

Maximally Beneficial, Minimally Invasive

By Sameh Fahmy

All across Boston, MA, USA, billboard advertisements for Beth Israel Deaconess Medical Center show a baseball with a small bandage across it. "How much more minimally invasive can heart surgery get?" the ads read.

The ability to perform procedures such as minimally invasive valve repairs and replacements is a powerful marketing tool, but what excites Director of Vascular Anesthesia Feroze Mahmood, MD, most is its potential to improve patient outcomes. "If I were to have the operation, I would choose the minimally invasive operation," he says. "I see it every day and I like it."

Medical Solutions sat down with Mahmood to discuss advances in minimally invasive valve repairs and replacements and the role Siemens technology plays in improving patient outcomes.

How long have you been performing minimally invasive valve repair and replacement at Beth Israel Deaconess Medical Center?

MAHMOOD: We've been doing minimally invasive valve repairs for the last five years [since 2002] now. The incision is small, the approach to the heart is very limited, and a great degree of the visualization is performed by us as echocardiographers. Not only do we guide the surgeons in performing the surgery, but the most important part that people usually do not realize is that we assess whether the valve is suitable for repair before we perform the operation.

What led the hospital to begin offering the procedure – was it a technological advance or a surgical advance?

MAHMOOD: I'd say, both of them. The technology advancement is quite phenomenal. The images that we get of the heart and valves are very good right now, and you can do a very good prebypass and postbypass assessment. And along with that, our surgical incision-making and instruments are so good right now that for some patients who have had minimally invasive mitral valve repair, the incision is just two-and-a-half inches long, and they get discharged home with a bandage.

How many patients have been treated so far, and how does that compare with the total number of valve repairs and replacements during that period?

MAHMOOD: We have had about 75 to 100 patients who have had minimally invasive mitral valve replacement in the last five years. And I'm not counting the patients who we started with minimally invasive surgery, but had to extend the incision for some reason or another. The total number is a little skewed, because many times when you go in there for a coronary artery bypass graft surgery, you find that the patient has a dysfunctional mitral valve and has some mitral regurgitation that was unanticipated. So including that, we've had about 250 to 300 mitral valve repairs in those years.

Which types of patients qualify for the minimally invasive valve repair and replacement?

MAHMOOD: Generally, the patients who qualify for minimally invasive repair and replacement are young, otherwise they are healthy adults who have isolated

mitral valve disease and have isolated single valve or single leaflet pathology. They also do not have any coronary artery disease or congenital anomalies of their heart.

What are some of the benefits of the minimally invasive procedure?

MAHMOOD: My personal view is that the main benefit of the minimally invasive operation is the shorter hospital stay and faster recuperation. The incision is so small, and you can achieve comparable results, so why even have a big sternal split – such a painful incision which keeps you in the hospital longer? Another benefit is the better cosmetic result compared to the disfiguring incision of a sternal split. So number one, I think, it will translate into a shorter hospital stay because of the smaller incision; secondly, I think, is the cosmetic benefit.

Can you quantify the differences in hospital stays?

MAHMOOD: An uncomplicated mitral valve repair normally requires a four-to-five-day stay; the shortest we've discharged a patient is about three days after the operation.

What are some of the potential disadvantages of the minimally invasive approach?

MAHMOOD: The operation takes a lot longer, and it involves the anesthesiologist placing some very advanced cannulas through the neck. That is very complex, very difficult, and it requires multiple people to do it – one person doing the echo exam while the other person is trying to put the catheter in.

Feroze Mahmood, MD,
is one of the leading
echocardiographers in
the USA.





Beth Israel Deaconess Medical Center is the official healthcare supplier to the Boston Red Sox baseball team.

Can you quantify the difference in operating time?

MAHMOOD: The rate-limiting steps of this operation are placement of these cannulas. Sometimes I've done that with my first attempt within 30 seconds. And then, the next one takes three hours. So the time span can be anywhere.

How widespread has the adoption of the minimally invasive approach been?

MAHMOOD: It is essentially being done at the major academic centers; it is not something that's routinely being done in small community hospitals or in isolated private practice cases. But it's getting more widespread as more surgeons are

training and as more patients are finding out that it is better cosmetically and that you can achieve better results.

Now let's shift gears a little bit and talk about the technology that helps make the minimally invasive valve repair and replacement possible. Specifically, what roles do transesophageal echocardiographic examinations (TEE) and catheter-based ultrasound play?

MAHMOOD: TEE is done in the prebypass time frame and is of paramount importance in deciding whether this patient is going to need repair or replacement. And in the patients who have very poor echo windows, this is a big dilemma. I've talked

to people with Siemens at the Ultrasound Innovation Center in Mountain View, California, about the possibility of using intracardiac echo to get that probe in there to visualize the operation in a patient with very poor echo windows. So the intracardiac catheter has not been specifically used for this purpose yet, but I think that will be the next step.

Which features of the ACUSON Sequoia™ ultrasound system play a role in improving patient outcomes?

MAHMOOD: The contrast ratio in the system is very good, and if you ask me – dollar for dollar – which system has the best image quality, I think the ACUSON Sequoia ultrasound system is by far the best. It helps a lot, especially with this three-dimensional reconstruction of the mitral valve on the package. It is a top-notch machine.

What features of the ACUSON Sequoia are especially helpful for improving workflow?

MAHMOOD: The main feature is the button for automatic optimization of the image, because people who perform echocardiographic examinations are of different levels of competence and different levels of comfort with the machine. And trying to optimize an image, increasing the depth of the frame rate and gain settings, and other functions sometimes can be very problematic for those people. So, the one button that optimizes everything for you, including two-dimensional images, color flow, and Doppler images, is the best that there is. Another bonus is that the layout of the buttons is so intuitive.

Is there anything else you'd like to mention about minimally invasive valve repair and how Siemens technology helps make it possible?

MAHMOOD: We have started using the Mitral Valve Assessment Package, which allows us to specifically identify the scallops of the leaflet that are involved and to trim down the regurgitation jets to their point of origin from the valve, and it's just unbelievable. For valve surgery, there is no comparison.

The interview with Dr. Mahmood was held in Boston, MA, USA, by medical writer Sameh Fahmy, a science and technology journalist based in Athens, GA, USA.