Martyn Thomas, MD

An expert on valvular repair discusses the current state of FDA approval for TAVI, valvular replacement devices, and why he finds interventional cardiology to be such an exciting field to work in.

You recently attended the US Food and Drug Administration (FDA) Circulatory System Devices Panel meeting to review the evidence for the Edwards Sapien transcatheter heart valve (Edwards Lifesciences, Irvine, CA). What do you anticipate in the near future in terms of approval for this device?

The panel voted overwhelmingly to approve the use of transfemoral transcatheter aortic valve implantation (TAVI) in inoperable patients (cohort B patients in the randomized PARTNER trial). There was a lot of discussion regarding stroke and vascular complications, but thankfully, they eventually decided that the benefits of this treatment far outweighed the risks. For this reason, I assume transfemoral TAVI will be approved by the FDA for inoperable patients late in 2011. I am less clear with regard to the high-risk surgical patients (cohort A patients). The 1-year mortality rate was similar between surgery and TAVI, but a cost-effectiveness comparison between the two has yet to be reported. Because of this, there will undoubtedly also be a delay in the approval of the transapical approach because it was only performed in cohort A patients.

Do you think that conventional surgery will always be the gold standard for treating valvular disease, or will percutaneous methods eventually overtake the conventional approach? Will TAVI always remain a satisfactory second option for those who have contraindications to surgery?

I think that TAVI is here to stay. In my mind, it is already the standard of care for patients who have been turned down for conventional surgery (assuming a multidisciplinary team believes that the patient will benefit). Conventional aortic surgery will remain the gold standard for some time; however, I think gradually the majority of patients will be treated by TAVI.

Before this happens, a number of complications associated with the TAVI procedure need to be resolved. These include stroke and the incidence of peripheral vascular complications. In addition, as TAVI is used in a younger population, the incidence of bicuspid valves will increase. The major issue here for TAVI will be the incidence of paravalvular aortic regurgitation due to eccentric calcification. New devices or techniques will need to be devised to prevent or treat this because the presence of paravalvular aortic regurgitation will be unacceptable in a younger, lower-risk patient population.

Why has there been more success with the femoral approach than with the transapical approach when performing TAVI? Are other access routes (such as subclavian) viable alternatives at this time?

Transfemoral and transapical patients are different, and this is the most likely reason that the reported results for the transfemoral approach have, in general, better 30-day and 1-year survival rates. Transapical patients have more comorbidities such as peripheral vascular disease, carotid disease, renovascular disease, and previous revascularization by percutaneous coronary intervention or coronary artery bypass grafting. Generally, this results in transapical patients having a higher logistic EuroSCORE than transfemoral patients.

I think the transapical approach may be challenged in the future by the transaortic approach. Surgeons are very used to transaortic access because they use it every day in routine cardiac surgery. Some surgeons are less comfortable with the transapical approach, and it is well known that an apical bleed during the procedure carries a very high mortality rate.

Do you think that the FDA is taking more time than usual to approve valvular replacement devices, or is it consistent with their approval of other coronary devices?

Assuming approval is granted within the coming months, I think it will be similar to the stent story.

(Continued on page 89)

(Continued from page 90)

Sadly, the United States will only have access to an early version of the Edwards Sapien device that requires the use of large 22- and 24-F sheaths. The transfemoral devices currently available in Europe use smaller 16- or 18-F sheaths. It appears that the FDA process actually prevents the American public from having access to the latest-generation devices rather than facilitating it. It is a sad reflection that innovative technologies take 2 to 3 years longer to be introduced in the United States compared to Europe. Introduction of new technologies is also prohibitively expensive such that some companies are deciding not to introduce medical technology in the United States and prefer to concentrate on Europe, China, and India.

As favorable data continue to be reported from trials studying TAVI devices, do you see a boom ahead in terms of industry entering this arena with new devices?

I am not convinced that we will have a similar situation as we did with stents in terms of the introduction of multiple new devices. I would guess that there may be four TAVI devices commercially available in 2 years' time. I think iterative improvements in design will be made either by the established companies or by smaller companies that hope to sell their intellectual property. It is important to have multiple device choices because a significant decrease in the costs of the devices will need to occur if they are to be more widely used, especially in lower-risk patients.

I also think we will eventually find a solution to transcatheter intervention for repair of the mitral valve. The mitral valve is a complex structure that may require multiple different devices depending on the pathology. However, once a solution to this problem is found, I think this will be a huge market. The incidence of significant mitral regurgitation in the elderly population is much larger than that of aortic stenosis, so a transcatheter mitral technology would create quite a boom.

What are the pros and cons of more expedient device approval, as is seen in Europe?

I agree that there are pros and cons. However, there are more pros than cons, and currently, Europe has a pretty good system. I think the United States is overregulated, but there are also parts of the world that are underregulated with a lack of ethics systems in place. Europe has a pretty pragmatic system that sits between these extremes. It allows European physicians and patients early access to new technologies such as TAVI. Once a device obtains a CE Mark, it is then made available for commercial use. However, the CE Mark has major limitations because it can only be obtained for a small number of patients and certainly does not indicate efficacy. Therefore, the system requires physicians in Europe to behave responsibly during the rollout of new devices. In general, I think this does happen, and I have not seen major evidence of risk creep (downward) with TAVI, as has sometimes been stated by those in the United States.

Which new technologies in the pipeline are you excited about (valvular or otherwise)?

There are two areas that I think will have a major impact if they reach their potential. In the valvular field, I am sure new transcatheter mitral devices will be developed in the coming years. The mitral valve is complex but I am convinced that once we have solved the problem of the landing zone, we will be able to deliver a new mitral valve using catheter-based techniques. In the coronary field, it is a diagnostic test that I am most excited about. The test is called *computed tomographic fractional flow reserve.* This test will take a resting computed tomographic scan and, with specialized techniques, give us both anatomic and physiological information. Before the patient is on the cath lab table, we will know the anatomy and the fractional flow reserve of each vessel. Clinical trials are currently ongoing to assess the sensitivity and specificity of this test. If those results hold up, it will revolutionize the diagnostic pathways of coronary artery disease.

Which aspect of interventional cardiology do you find to be the most rewarding?

I love interventional cardiology because I am able to use devices that have a significant affect on treatments and make a true difference to patients both in terms of quality of life and length of life. This fact is well demonstrated by TAVI. Interventional cardiology moves so quickly that I have no idea what I will be doing in 2 years' time—I love it! ■

Martyn Thomas, MD, is Clinical Director of Cardiovascular Services, St. Thomas' Hospital in London, United Kingdom. He has disclosed that he receives grant/research funding from Edwards Lifesciences. Dr. Thomas may be reached at 07885268035; mttwins@aol.com.

CONTACT US

Send us your comments via email to letters@bmctoday.com.