Percutaneous Therapy for Valvular Heart Disease
A Huge Advance and a Huge Challenge to Do it Right

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In this week’s *Circulation*, Webb and colleagues report on the use of percutaneous “valve-in-valve” rereplacement in the treatment of 24 ill patients with prosthetic valve failure under compassionate-use protocols. Ten procedures addressed the aortic valve; 7, the mitral valve; 6, the pulmonary valve; and 1, the tricuspid valve. The 30-day survival rate was 96%. Clinically, the results were excellent, with 88% of these highly symptomatic patients returning to New York Heart Association class I or II. Hemodynamically, the results were more modest, with an average postprocedure transaortic gradient of 20 mm Hg and a transmitral gradient of 8 mm Hg.

Although the above results are gratifying, they go far beyond the fact that 24 ill patients received valve-in-valve replacement. They focus on the next step in the therapy of valvular heart disease (VHD) ushered in by the advent of percutaneous devices. Where exactly this group of therapies will lead is uncertain, but what is certain is that each step of the way will be an exciting one with many successes and some failures.

All severe symptomatic VHD is eventually fatal if left untreated, and the only effective treatment is restoration of valve function toward normal. No medical therapies significantly alter the course of VHD; only mechanical relief of the pressure or volume overload created by VHD can increase survival. Mechanical therapy had ventured outside the operating room well before the present report. Balloon valvotomy became the standard therapy of choice for many patients with pulmonary and mitral stenosis several years ago. Successful percutaneous transcatheter relief of aortic stenosis is a reality for selected patients, as it is for some patients with mitral regurgitation in Europe and will likely become so in the United States in the near future. With these advances, we are about to be faced with important clinical decisions about how to apply them. When should they be used instead of standard surgical techniques, techniques that have become ever more reliable and safer in their own right? The answer will be determined by the safety of the percutaneous devices compared with standard surgery in randomized trials and by the eventual durability of these new devices. It will obviously take time to resolve this latter issue, time during which both surgery and percutaneous therapy will evolve, causing us always to look through the rearview mirror at where we were instead of where we are going. And of course, we will be pressed by our patients to use less invasive therapies when the safety and efficacy of those therapies are equivalent to more invasive therapies. We also will be pressed by our patients to use those therapies even when they are not superior or even equal because patients simply do not like surgery if they think they can avoid it.

Suppose these devices become as safe and easy to apply as did coronary stents, a tempting analogy to draw. Would we apply them sooner to asymptomatic patients or to patients with less than severe disease? Would we apply them in patients with very advanced disease deemed too high risk for conventional surgery?

We might be able to better define the proper use of percutaneous therapy if we better understood the prognosis of VHD in a given patient. Some of the uncertainty about how to treat VHD stems from our insecurity about the best timing for mechanical intervention. Currently, we decide to operate on patients with VHD on the basis of whether they have symptoms and whether they are manifesting gross evidence of left and/or right ventricular dysfunction, usually judged by ejection fraction. These 40-year-old tools have served us reasonably well, but there is still enormous uncertainty about the timing of valve surgery for many patients, especially those who are truly asymptomatic. There must be a host of biological processes that precede the eventual decline of cardiac function and presage the onset of symptoms: activation of the adrenergic nervous system; an increase in natriuretic peptides; activation of the rennin-angiotensin system, of matrix metalloproteinases, and of protein synthesis; and may more. If we knew that detection of such biological change was the beginning of an inexorable progression of disease to the point of needing mechanical correction and understood what that time course was, we could time valve interventions, percutaneous or surgical, in a much more scientific fashion than we do today.

Even if we could time therapy better and if percutaneous devices are proven safe and effective (some already have been), we will have to decide which therapy to use and in whom. Patient preference will surely play a role in that decision. Will we let the genie out of the bottle again as we did with percutaneous coronary intervention, when some procedures were performed without clear cut indications or even clear cut benefits? Our colleagues who care for patients with cancer seem to have arrived at a sound solution that could help us resolve these issues. In caring for a
patient, medical oncology, radiation oncology, and surgical oncology are all options. The decision about which therapy to apply and when is usually made from the deliberations of a “tumor board.” A case is presented at a meeting of all of the potential therapeutic specialists; the known data from patients with similar disease are presented; and a decision about the best course of action for the patient under consideration is made. If we are really going to be certain that the best option for a given patient with VHD is exercised, we should do the same as our oncology colleagues. As has been already done in clinical trials of percutaneous devices, we should present the patient’s case for all of the options available. We then could decide on the best option for the patient using the data available. This is, after all, what the goal of any therapy should be, and we must do the right thing.

The advent of percutaneous device therapy for VHD is one of the most exciting events in cardiology in the last 50 years, and the work by Webb et al published here exemplifies the speed with which this technology is advancing. We as cardiovascular specialists hailing from a variety of disciplines have an obligation to our patients to use our collective knowledge for their best interests. Let us keep the genie in the bottle this time around and make the field of percutaneous valves one of clinical, ethical, and therapeutic envy for the rest of medicine.

Disclosures

None.

References


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