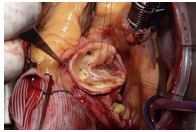


The authors reported no conflicts of interest.

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### REPLY: AORTIC ROOT REPAIR—ALL OR NOTHING

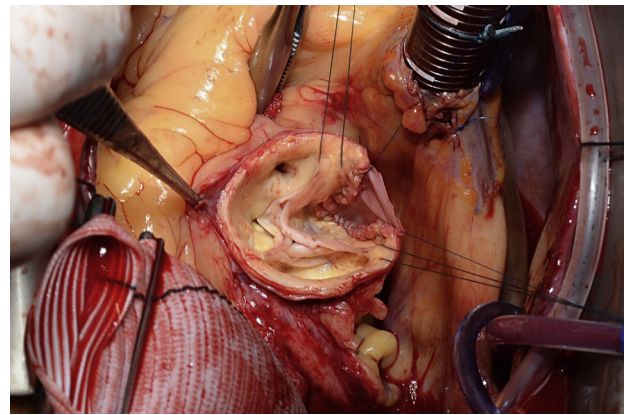
#### Reply to the Editor:

With great interest, we read the letter of Guo and colleagues.<sup>1</sup> The authors describe an alternative method for aortic root repair in acute type A aortic dissection using pericardial autograft. They suggest a significant reduction of remnant dissection tissue by removing the intimal dissection flap to the normal aortic wall near the annulus at the noncoronary sinus. Consequently, the intimal flap rim and adventitia near the coronary ostia are sutured to the pericardial patch using a running 5-0 PROLENE suture. Guo and colleagues assume that their technique reduces the risk of coronary stenosis due to blood flow and thrombus compression. Although this technique might reduce some dissected tissue (mainly of the noncoronary sinus), potential remnant dissection tissue around the coronary ostia remains. This diminishes the effort to reduce the risk of proximal bleeding and hence increase long-term durability. In contrast, the suggested technique is time-consuming while demanding experienced surgical skills and therefore less feasible for the unexperienced surgeon. The implementation of any pericardial patch for root repair may also lead to anatomic deformity and consequently aortic valve insufficiency.

Our institutional experience with pericardial patch for aortic root repair (for an exemplary picture, see [Figure 1](#)) underlines the missing additional (long-term) benefit of this method. Our technique (instead of Tanaka and colleagues<sup>2</sup>) does not include horizontal mattress sutures while using a finer running suture (5-0 PROLENE), making it a fast approach while minimizing bleeding. However, the described technique from Guo and colleagues can be suitable for selected cases (ie, noncoronary sinus dilation).

In our opinion, aortic root repair should be an easily applicable and fast approach (even for the inexperienced surgeon), considering complexity and effectiveness true to the motto: less is sometimes more.

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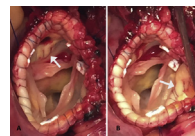
**FIGURE 1.** Aortic root repair with pericardial patch (Vascu-Guard; Baxter Healthcare, Munich, Germany) of the noncoronary sinus.

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### REPLY FROM THE AUTHOR: RESPECT MOTHER NATURE—AORTIC ROOT REPAIR IN ACUTE TYPE A AORTIC DISSECTION

#### Reply to the Editor:

In their Letter to the Editor, Guo and colleagues<sup>1</sup> describe their technique of aortic root repair or replacement with autologous pericardium in acute type A aortic dissection (ATAAD) in response to my group's previous study on direct repair of the aortic root without surgical adjuncts.<sup>2</sup> Because of concerns of (1) bleeding from the proximal suture line, (2) long-term durability of the repaired root with dissected tissue, and (3) coronary stenosis, they replaced most dissection flaps at all 3 coronary sinuses with autologous pericardium.<sup>1</sup> In their letter, Guo and colleagues<sup>1</sup> claim that their technique was safe and effective, although they do not describe the indications for this technique, nor do they report the short- or long-term outcomes.

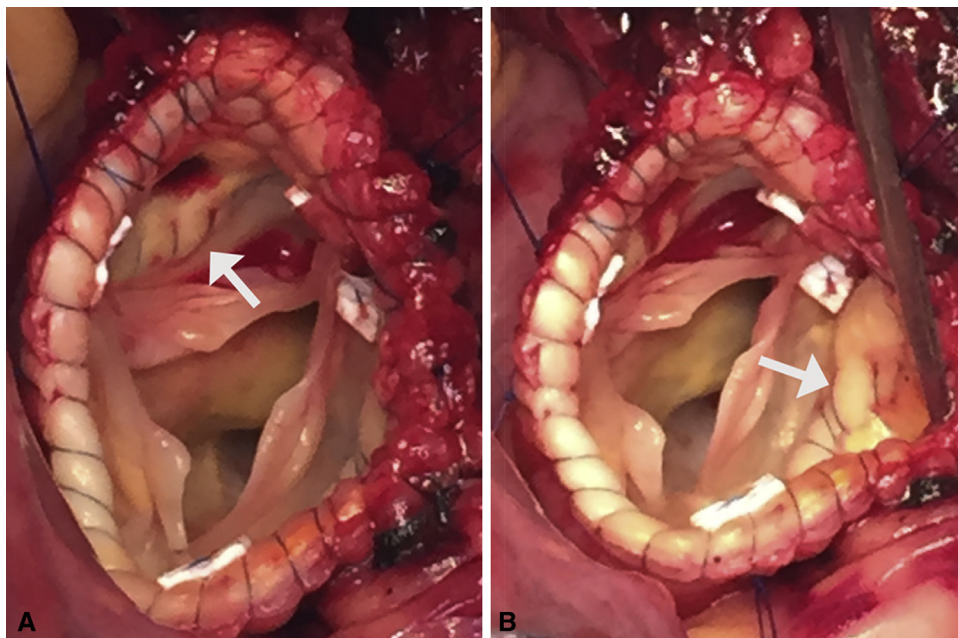
I consider their technique to represent a partial aortic root replacement, because they replaced the dissection flap (more than two-thirds of the media of the aortic wall) of all 3 sinuses with pericardium. Should we replace the dissection flap of all 3 coronary sinuses for a

normal-sized root without intimal tear or pathogenic mutations? The answer is no. The smooth muscle cells, which compose the media layer of the aorta, are of multiple embryonic origins<sup>3</sup> and respond to TGF- $\beta$  differently.<sup>4</sup> The aortic root is derived from the second heart field, whereas the ascending aorta and aortic arch originate from neural crest stem cells.<sup>3</sup> We frequently see patients with isolated ascending or arch aneurysm without aortic root involvement. In patients with ATAAD, an intimal tear at the ascending aorta causing aortic dissection extending to the aortic root does not necessarily mean that the aortic root will have a root aneurysm later on. As a matter of fact, many studies have shown excellent long-term outcomes with aortic root repair by preservation of the whole structure of the aortic root.<sup>5,6</sup> My group has been using the direct root repair technique previously described<sup>2</sup> for 9 years, and we have followed up all our patients at our aortic clinic and by phone. To date, we have had no patients with aortic root aneurysm or a need for reoperation. I believe that it is very safe to repair the dissected aortic root with the dissection flap if it does not meet the criteria for replacement. Our criteria for root replacement include a diameter of at least 4.5 cm, known pathogenic gene mutation,<sup>7</sup> intimal tear in the aortic root, or irreparable aortic valve pathology.<sup>2,5</sup>

The advantages of direct repair of the root without resection of the dissection flap are (1) preservation of the natural normal geometry of the aortic root for a durable competent aortic valve, (2) preservation of normal full-thickness aortic wall to prevent aortic root aneurysm;

and (3) preservation of intact intima to prevent bacterial infection and thrombosis. The media is the key layer of the aortic wall composed of smooth muscle cells and elastin. The human pericardium is composed of fibroblasts and collagen. If the majority of the media is resected as a dissection flap and replaced with pericardium, the elastic aortic root becomes a very stiff aortic root, which is likely more susceptible to aortic root aneurysm as seen in patients with Marfan disease,<sup>8,9</sup> who have significantly more collagen in the aortic root compared to normal people. Technically, it is much more complex to replace all the dissection flaps in 3 aortic sinuses<sup>1</sup> and have more needle holes causing bleeding than simply to obliterate the false lumen by closing the dissection at the sinotubular junction.<sup>2</sup> In the emergency situation of ATAAD repair, it may not be wise to perform a more complex operation that is not needed and could be detrimental.

With regard to Guo and colleagues' concerns about our techniques,<sup>1</sup> we have rarely seen surgical bleeding from proximal anastomotic suture lines at the sinotubular junction. We have not seen any cases with flow in the false lumen after root repair by transesophageal echocardiography in the operating room. One-third of our patients with ATAAD did not require any blood transfusion.<sup>2</sup> We remove all the thrombi in the false lumen before closing it at the sinotubular junction. If there is aortic root dissection around the coronary ostia, we reinforce the sinus wall around the coronary ostia by in situ coronary button reimplantation<sup>2</sup> (Figure 1). With this technique, we



**FIGURE 1.** In situ left (A) and right (B) coronary button implantation to reinforce the aortic wall around the coronary ostia to prevent coronary artery dissection. *White arrows* indicate the full-thickness suture lines around the left (A) and right (B) coronary ostia.

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have not seen any stenosis of the coronary ostia as a result of compression from blood flow or thrombus in false lumen of the aortic root. Our operative mortality is 6.5%.<sup>2</sup> We have followed up our patients with computed tomographic angiography annually, or biannually if the dissected aorta is stable. We find that all dissected aortic roots have completely after repair, healed with no residual dissection or aneurysm.

In summary, for aortic root repair in ATAAD, it is essential to respect mother nature and keep the operation simple and effective.

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## FACING THE SMALL AORTIC ROOT IN AORTIC VALVE REPLACEMENT: ENLARGE OR NOT ENLARGE?

**To the Editor:**

In patients with severe aortic stenosis, aortic valve replacement (AVR) should aim to implant a prosthesis of adequate size to effectively eliminate left ventricular obstruction and avoid the risk of patient–prosthesis mismatch (PPM). PPM has been demonstrated to be associated with increased mortality, decreased exercise tolerance, and reduced left ventricular mass regression after AVR for aortic stenosis.<sup>1</sup>

The important paper by Tam and colleagues<sup>2</sup> in the October 2020 issue of the *Journal* presents the results of a multicenter study analyzing 2 cohorts of patients, compared by propensity score matching, with or without aortic root enlargement (ARE) at time of AVR. They confirmed that ARE did not influence neither early mortality, despite longer operation times, nor survival up to 8 years, when compared with AVR alone. However, in their study there is no mention of the techniques used for ARE, which may have a different impact on the entity of annular enlargement,<sup>3</sup> on the real increase of prosthetic sizes, and whether PPM was effectively eliminated or minimized.

We have always been interested in the issue of PPM following AVR, and in a recent study we have shown, in agreement with Tam and colleagues,<sup>2</sup> that ARE is a safe and effective technique that does not adversely affect operative mortality<sup>4</sup>; moreover, our clinical, echocardiographic, and angio–computed tomographic follow-up indicates that, when a pericardial patch is used for ARE, this procedure is extremely stable, with no aneurysm formation up to 18 years and effectively addressing the problem of PPM. It must also be emphasized that, in their population, Tam and colleagues<sup>2</sup> report a high prevalence of tissue valves employed for AVR. In this respect, the need to avoid PPM appears even more relevant considering that PPM may accelerate structural deterioration of biological prostheses, either porcine or pericardial, influencing their long-term durability.<sup>5</sup>

There is currently enough evidence that ARE represents an important adjunct to the surgical armamentarium and that it should receive more widespread acceptance; on the other hand, use of small-sized bioprostheses for AVR should be discouraged, also in view of possible future valve-in-valve procedures.

The experience by Tam and colleagues<sup>2</sup> is clearly in favor of ARE during AVR. Despite the increasing use of new bioprosthetic models, such as the rapid deployment or sutureless devices, we feel that ARE should be still taught