KICKING THE CAN DOWN THE ROAD— FOR 42 YEARS!

To the Editor:

We found the recent report by Battaglia and colleagues¹ surprisingly thought provoking given the focus on “extinct” technology, and we applaud the authors’ efforts. Their well-made point reminds us that mechanical heart valves are nothing if not durable and can provide a near-permanent solution to valvular pathologies. Mechanical valve replacement may be associated with improved survival compared with bioprostheses, but this has been difficult to demonstrate consistently and definitively.^{2,3} For example, we previously evaluated 2148 patients who underwent aortic valve replacement (AVR) from

1986 to 2009, assessing outcomes by mail/telephone questionnaires supplemented by the National Death Index query. The mean time to follow-up or death was 7 years; follow-up for all-cause mortality was complete in 96.2% of patients.⁴ Bioprosthetic AVR (n = 1108) had worse survival than mechanical AVR (n = 1040) in unadjusted models, primarily because of selection biases associated with use of tissue valves in advanced ages in this era (Figure 1). Conversely, the Starr-Edwards “ball-in-cage” prosthesis (n = 130) compared favorably to bileaflet carbon mechanical valves (n = 910) with similar Kaplan–Meier all-cause, cumulative mortality ($P = .93$) (Figure 1).

Nevertheless, despite performance advantages of mechanical valves, patient and practitioner priorities have clearly shifted, leading to strong preference for bioprosthetic valve replacement.⁵ Collective thought processes affecting valve therapy have further evolved such that percutaneous approaches are often preferred over surgery, especially for patients with an aortic valve and high- to intermediate-risk profiles.⁶ Enthusiasm for transcatheter AVR has increased despite limited understanding of the ultimate efficacy, durability, or, for that matter, safety of percutaneous valve options over the long term.

Battaglia and colleagues¹ remind us that regardless of the durability of mechanical valves, few things in structural

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FIGURE 1. Unadjusted Kaplan–Meier curves for all-cause death after AVR categorized by prosthesis subtype. Although observed mortality was higher after pericardial and porcine bioprosthetic AVR, there was no difference in survival after risk adjustment.⁴ All-cause survival after AVR with a Starr-Edwards mechanical prosthesis was not different than bileaflet mechanical AVR. CI, Confidence interval.

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heart disease are actually “permanent,” and we frequently exchange one problem today for another tomorrow, again emphasizing motives, values, and priorities. Even while acknowledging the lethal nature of heart valve disorders, we appear satisfied to “kick the can down the road,” deferring definitive management in lieu of temporary fixes. In a society now dominated by immediate information exchange, do trends in cardiovascular disease management reflect an inexorable move toward easier and quicker problem resolution instead of longer-lasting solutions for difficult problems? Does avoiding the tough solution truly yield “quality” when the problem is incompletely managed? This strategy may be valid for mundane issues but seems ill advised when applied to life-threatening difficulties.

Commenting on a previous report of extreme durability from the ball-in-cage valve and perhaps reflecting skepticism toward contemporaneous therapies, Starr and Grunkemeier⁷ observed “the satisfactory functioning of an artificial heart valve to 24 years is a rather notable event. It requires that both the patient and the valve continue to function.” Of course, these concepts remain relevant for contemporary prostheses and patients, but our concepts of *functioning* appear to have evolved.

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VALVE CHOICES: NO FREE LUNCH Reply to the Editor:

A multifactorial paradigm shift in the management of valvular heart disease has occurred during the last several decades, from the introduction

of the Starr-Edward valve to the multiple generations of mechanical and bioprosthetic valves and beyond to the revolutionary transcatheter valve technologies. Likewise, a parallel evolution of digital technology has resulted in well-informed patients who are able to weigh the risk of lifelong anticoagulation associated with mechanical valves against the risk of future interventions associated with bioprosthetic valves, tempered with the prospect of a valve-in-valve procedure. Nonetheless, the durability and engineering prowess of the Starr-Edwards and later generations of mechanical valves are noteworthy and cannot be ignored.¹ As Atkins and colleagues² point out in their letter to the Editor, the valve choices of patients and practitioners have clearly shifted toward a strong preference for bioprosthetic valves. Arguably, it appears that enthusiasm regarding transcatheter approaches and lifestyle choices in younger patients is the principal contributor to this overall trend.³⁻⁵ A retrospective review of the Society of Thoracic Surgeons' database showed bioprosthetic valve use had increased from 43.6% in 1997 to 78.4% in 2006.⁵ Similar trends have been observed at our institution, both for patients aged less than 60 years (with an increase from 20% to more than 60%)⁶ and for those aged less than 50 years (with an increase from 16% to 47%).⁴ We therefore expect this trend to continue further in the years ahead.

We agree with Atkins and colleagues² that our concept of valve function appears to have evolved. The interpretation of the data is made more difficult by the difference between valve-related deaths and all-cause mortality and by the difference between bioprosthetic valve degeneration and the need for reoperation. Moreover, the validity of the traditional outcome measure of all-cause mortality is in question. For instance, a recent retrospective study of 416 patients aged less than 60 years who underwent bioprosthetic aortic valve replacement demonstrated an overall survival at 15 years of 62.1% but a freedom from valve-related death of 97.1%.³ Our own retrospective review demonstrated that the increased risks of reoperation with bioprosthetic valves and of major bleeding incidents with mechanical aortic valves were not reflected