INTRODUCTION

Before we get stuck into the debate, some basic information needs to be provided. Dissection of the aorta is a life-threatening disease and is considered as “acute” when the diagnosis is made within 2 weeks of the initial symptoms. The definition of an acute dissection is even not uniform in that several pathologies, such as intramural hematoma and penetrating aortic ulcer that may evolve to a dissection, are included. Acute dissection of the ascending aorta (DeBakey I or II, or Stanford A), with an assumed mortality rate of 1—2% per hour in the first 24 hours of symptom onset requires a prompt surgical therapy. Medical therapy alone in this setting is associated with 50% mortality at 30 days in older series, and has been reported to be lower with surgery. However, there is no evidence based on randomized controlled trials (RCT) or comparative studies to answer this question. According to the International Registry of acute Aortic Dissection (IRAD) dissection of the aorta occurs in the descending aorta (DeBakey III or Stanford B) in about 37% of patients. Data from the IRAD registry are currently setting a trend on the views of acute dissection, for both type A and type B. This important register is multicentered and has gathered details of numerous patients, adding very useful information, such as predictors for mortality and complications. However, several questions cannot be answered by this register, like how many of the uncomplicated dissections will become complicated and how standardized the different therapy options are. No information is provided regarding hypertension control. These are extremely important questions for initial decision-making. Although acute type B dissection carries a lower initial overall mortality than type A dissections, with about 10% deaths within 30 days, the diagnosis can be difficult—and sometimes even delayed—owing to multiple possible symptoms. The outcome of type B dissections is related to the clinical presentation and can be worsened by severe life-threatening complications. The most common ones are death, rupture, malperfusion, retrograde dissection into the ascending aorta, refractory pain, and, in the long run, aortic dilatation and aneurysm formation. Occurrence of at least one of those conditions thus makes a dissection “complicated.” About 30% of acute type B aortic dissections (BAD) are complicated by peripheral vascular ischemia or hemodynamic instability, with a subsequent high risk of death, but we do not know which patient will get these complications. In addition to these early complications, aneurysmal evolution occurred within 5 years in 20—50% of the patients who had survived the acute phase and these are the complications that we aim to prevent. IRAD data have shown that the most common cause of death is rupture (40%) followed by intestinal ischemia (17—39%).

BEST MEDICAL TREATMENT

Although not scientifically proven, but based on good clinical practice, there is a general agreement that patients with an initially uncomplicated BAD should receive medical therapy with close monitoring of blood pressure to decrease the shear forces on the aortic wall. Basic medical treatment comprises β-blockers, diuretics, calcium-blockers, and angiotensin converting enzyme-inhibitors with—in the acute phase—additional α-blockers, as well as nitroglycerine. The primary aim of this approach is to obtain a systolic blood pressure between 100 and 120 mmHg, with the maintenance of a urinary output and prevention of malperfusion of the visceral organs. In a series of 171 cases of acute BAD with a median follow-up of 2.3 years, Kodama et al. found that, although use of β-blockers did not itself affect outcomes, heart rate control was associated with a significant reduction in overall aortic complications (12.5% vs. 36% in controls). Meanwhile, current data revealed a mortality rate of medically-treated BAD of around 10% within the first month. From the IRAD data it could be concluded that calcium channel-blockers were correlated with a better survival during follow-up in BAD, whereas β-blockers improved the outcome after surgery for type A aortic dissections. These conflicting data need to be clarified in future RCTs using β-blockers and calcium channel-blockers in patients with only type B dissections leaving type A dissection patients for a separate study.

The same confusion exists when addressing the long-term survival of patients with BAD. In this context, only one publication from Sweden has shown that after surviving the first month, the long-term survival was not different from that of the general population, whereas other authors have reported a significant number of complications with 48—82% survival at 5 years. IRAD data have confirmed this trend by showing that 189 consecutive patients with acute BAD, who were successfully discharged alive following medical therapy, had a 3-year survival of 78%. In this setting, 25—50% of patients treated medically will develop late aortic-related complications with the need for an
endovascular or open repair. Thus, we are lacking reliable information on the survival of patients with type B dissections.

**THORACIC ENDOVASCULAR AORTIC REPAIR (TEVAR)**

Endovascular repair is a well-known alternative to open repair for the treatment of abdominal aortic aneurysm, supported by two initial European prospective, randomized trials (Dutch Randomised Endovascular Aneurysm Management [DREAM], Endovascular Aneurysm Repair [EVAR]). Accordingly, but despite the lack of RCTs, the use of stent grafts has been introduced, and have been reported to be favorable in thoracic aortic aneurysms and in traumatic thoracic aortic ruptures. Since the first report of thoracic endovascular aortic repair (TEVAR) in aortic dissections by Dake et al. in 1999, several cohort studies have demonstrated feasibility and efficacy, but so far there is no RCT of TEVAR for the treatment of acute complicated type B dissection, although non-randomized studies suggested lower mortality rates when compared with open surgery. It is true that the results of stents or fenestration procedures for treating vascular malperfusion caused by BAD are encouraging with respect to vessel patency, but not to mortality. However, all these series are retrospective and without a control group of patients, and, subsequently, their scientific evidence is low.

We have shown in our updated meta-analysis of TEVAR for predominantly acute uncomplicated BAD an average weighted 30-day mortality of 10.0% (68 studies, 1,685 patients), and a late mortality with a weighted average event rate of 11% (63 studies, 1,609 patients), suggesting that TEVAR may also be beneficial in these cases. Our meta-analysis of four single-arm studies with a total of 501 patients regarding best medical treatment (BMT) for uncomplicated BAD showed an average weighted rate for late mortality or late complications of 13.8% and a 30-day mortality of 11% (seven studies, 962 patients). However, these data cannot be used as evidence as the numbers were small and a control group was lacking.

Another meta-analysis of four non-randomized studies each comparing TEVAR with BMT for complicated BAD (292 patients with medical treatment and 141 patients with TEVAR) showed no significant difference between the two therapeutic options. Again, these data are of limited value owing to the limited number of patients and the non-randomized study design.

Regarding uncomplicated chronic BAD, the results of a randomized trial comparing TEVAR with BMT after 2 weeks were recently published (Investigation of STEnt Grafts in Aortic Dissection [INSTEAD] trial). This trial showed that when the stent graft was placed between 2 weeks and 1 year after the onset of the acute dissection, TEVAR did not do better than BMT on 2-year all-cause or aortic related mortality. Even if underpowered for mortality, the INSTEAD trial has shown that there was a remodeling of the aorta leading to an enlarged true lumen with regression of the false lumen. Aortic remodeling with thrombosis of the thoracic false lumen occurred in 91.3% of patients with TEVAR versus 19.4% of patients with BMT.

There are arguments against the use of stent grafts in the vulnerable dissected aorta, but the INSTEAD trial clearly showed that TEVAR was not associated with a higher mortality than BMT in chronic uncomplicated BAD. We are awaiting the publication of the long-term follow-up results, which, when orally presented, has shown a better survival of the TEVAR group than the BMT group. Accordingly, TEVAR might be a better therapeutic option than BMT alone for 20–30% of patients with uncomplicated BAD that will develop an aneurysmal dilatation of the false lumen, requiring late surgical intervention. The reason might be found in the hazard of having a patent false lumen, which was described by Akutsu et al., who found a higher mortality rate in patients with a patent false lumen than those with a thrombosed one. In this setting, a multivariate analysis has shown that baseline maximum descending aortic diameter, proximal location, and size of the entry tear were predictors of related adverse events, whereas mortality was predicted by the maximum diameter of the descending thoracic aorta, entry tear size, and Marfan syndrome. These results again underline the need for a prospective RCT to study the long-term result of TEVAR + BMT versus BMT alone in patients with BAD.

Following the review of the available data, what evidence-based concept do we have for the treatment of acute uncomplicated type B dissection? Absolutely none! All our knowledge is based on a large, but heterogeneous, registry of type A and type B dissections—the results of which demonstrate the risk of false lumen enlargement—and one RCT on chronic uncomplicated type B dissections, which demonstrates the safety of TEVAR for treating the dissected aorta, leading to thrombosis of the false lumen. What advantage is there in treating a dissection in the first 2 weeks after the initial event where no remodeling processes or stabilization of the aortic wall layers have occurred? Covering the entry tear of acute type B dissections and thereby causing a thrombosis of the false lumen in an early phase of the disease could be the solution to avoiding late lumen enlargement, as well as treating some malperfusion complications, as observed in our own clinical practice.

Currently, there is no level I evidence to support the routine use of TEVAR for DeBakey III dissections, and there is no level I evidence for medical treatment either. The need for interventions in uncomplicated DeBakey III dissections, where mortality for TEVAR is in the same range as BMT for uncomplicated dissections. But are we comparing the same patients? It is likely that the two cohorts are very different. Furthermore, the treatment paradigm still under use, which advocates intervention only in the complicated cases, is derived from those times when open surgery had a worse risk-to-benefit ratio than medical therapy. Today, with the evolution of TEVAR and improved stent grafts, standardization of TEVAR might shift the risk-to-benefit ratio in favor of early
intervention. For obvious reasons, though, this needs to be scientifically proven. The European “Acute Dissection Stent-graft Or Best medical treatment” (ADSORB) study, which is evaluating TEVAR + BMT versus BMT alone in patients with acute uncomplicated BAD, has completed its enrolment, and the results of the study are urgently needed to determine the best way to treat this potentially lethal disease.14

REFERENCES


