



# Endo-Bentall: is this feasible?

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Aortic root pathologies are commonly managed with a valved conduit and coronary re-implantation, a technique originally pioneered by Bentall and De Bono, and later coined the “Bentall” in homage (1). While it would have been impossible for either to have fathomed that this complex operation with its multitude of technical nuances would ever be performed without a median sternotomy or the assistance of cardiopulmonary bypass, an endovascular approach does, in fact, seem plausible. In a 2018 commentary, Dr. Kreibich proposed this novel technique to address root and proximal ascending aortopathy, while methodically outlining the obstacles associated with its inevitable execution (2). Dr. Felipe Gaia and colleagues conquered many of these difficulties and recently published their first-in-human “Endo-Bentall” experience, utilizing a transcatheter valve secured to an ascending stent graft, prefabricated with coronary ostial branches.

Despite the significance of this achievement, the authors sensibly advocate for the reservation of this approach to compassionate-use scenarios (3). This is an important consideration as reported outcomes following surgical root interventions in low-risk cohorts are excellent, especially in high volume centers (4). As demonstrated in an examination of patients undergoing a Bentall procedure with a history of prior cardiac surgery, however, short-term morbidity and mortality are far worse (5). With a 30% risk of peri-operative mortality and major morbidity, there is absolute demand for a less invasive alternative to a root re-intervention. There are several factors which complicate the design and deployment of such a device, used to manage proximal aortopathies. The aortic root is an incredibly dynamic structure with documented variations in its dimensions during systole and diastole (6). The stent graft must be able to accommodate this geometric fluidity by

providing an adequate seal without inducing a fracture and subsequent endoleak.

Additionally, in regards to dissections, there is an expected acute increase in the mid-ascending aortic diameter up to 30%, which must be respected during graft selection, as oversizing by more than 5% of the baseline media diameter can result in a new entry tear (7). Moreover, in contrast to the descending thoracic aorta, the ascending aorta has a short effective treatment length, restrained by the coronaries proximally and the brachiocephalic trunk distally. Thus, the pathology must be largely isolated to the root and/or proximal ascending aorta with a suitable landing zone of ‘healthy’ aorta proximal to the take-off of the first supra-aortic branch vessel. This could preclude patients with distal entry tears or root/ascending phenotypes from an endovascular approach. Perhaps the greatest limiting factor for the adoption of this technology, however, is the unknown durability of the various components of the composite stent grafts. Extrapolation from the trans-catheter registry, which has revealed 91% freedom from structural valve deterioration between five and ten years post-implantation, is encouraging, at least at the valvular level (8). The longevity of a transapically deployed ascending stent is certainly more unclear with outcomes largely relegated to case series. Despite the aforementioned concerns, it is critical that cardiovascular surgeons continue to push the limits of endovascular strategies to manage complex root disease, especially in patients in which an open approach is of prohibitive risk.

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**Footnote**

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

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