The Best Practice for Type B Aortic Dissection

Future refinements of stent graft technology, growing technical skill, and long-term outcome data are needed to determine the potential long-term benefit of endovascular repair.

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Aortic diseases have progressively gained increasing clinical importance in the last decades, both for their emerging epidemiology, characterized by a growing yearly incidence,[1] and for the severity of disease prognosis. Among them, acute aortic dissection is one of the most serious cardiovascular events. The estimated mortality rate of untreated aortic dissection is 1% to 2% per hour in the first 24 hours after onset and 80% within 2 weeks.

Although general consensus exists regarding the need of immediate surgical repair for patients with acute ascending aortic dissection (type A dissection), the optimal treatment of type B dissection is still a matter of debate. It has been generally recommended that patients who have type B aortic dissection without complications are treated with medical therapy in an intensive care unit. Usually, with aggressive antihypertensive therapy, up to 85% of patients may survive their initial hospital stay. In addition, keeping the heart rate below 60 bpm significantly decreases secondary adverse events (aortic expansion, recurrent aortic dissection, aortic rupture) compared to a conventional rate of > 60 bpm.[2] Unfortunately, approximately 30% to 42% of acute type B aortic dissections at clinical presentation are complicated by peripheral vascular ischemia or hemodynamic instability and have a highly unpredictable outcome, thus necessitating percutaneous or open surgical intervention. Despite substantial surgical, anesthesiologic, and postoperative care advances, emergent traditional open surgical repair of acute complicated dissection still has high mortality (25%–50%) and morbidity rates,[3-7] resulting in prolonged hospitalization and high costs. The advent of endovascular treatment of the thoracic aorta has revolutionized the clinical approach to type B aortic dissection, representing a new minimally invasive alternative to traditional surgery for the management of acute thoracic aortic pathologies, even in high-risk patients who could not be considered operative candidates. The emerging role of endovascular strategies has gained wide acceptance considering the unsatisfactory results of open repair. Encouraging initial reports of clinical outcomes achieved by endovascular repair and stent graft implantation to treat type B aortic dissection have also accelerated the adoption of TEVAR.[8,9]

Closure of the entry tear of dissection may promote both depressurization and shrinkage of the false lumen, with subsequent thrombosis, fibrous transformation, remodeling, and stabilization of the aorta, but also resolution of dynamic malperfusion. However, accurate anatomic selections of candidates, a thorough knowledge of imaging methods, as well as a wide endovascular experience are mandatory for achieving optimal results.

RESULTS OF ENDOVASCULAR TREATMENT OF ACUTE TYPE B AORTIC DISSECTION

Endovascular treatment is advocated when a patient with acute type B aortic dissection presents with signs of aortic rupture at imaging and clinical evaluation shows evidence of severely impaired visceral/peripheral perfusion or symptoms of clinical instability, such as uncontrolled hypertension, severe hypotension, and recurrent or refractory pain. One or more covered stents are placed through femoral access over the intimal tear, and additional stents are often used to hold open the true lumen, cover additional entry sites, and promote thrombosis of the false lumen, thus protecting the aortic wall from rupture. Moreover, in the majority of cases, stent graft occlusion of the entry site in the descending thoracic aorta also leads to re-expansion of the true lumen, when compressed,

normalizing distal vessel perfusion and restoring branch vessel patency. This approach is being increasingly used in patients with type B dissection.[10-15] Results from clinical trials and meta-analysis of case series reported overall outcomes with in-hospital mortality rates ranging from 5% to 9%, 2% to 6% for stroke, and 1% to 3% for paraplegia.

The IRAD registry provides an analysis of the different management options for type B aortic dissection, with data comparing the impact on survival of different treatment strategies in 571 patients with acute type B aortic dissection:[16] 390 patients (68.3%) with uncomplicated aortic dissection were treated medically, whereas among complicated cases, 59 (10.3%) underwent standard open surgery and 66 (11.6%) underwent endovascular repair. TEVAR provided better outcomes, with 9.3% mortality in patients treated with a stent graft and 33.9% mortality in patients who underwent open surgery. In patients discharged to home, long-term results[17] seem to confirm the benefit of stent graft repair with respect to medical therapy alone. On the basis of several reports showing improved survival rates, endovascular repair is becoming the standard treatment for patients with acute complicated type B dissection.

RESULTS OF ENDOVASCULAR TREATMENT FOR CHRONIC TYPE B DISSECTION

The "14 days after symptoms onset" has been designated as an acute phase of aortic dissection, owing to the highest rates of mortality and morbidity that occur in this period. Usually after that period, blood pressure has been stabilized and symptom relief achieved, and type B dissection is considered chronic. The patient could also be discharged, and clinical and imaging follow-up could be performed at 3 and 6 months and then yearly. TEVAR is considered a life-saving treatment for complicated acute type B dissection, but its role in stable type B dissection is still unknown.

Even if medical therapy is currently considered the best option for uncomplicated dissection, the effect of medical therapy may delay expansion of the descending aorta but does not promote the remodelling process. Subsequent interventions are often performed in chronic type B dissection for the development of complications, such as aneurysm expansion, progressive dissection, and other related adverse events from the unresolved dissection process. Recurrence of symptoms, aneurysmal dilation (> 55 mm), or a yearly aortic increase > 4 mm are all indicative of "complicated chronic dissections" and have a worse prognosis without treatment. However, aortic remodeling seems to be less effective in chronic dissection with a dilated false lumen, with late aneurysmal degeneration of the thrombosed false lumen reported in 7.8% of cases,[16,18,19] suggesting the need for earlier treatment before aortic dilation may occur.

THE INSTEAD TRIAL

The Investigation of Stent Grafts in Aortic Dissection (INSTEAD) trial[20] enrolled 140 patients (72 with additional endovascular treatment) and had all-cause of death at 2 years as the primary endpoint; aortic-related death, aortic remodeling, and disease progression (need for conversion or reintervention with stent graft or open surgery) were secondary endpoints. The results did not show any significant advantage of endovascular treatment in comparison with optimal medical therapy at 2-year follow-up, with no difference in all-cause deaths and a 2-year cumulative survival rate of 95.6% ± 2.5% with medical treatment and 88.9% ± 3.7% with adjunctive TEVAR. No differences were found between the two groups for aortic-related death and disease progression. The INSTEAD study at 2 years does confirm the effectiveness of endovascular therapy for false lumen thrombosis (achieved in 90% of cases) and strengthens the role of a tight blood pressure control and close surveillance. Together with the nonsignificant procedure-related complications highlighted, these results support a complication-specific approach instead of endovascular therapy for all stable type B dissections. According to this approach, all patients who do not respond to medical treatment showing progressive false lumen expansion could be treated with a stent graft because even deferred endovascular therapy is feasible.

The INSTEAD study is limited by a short observation period (only 2 years). Some of the positive and promising aspects related to endovascular therapy, such as false lumen thrombosis and remodeling, need longer follow-up periods to be confirmed and demonstrate a potential advantage versus medical treatment. Waiting for long-term follow-up of randomized trials, which could modify our decision strategy, continuous progress in stent graft technology, and improving morphology and flexibility, may lead to more suitable stent graft configuration for aortic dissection and thus improve clinical results. ■

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