Letters

TO THE EDITOR

Anatomic Guided Crossing of a Stenotic Aortic Valve Under Fluoroscopy: “Right Cusp Rule, Part III”

The retrograde crossing of a severely stenotic aortic valve (AV) is a crucial step in the course of the transfemoral transcatheter aortic valve replacement (TAVR) procedure. Crossing the valve can be time-consuming, and it can substantially increase the risk of cerebral embolism. Omran et al. (1) reported a 22% rate of focal diffusion-imaging abnormalities on magnetic resonance imaging in patients undergoing retrograde catheterization of the aortic valve; 3% of these patients presented with clinically apparent neurological deficits.

Three-dimensional imaging of cardiac structures has expanded our understanding of the underlying AV anatomy. With 2-dimensional fluoroscopic imaging, the anteroposterior position of the guide catheter and the wire cannot be accurately identified. We describe a novel and systematic anatomy-based technique to successfully cross a severely stenotic AV; this concept was derived from the previously described “Right Cusp Rule” (2).

Under fluoroscopy, using the Right Cusp Rule (2), obtain the perpendicular implantation view in which all 3 coronary cusps are aligned in a straight line and the opening of the usually calcified edges of the non- and left coronary cusp are visible in the eye of the pigtail seated in the right coronary cusp (Figure 1A). To avoid an anterior position, point the Amplatz 1 (AL-1) catheter toward the anatomically posteriorly located noncoronary cusp and slowly move the straight wire in small steps toward the valve opening as you rotate the AL-1 catheter clockwise (Figures 1B to 1D) until the wire crosses the valve and into the left ventricle (E).

Watch for the “whip” of the catheter or wire from the

FIGURE 1 Crossing a Severely Stenotic Aortic Valve

Angiographic images with schematic overlay (top panel) and without the schematic overlay (bottom panel). (A) The aortic anatomy with all 3 cusps aligned (upper panel: blue = noncoronary cusp, red = right coronary cusp, yellow = left coronary cusp). Start at the noncoronary cusp (B) and rotate the AL-1 catheter clockwise as you move the straight wire in small steps toward the valve opening near the eye of the pigtail (C, D) until it crosses the valve and into the left ventricle (E).
valve jet; this indicates that you are close to the valve opening and will aid in crossing the valve.

The transverse computed tomography image of the AV with the schematic overlay (Figure 2, left) depicts the recommended course of the straight wire (along the dotted red line in the direction of the arrowhead) from the noncoronary toward the right coronary cusp. The schematic illustration on the right depicts normal valve opening (A, red arrow), opening toward the left coronary cusp (B) and opening toward the noncoronary cusp (C), respectively. L = yellow; N = blue; R = red.

An eccentric opening of the AV (Figures 2B and 2C) can be a hindrance to crossing the valve using our described technique. In these cases, using a right Judkins (JR-4) catheter or a pigtail catheter can be helpful in crossing the valve. If the eccentric opening is toward the left cusp (Figure 2B), then, in your implantation view, point the JR-4 or pigtail catheter toward the left cusp and begin with the straight wire in the left cusp and work slowly toward the eye of the pigtail. If the eccentric opening is toward the noncoronary cusp (Figure 2C), then point the JR-4 or pigtail catheter toward the noncoronary cusp and work your straight wire slowly from the noncoronary cusp toward the eye of the pigtail. Softer wires, such as a Glidewire, can sometime help with crossing the AV with an eccentric opening.

*Albert M. Kasel, MD
Anupama Shivaraju, MD
Wolfgang von Scheidt, MD
Adnan Kastrati, MD
Christian Thilo, MD

*Department of Cardiovascular Disease
Deutsches Herzzentrum München
Lazarettstrasse 36
80636 Munich
Germany
E-mail: markus.kasel@web.de
http://dx.doi.org/10.1016/j.jcin.2014.10.009

Please note: Dr. Kasel is a medical consultant for and receives research support from Edwards LifeSciences. All other authors have reported that they do not have any relationships relevant to the contents of this paper to disclose.

REFERENCES

Calcified Nodule Mimicking Red Thrombus on Optical Coherence Tomography

The single case report by Hao et al. (1) describing the unique pathological microstructure of a calcified nodule (CN) in an 89-year-old woman dying of congestive heart failure provides unique clues to