Computed tomography (CT) has a number of potential advantages over other imaging techniques. They include the relatively fast and straightforward image acquisition with little need for preparation, and the ability to schedule the test at a short notice—an advantage that cannot be underestimated in a clinical setting. Further, CT has a high spatial resolution of 0.4 to 0.5 mm in the imaging plane, and the utilization of multidetector row arrays permits acquisition of very thin slices so that the obtained dataset is almost isotropic. An isotropic resolution denotes the same spatial resolution in all dimensions and can be reformatted in any desired orientation without losing image quality in the rendered image. The disadvantages of CT imaging include the radiation exposure and administration of iodinated contrast. The need for electrocardiography-triggered or electrocardiography-gated image acquisition for many cardiac applications makes image acquisition more elaborate, and both physicians and technologists require adequate training to manage such situations.

The main clinical application of cardiac CT is imaging of the coronary arteries, wherein other noninvasive imaging modalities currently do not provide comparable image quality. The excellence of coronary imaging is so overpowering that it is often forgotten that CT may also permit high-resolution imaging of cardiac morphology and cardiac function. Some of the examples of the latter include applications to analyze ventricular geometry (1,2), right ventricular function (3), and left ventricular dyssynchrony (4). If adequate contrast enhancement can be obtained, the imaging of cardiac valves is also possible, mainly of the aortic and pulmonary valve stenosis (5,6) and, with limitations, of valve regurgitation (7,8). Clinically, however, alternative imaging modalities are so widely available that CT is not routinely used for the assessment of the native valves. Echocardiography remains the modality of choice for all aspects of imaging of valvular regurgitation and stenosis, and magnetic resonance is able to fill some gaps. Echocardiography and magnetic resonance may not always require contrast agents nor do they expose patients to radiation. Because CT requires both, it does not seem even reasonable to consider CT imaging for valve disease.

In this issue of *iJACC*, Habets et al. (9) report a series of patients with prosthetic valve dysfunction where CT imaging provided complementary information to echocardiography. The high spatial resolution of CT, its ability to perform arbitrary slice reconstruction, and relatively few artefacts caused by the metallic valve prostheses allow identification of thrombotic apposition, pannus, and small cavities that may escape the echocardiographic scrutiny. A case series, however, may only permit relatively weak conclusions. It does not ensure that such a pathology would always be detected by CT (sensitivity), that all that is detected by CT imaging is a true finding (specificity; for instance, small motion artefacts may be mistaken for a pannus or thrombus), or that CT is in any way better than the echocardiography (incremental value). The report does, however, permit a few observations. First, it demonstrates that complex clinical problems may often require complex solutions. In this case,
suspected prosthetic valve dysfunction required multimodal imaging because no imaging modality alone could provide definitive information. Second, both experience and expertise may be needed for both echocardiography and CT imaging to obtain diagnostic clues in complex cases. Such expertise may be found in a single person or in several collaborators, which leads to the third, important observation. The current study was coauthored by cardiologists and radiologists. Collaboration across the traditional disciplinary boundaries will most certainly and more frequently be required as the clinical demands become increasingly complex, as well as the diagnostic tests we employ. Collaborations across departmental structures are not without problems; egos aside, there are issues concerning patient management, scheduling, reporting, legal responsibility, and reimbursement that would need to be formally addressed for optimal patient care through shared experience and knowledge.

While collaboration between imaging technologies (and imagers) is welcome, the thoughtful skeptic in all of us should also flash a twinkle of caution, too. Imaging for imaging’s sake and collaboration for collaboration’s sake (which could inadvertently and dangerously cross over into mutual revenue generation) will be very unfortunate. In our excitement with new techniques and wonderful images, we are often seeing a “can do—so will do” attitude to multimodality imaging. A thoughtful cardiologist could legitimately question some of the cases presented in this iPIX, too. CT did offer excellent pictorial information, but how often was the multimodality imaging justified based on known cost and known outcome data? In some of these iPIX cases, transesophageal echocardiography showed adequate information to make treatment decisions even though CT showed it more beautifully. In some other cases, it was not that CT showed something unique or unobtainable, but that the transesophageal echocardiography interpretation could have been more refined. The attributes of the new modality generate the danger that the older stodgy, but effective, techniques may not get the attention to details that they deserve. All of us are true believers and followers of multimodality imaging and in turn multispecialty collaboration. However, we will still have to ask and answer the pressing question in each and every patient, and each and every time—what does a new strategy add that is unique for patient’s outcome validated diagnosis, prognosis, and management? We show these iPIX cases to illustrate clinical utility of multimodality imaging but to also show how the spectrum of such collaborative imaging can (should) provoke deep thought and a meaningful dialogue.

Having said that, the current iPIX does suggest benefits of collaborative efforts, and most departments would be well advised to start working on solutions towards this goal. The most prominent ongoing example is transcatheter aortic valve replacement (TAVR). Cardiology, cardiac surgery, anesthesia, vascular medicine, radiology, and other specialties are intimately involved in the joint workup of potential candidates, the procedure itself, and post-procedural care. CT, in addition to other imaging, is playing an increasingly important role for TAVR preparation (10–12), which is a consequence of its unparalleled image quality for assessment of the aortic root (Fig. 1). Would such procedures bring the cardiology and radiology colleagues closer? Would such procedures do what could not be achieved by years of negotiations and politicking?
REFERENCES