on-pump and off-pump aortic coronary bypass grafting (CABG) surgery. The authors compared 4 groups of patients according to the surgical technique used. Because of the low number of patients in each group, the main purpose of the study was to detect the high-intensity transient signals (HITS) by transcranial Doppler ultrasonography instead of the incidence of major neurologic events such as cerebral stroke. Indeed, the authors reported postoperative cerebral stroke in 2 patients of single-clamp subgroup, although these events occurred after the first postoperative day in patients already extubated and the number of HITS were not outliers compared with the other patients. In addition, neurocognitive tests did not yield useful data because they were available only for a small number of patients. The authors have finally shown that patients in whom the HEARTSTRING device (Maquet Cardiovascular, San Jose, Calif) was used had more HITS than patients who underwent the partial clamping technique and the number of HITS increased proportionally to the number of HEARTSTRING devices used for each patient.

Despite the great value of this prospective randomized study, the small number of patients included did not allow the authors to demonstrate whether the use of HEARTSTRING really places patients at risk of developing postoperative stroke in the real world, bearing in mind that gaseous emboli occurred more frequently than solid with the HEARTSTRING² and therefore the incidence of stroke could be dramatically reduced. Unfortunately, the authors were not able to differentiate between solid and gaseous emboli.

In a retrospective analysis of 412 HEARTSTRING patients, Hilker and colleagues³ reported 2 stroke events (0.48%), which were below the predicted value of 1.3% of their studied population. Zhao and colleagues⁴ conducted a meta-analysis on 37,720 patients with the aim of verifying the incidence of stroke according to the techniques used. Off-pump CABG was associated with a 76% reduction in stroke compared with conventional CABG, and the use of HEARTSTRING was associated with a significant 56% reduction, whereas the partial clamp showed the lowest reduction. The data reported by Halkos and colleagues¹ in this study are of paramount importance to guide the surgeon to the more appropriate surgical technique in patients with high predictive risk for postoperative stroke.

The ideal technique remains the anaortic one. When this technique cannot be used, the clampless anastomosis with HEARTSTRING should be considered and should be part of the armamentarium of each cardiac surgeon, also considering the simplicity of the technique itself. We fully agree with the authors that with the HEARTSTRING device there is still a manipulation of the ascending aorta. A blower-mister device is often used to enhance visualization during construction of the anastomosis. This can increase the risk of cerebral microembolization, although most of the microemboli may occur during the application and the removal of the device.² Despite these limits, HEARTSTRING remains a useful tool, especially in patients with moderate- or high-grade ascending aorta disease, as reported by the same authors.⁵

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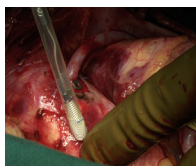
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USE OF CLAMPLESS FACILITATING DEVICES IN PATIENTS WITH LOW-GRADE AORTIC DISEASE: IS THE COST JUSTIFIED BY THE THEORETIC RISK REDUCTION?



Reply to the Editor:

I appreciate the commentary of Formica and colleagues regarding the use of clampless facilitating devices (CFDs) in patients undergoing coronary artery bypass grafting (CABG). The quest to reduce stroke after CABG has led to numerous observational and prospective trials with a variety of approaches, including off-pump CABG, anaortic approaches, hybrid revascularization, and CFDs. With regard to my group's recent prospective, randomized trial,¹ we agree with Formica and colleagues that there were limitations with our study, specifically that the primary end point was a surrogate for stroke, transcranial Doppler high-intensity transient signals (HITS) rather than a hard clinical end point. Nonetheless, we anticipated a reduction in HITS in the CFD group, supporting the use of these devices, but the results did not support our hypothesis. Selection bias, which is a major limitation of many observational studies, including those from our own institution,² was minimized in this study with randomization.

Nonetheless, what our randomized, controlled trial did show was that HITS increased proportionally to the number of devices used and that the total numbers of gaseous and solid HITS detected were higher in the CFD group than in the partial-clamp group. I agree with Formica and colleagues that many of these HITS may have represented gaseous rather than solid microemboli, but the transcranial Doppler technology used in this trial was insufficiently sensitive to differentiate reliably the two. Furthermore, I agree that transcranial Doppler technology is associated with its own limitations.

The current issue is whether patients with low-grade aortic disease in whom CABG is performed off pump truly benefit from the use of CFDs. This is not the same as an anaortic approach, which I also agree is probably associated with the lowest stroke risk. It is important to acknowledge

that this trial excluded patients with more advanced aortic disease (grade III-V), because our current practice is to avoid any clamping of these aortas. The use of epiaortic ultrasonography in this study allowed us to evaluate a homogeneous group of patients undergoing CABG. In addition, because of the current climate of cost containment, it is important to consider that the cost of each Heartstring device (MAQUET Holding B.V. & Co. KG, Rastatt, Germany) to the hospital is approximately \$500 to \$700, without a clearly defined benefit in the patient population that was studied.

Our recommendations on the basis of our results was that for patients undergoing off-pump CABG with low-grade aortic (grade I-II) disease, as determined by epiaortic ultrasonography, there was no observed benefit in HITS between patients randomized to receive CFDs versus partial clamping of the aorta. Clearly, surgical decision making in the operating room is needed to determine the best proximal anastomosis strategy for patients undergoing CABG, and we agree that CFDs are an important tool when clinically indicated.

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**A TUG ON THE HEARTSTRINGS
Reply to the Editor:**



After the publication of "Operative Strategies to Reduce Cerebral Embolic Events During On- and Off-Pump Coronary Bypass Surgery: A Stratified, Prospective Randomized Trial" by Halkos and colleagues¹ from Emory University School of Medicine, a letter to the editor was submitted by Drs Formica, D'Alessandro, and Amerigo Messina² from