Is endovascular repair for patients with primary adult coarctation, bicuspid aortic valve, dilated ascending aorta and hypertension the new gold standard?

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We read with great interest the recent article by Wheatley III Grayson et al. on the safety and effectiveness of endovascular repair for primary adult coarctation (PAAC) as an alternative to surgical repair [1]. They report excellent early and midterm results on 16 adult patients with PAAC treated with endovascular repair. The study group included three (18.7%) PAAC patients associated with bicuspid aortic valve, dilated ascending aorta and hypertension; two other (12.5%) PAAC patients are affected by hypertension and dilated ascending aorta. We have treated, as ‘others’ group, PAAC patients associated with cardiovascular disorders with one-stage surgical procedure: repair of aortic coarctation by ascending—descending posterior pericardial bypass and the associated disorders by specific surgical treatment [2,3]. Intermediate term (mean follow-up of 40 months) has shown that this one-stage surgical approach is safe and effective [4]. Patients with bicuspid aortic valve, dilated ascending aorta and hypertension are at higher risk for aortic dissection; moreover, the association of PAAC and the previously cited cardiovascular co-morbidities outlines an inherent aortic disorder [5].

Do the authors believe that, for their young group of patients (mean age 39.7 years) with PAAC, bicuspid aortic valve, dilated ascending aorta and hypertension, a single-stage surgical repair should be an alternative for the ultimate treatment of all aortic pathologies?

References

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Reply to the Letter to the Editor

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We appreciate the comments expressed by Dr Gelpi and colleagues regarding our article titled ‘Is endovascular repair the new gold standard for primary adult coarctation?’ [1]. Their comments regarding management of younger patients with primary aortic coarctation (PAAC) are certainly very pertinent and succinctly express conventional management paradigms for these patients, and we congratulate them on their excellent surgical outcomes. However, our center has made a conscious effort to study the short-, medium-, and long-term effects of an alternative and less-invasive treatment protocol for these patients [2]. Although the number of patients treated at our center during the study period is small (n = 16), we have followed a highly structured follow-up protocol in these patients to determine any subsequent cardiovascular events. Even in patients with bicuspid aortic valve and dilation of the ascending aorta, there have been no interventions or cardiovascular complications. Extended follow-up is necessary on these and similarly treated patients to assess the long-term cardiovascular effects of focal relief of aortic coarctation.

To be specific, a head-to-head, statistically powered, multicenter prospective randomized trial of endovascular...
repair versus a one-stage surgical procedure is needed for these patients. However, due to the limited number of patients, it is highly unlikely that a trial will be completed. It may be that the rates of cardiovascular complications, such as aortic dissection or subsequent aortic valve insufficiency, in patients with 'unmanaged' (i.e., uncontrolled hypertension) primary adult coarctation, which are stated in the literature, may be higher than the rates of 'treated and carefully managed' PAAC patients. Endovascularly treated patients are seen regularly in the clinic, and have frequent cardiovascular imaging studies, have active control of their blood pressure, and have no residual gradient across their stent-repaired coarctation. It is our belief that this management paradigm fundamentally changes the natural history of patients with PAAC, and decreases the need of future cardiovascular intervention related to associated cardiovascular disorders. If a subsequent cardiovascular change did develop, then it could be managed electively and the stent repair would not affect the surgical management.

In summary, it is too early to answer our rhetorical question expressed in the title of our article based on an evidence-based approach. However, as we, and other centers, continue to follow PAAC patients treated with an endovascular stent for the long-term, we will be able to assess whether this less-invasive and focal approach combined with a careful surveillance program alters the natural history of these patients versus a one-stage surgical repair. So far, there is no evidence in the limited number of patients in our study that there has been any deterioration or change to their existing non-coarct cardiovascular issues.

References


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Letter to the Editor

Have we a surgical ‘easy-hand’ for replacement of the ascending aorta?

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Keywords: Aortic root; Ascending aorta; Aortic surgery; Aortoplasty

We read with great interest the article by Dr Doss et al. reporting on the mid-term results of concomitant aortoplasty to bicuspid aortic-valve repairing, displaying the same root stability as offered by re-implantation technique [1].

We concur with Dr Moritz’s policy stating a tailored management for the ascending aorta (AA) and aortic root (AR) diseases.

Being implicated in decreasing stress on the aortic leaflets, regulations of aortic leaflets dynamics, and prompting effects on the systolic coronary flow [2,3], AR should be considered per se as an ‘organ’ rather than just as a transitional structure hosting the aortic valve leaflets and coronary ostia. Being unable to completely restore all its physiological aspects by root replacement, every reasonable effort made to maintain the native ‘AR organ’ should be commended on.

Unlike the aorta, AR is a purely connective structure without intrinsic parietal muscular tonicity. The latter implies the absence of endogenous regulations or impossibility of directly pharmacologic modulations in parietal tension of AR. Therefore, AR is highly susceptible to variations of hemodynamic conditions, pressure regimens, and the pattern of trans-aortic flow.

AA replacement creates a condition where forward parietal progression of the systolic wave is abruptly blocked, resulting in an increased afterload that AR should face. Such a condition would result in a rapid dilation of a preserved AR, especially in a young, bicuspid or patients with connective disorders (http://gallery.ctsnet.org/main.php?g2_itemid=1191). Therefore, we believe that performing a reliable and well-indicated aortoplasty should offer a better AR impedance.

Age-related/flow-induced AA elongation—dilatation or AA aneurysm results in an increased inclination of the ventriculo-aortic junction as already has been described [4,5]. The latter may produce a septal bulge with narrowing the left-ventricle outflow tract (LVOT) occasionally mandating unjustified myomectomy, alter the trans-aortic flow pattern, and induce error in assessing the leaflet geometry in view of an adequate repairing strategy (annular distortion and false prolapse). A direct consequence of the latter is propagation of a vicious cycle between an abnormal pattern of trans-aortic flow and further dilatation of the AA (especially on its convexity). The second strong point of Moritz aortoplasty consists in its ‘bi-planar’ feature reducing the height of horizontal aortotomy which should compensate for the increased inclination of the ventriculo-aortic junction that may optimize hemodynamics of the LVOT, trans-aortic or trans-prosthetic flow.

‘Bi-planar aortoplasty’ offers a tailored surgical solution to manage AA dilation/aneurysm and preservation of AR organ while restoring adequate ventriculo-aortic inclination, even inciting an earlier operation before an aortic parietal complication will abort its further feasibility. Being aware of the aforementioned pathological components, we recently have renewed our interest in bi-planar aortoplasty with extending its indications to concomitant AA dilatation/aneurysm management and aortic heart valve disease (replacement or repair) including elderly patients. Therefore, we welcome the Frankfort series as a reflecting point on our surgical ‘easy hand’ for AA replacement. In our opinion, this article offers enough incentive to conduct further randomized clinical trials or mathematical modeling studies, especially in an area where the stress is put on a more physiological approach in view of expecting more durable results and lesser procedure-related complications.

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