

Re-interventions after TEVAR for type B aortic dissection: considerations for management and the need for further insight

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Submitted May 02, 2016. Accepted for publication May 10, 2016.

doi: 10.21037/jtd.2016.05.42

View this article at: <http://dx.doi.org/10.21037/jtd.2016.05.42>

The paper by Zhang *et al.* discusses an important issue regarding thoracic endovascular aortic repair (TEVAR) for type B aortic dissections (1). The article is a single center retrospective report, so some caution is appropriate when considering the results. The authors do report some interesting findings that add to our current literature. Chronicity, smoking and oversizing the implanted stent graft too much, were found to be predictive of re-interventions after TEVAR for type B aortic dissections.

Looking at the definitions used in the publication, it is important to note that type B aortic dissection was defined as all dissections that did not involve the ascending aorta. This is interesting, because this would mean that patients who had arch involvement could have been included in the cohort. This is not further stratified in the paper. The principal goal of TEVAR is to cover the primary entry tear (2), however, with an entry tear in the arch; this would not be possible without coverage of one or more of the arch vessels. No data is reported about coverage of the left subclavian artery (LSA), branch artery revascularization techniques or dissections involving the arch. However, these are important for correct interpretation of the reported mortality and complication rates. Coverage of the LSA without branch vessel revascularization has shown to be associated with increased rates of postoperative neurological complications as well as increased mortality (3).

It is commonly understood that TEVAR in the chronic phase is more difficult compared to the acute phase, mainly due to changes in the intimal flap that occur over time. In the acute phase, the intimal flap is thin and flexible, making true lumen expansion and stent graft deployment relatively

straight forward. In the chronic phase, the intimal flap often becomes stiff and scarred, making both expansion of the true lumen and maneuvering the endograft more difficult (4). Furthermore, acquiring adequate sealing may be compromised as well. This explains why chronic dissections could be a predictor of need for re-interventions, since endoleaks were the most common reason for subsequent procedures.

The authors used old definitions for “acute” and “chronic” dissections, meaning that acute dissection was defined as <2 weeks after onset of symptoms and chronic dissections as more than 2 weeks. Currently, a more detailed subdivision is being adopted. A publication by the International Registry of Acute Aortic Dissection (IRAD) divided patients between hyperacute (<24 hours), acute (2–7 days), subacute (8–30 days) and chronic (>30 days) (5). Another recent temporal subdivision is acute (up to 2 weeks), subacute (up to 3 months) and chronic (more than 3 months) (2,6). The VIRTUE trial found that aortic dissection patients should ideally be treated in the subacute phase, because the risk of stent graft induced complications is lower compared to the acute phase, but plasticity of the intimal flap is similar (6). Therefore, the claim from Zhang *et al.* that dissection patients need treatment in the earliest phase possible being similar to the outcomes of the VIRTUE trial (1) is simply not true. If the authors truly wish to compare their results to the VIRTUE trial, another analysis should be performed where the patients are divided in groups according to the ‘new’ temporal classification.

Actually, it would be very interesting to see how many patients were truly chronic and how many were subacute

because the authors found that chronicity was predictive of re-interventions. If a majority of patients were subacute instead of chronic, it might significantly change the conclusions of the paper from Zhang *et al.* and could mean that treatment in the acute phase was not the most optimal timing.

Another reported outcome of the paper is the fact that “uncomplicated” status was borderline significant as a predictor of re-interventions. However, when we look closely at the definition of uncomplicated used in this paper, we see that 44 patients were uncomplicated, even though they suffered from refractory hypertension (1). These patients should probably not be defined as uncomplicated, but rather as complicated. In fact, in a previous paper by the IRAD, it was shown that refractory hypertension and pain were associated with increased in-hospital mortality and that they should be considered for endovascular therapy (7). This could explain why this phenomenon was a borderline predictor of re-interventions.

Oversizing the stent graft in aortic dissections remains a topic of debate, although it is generally accepted that it should be kept to a minimum (8,9). The aortic wall in aortic dissection is extremely fragile, especially in the (hyper)acute setting. When a stent graft is oversized too much, devastating complications can arise; such as stent graft induced new entry tears, rupture, or retrograde type A aortic dissections (8,9). These complications carry high mortality risks and should be avoided if possible. In the discussed paper, oversizing rates in the single TEVAR and re-intervention groups were 13.8% and 16.4%, respectively. Reported rates of retrograde type A dissection and recurrence of dissections were both 0.8%. This is not larger than reported in most literature (9,10); however five new dissections were seen after the first intervention and an additional two after the second. Although no data is reported about these new dissections, it is conceivable that these were induced by the mismatch of stent graft and aortic diameter, e.g., stent graft induced new entry tears.

The authors mention in the conclusion that one of the most common reasons for re-intervention was incomplete thrombosis of the false lumen. However, it is unclear if these patients received another intervention because there was growth of the aorta and if that was the reason for intervention. Furthermore, if there was indeed growth, perhaps the reason for re-intervention is possibly an endoleak. There is much debate regarding the impact of false lumen thrombosis on aortic growth and clinical outcomes. Generally, complete false lumen thrombosis is

considered beneficial since it is associated with favorable aortic remodeling. However, both partial thrombosis and patent false lumen status have been described as being predictive of aortic growth (11-15).

In the final conclusion it is stated that the reported results seem to provide new insights, but that large randomized controlled trials should be conducted to confirm them. The insights provided in the paper are not novel. The negative role of smoking is well known, which is why smoking cessation is an important piece of caring for cardiovascular patients. Also, that TEVAR in chronic type B dissection leads to less favorable results compared to acute TEVAR is also well established. Lastly, that increased oversizing is dangerous in terms of re-interventions and complications, as mentioned above, is not a new finding.

In this publication, the authors do confirm many previously reported findings, which is important since the overall literature regarding type B dissections is sparse. Furthermore, it is important to keep investigating the most optimal correct timing of TEVAR in acute type B dissections. Additionally, uncomplicated patients are often managed with medical therapy only and we need more knowledge about who would benefit from early TEVAR. Moreover, predictors of re-intervention after TEVAR for complicated type B dissections should be explored in more depth.

Acknowledgements

Dr. Eagle discloses financial relationships with W.L Gore, Medtronic and Terumo. IRAD was generously supported by W.L. Gore & Associates, Inc., Medtronic, the Varbedian Aortic Research Fund, the Hewlett Foundation, the Mardigian Foundation, UM Faculty Group Practice, Terumo, and Ann and Bob Aikens.

Footnote

Provenance: This is an invited Commentary commissioned by the Section Editor Lei Zhang (Department of Vascular Surgery, Changhai Hospital, Second Military Medical University, Shanghai, China).

Conflicts of Interest: The authors have no conflicts of interest to declare.

Comment on: Zhang L, Zhou J, Lu Q, *et al.* Potential risk factors of re-intervention after endovascular repair for type B aortic dissections. *Catheter Cardiovasc Interv* 2015;86:E1-E10.

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Cite this article as: Kamman AV, Eagle KA. Re-interventions after TEVAR for type B aortic dissection: considerations for management and the need for further insight. *J Thorac Dis* 2016;8(7):E615-E617. doi: 10.21037/jtd.2016.05.42