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Commentary: E does not equal M without C^2

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For several years, the famed German-born physicist Albert Einstein had suffered from occasional abdominal pain associated with nausea and vomiting. In 1948, while undergoing surgery to remove intestinal cysts, an abdominal aortic aneurysm was discovered. Dr Rudolph Nissen proceeded to wrap the aneurysm with cellophane with the aim of inducing “fibrosis” of the wall to prevent expansion and rupture.¹

Seven years later, Einstein experienced new-onset “vague abdominal discomfort,” which worsened in intensity and was associated with nausea and vomiting. After admission to Princeton Hospital in New Jersey, he was diagnosed with a leaking aneurysm.² Stating “It’s time to go, I’ve done my share,” he refused surgery. Albert Einstein died on April 18, 1955, at 1:15 am. His autopsy confirmed the ruptured abdominal aortic aneurysm. Thus, the concept of wrapping the aorta to prevent aneurysm rupture is not new.^{3,4}

In this issue of the *Journal*, Vento and colleagues⁵ present a follow-up study (from prior publications in 2011, 2014, and 2017) reporting longer-term outcomes from aortic wrapping using a Teflon sheet for acute type A aortic dissection. This report includes 35 cases over an 11-year period. The inclusion criteria appear to be appropriate, involving patients who were deemed “high risk” with stage IV chronic kidney disease, severe chronic obstructive pulmonary disease (forced expiratory volume in 1 second <30%), and congestive heart failure with reduced ejection fraction (<30%). Aortic wrapping was not performed if severe aortic insufficiency and “life-threatening” (cerebral, myocardial, visceral) malperfusion were present. The

Albert Einstein “waiting” at Pier Z in Frankfurt Airport in Germany.

CENTRAL MESSAGE

The authors demonstrate a potentially less-invasive technique to placate a serious problem with managing acute type A aortic dissection—but it tackles only one-half of the equation.

authors’ technique for wrapping was simply to use strips of Teflon approximated with a running polypropylene suture tightened (like a corset) to reduce the diameter of the dissected aorta during inflow occlusion (Video 1).⁵

Cardiopulmonary bypass was required in only 1 case. Early mortality was commendable at 9% (3 of 35). One patient (age 95 years) died due to iatrogenic rupture during renal artery stenting for malperfusion. The indication for the renal artery intervention in this patient could be disputed; without this death, the mortality would have been even lower.

Postoperative complications occurred in 20% of patients, although no patient sustained stroke. The main issue with aortic wrapping in this series appeared to be in-hospital reinterventions (31%), all related to consequences of the residual dissection flap, including embolectomy, axillofemoral bypass, renal artery stenting, transcatheter aortic valve replacement for severe aortic insufficiency, thoracic endovascular aortic repair for descending aortic aneurysm, and 4 ascending noncovered stents to prevent retrograde dissection into the aortic root. Notably, all of these reinterventions might have been avoided had a standard ascending or transverse arch repair been performed. In all, 82% of patients were alive at 3 years, with a dissection-related mortality of 11%.

Regarding aortic remodeling, it was not surprising that only 25% of patients experienced complete remodeling during follow-up, and that persistent flow in the false lumen

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was observed in 50% of patients. This is not different from what would be expected after proximal aortic repair.

The authors are to be commended for reporting their experience with aortic wrapping for acute type A aortic dissection; however, its applicability is limited. With acute type A aortic dissection, generally up to 25% of patients present with severe aortic insufficiency, 10% with shock and tamponade, and another 10% to 15% with significant end-organ malperfusion. Thus, more than 50% of all patients would be excluded before any consideration of applying the wrap on the “high-risk” cohort was made. It should be noted that the authors performed aortic wrapping in 25% (35 of 142) of their entire cohort of type A dissection patients, suggesting liberal use of the wrap in their experience.

We must always remember that the successful early management of acute type A aortic dissection relies on satisfying the simple equation of (1) replacement of the proximal aorta to prevent rupture and rectify valvular insufficiency and (2) reconstitution of flow to the true lumen to correct malperfusion.

If either of these 2 variables is excluded from the equation, successful early treatment is unlikely. Aortic wrapping may address the first variable (proximal aortic stabilization)—which is debatable—but it ignores the second variable, as nothing is done to the dissection flap.

In the end, the authors have demonstrated another potentially less-invasive technique to placate a serious problem—but it tackles only one-half of the equation. Thus, E does not equal M without C^2 .

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