

## Robotics and Radial: What Can It Do for Your Institution?

A Conversation with Sunil Rao, MD

Robotic percutaneous coronary intervention (PCI) is a developing technological option for interventionalists looking to treat eligible patients. Integration of the technology into hospital PCI programs presents opportunities for physicians and staff alike, and **Sunil Rao, MD**, an interventional cardiologist and Professor of medicine at Duke University, thinks that the benefits could be significant, ranging from increased efficiencies, to broader patient access, to specialized PCI procedures. In this interview, Dr. Rao discusses the potential advantages of robotic PCI.



Sunil V. Rao, MD, FACC, FSCAI

**You are well-known for your work in transradial PCI. Can you describe the benefits of radial for patients and for hospitals?**

Sure. There are both clinical and nonclinical benefits. The clinical benefits are a significant reduction in bleeding compli-

cations, as well as a reduction in vascular complications, and that ultimately leads to increased patient satisfaction and shorter length-of-stay. Both of these have benefits to the hospital because hospitals, obviously, are being rated on patient satisfaction and shorter length-of-stay means more beds for hospitals to bring in more patients. It allows for increased bed availability.

**Recent data have shown that radial access increased operator radiation exposure, even for experienced operators. Can you explain some of the risks of this increased exposure?**

There is a slightly increased risk of radiation exposure with radial procedures, and it's important for operators to use the best practices to try and reduce that radiation exposure. Over the long-term, we know that radiation exposure can increase the risk for cataracts, as well as the risk of certain cancers, and so this is a really important occupational hazard that interventional cardiologists have to pay attention to.

**How long have you had a robotic percutaneous coronary intervention program as part of your practice? Describe, if you could, the CorPath GRX System and its main benefits versus manual PCI.**

We've had our robotic program in place for about eight months, and I'd say it's about equal that we've used the previous version, the 200,

and then the GRX version. I think the GRX is a significant evolution in robotic assisted PCI because it allows for guide catheter manipulation. This allows you to tackle more complex cases where you can manipulate the guide and the balloon and stent independently and use that interplay to tackle more complex lesions.

**Can you talk about some of the specific benefits this technology can have for patients, physicians/cath lab staff, and for hospitals?**

I think the more obvious benefits are really for the physicians, because you can sit far away from the radiation source, which significantly reduces or nearly eliminates radiation exposure. The second thing to note is that you can do this without having to wear lead (especially once you get very proficient with it), which becomes an ergonomic issue and reduces the risk of back injury. I think it's clearly a beneficial setup for physicians.

For patients, there is a potential benefit in the sense that the robotic device allows you to measure anatomy to determine lesion length and you can theoretically use fewer stents if you measure the lesions appropriately. There is also potentially greater accuracy in stent positioning because you can advance and withdraw the stent one millimeter at a time, which is very challenging to do manually.

I think that for hospitals it's nice because it's an entry level into a novel technology—a potentially disruptive technology, and I think the future of this technology is very exciting, particularly for hospital systems, where they could potentially have remote PCIs.

**What role can robotics play in radial intervention, specifically left radial?**

It's pretty clear that the left radial approach is generally associated with lower radiation exposure. It's faster than the right radial approach primarily because there's less subclavian tortuosity on the left side versus the right side, particularly in older patients. The problem with left radial is that there's no completely satisfactory set up for a left radial

approach, and it does sometimes become an ergonomic challenge for interventional cardiologists to use the left radial approach.

With the robotic setup, once the guide catheter is placed, the robot does the rest of it in terms of wiring and then delivering stents and balloons, so the operator can just sit in the cockpit. There's no bending over the patient and that, I think, is a significant advantage of robotic assisted PCI for the left radial approach.

**Some physicians believe that robotic PCI can only be used in simple cases, and can you describe the types of procedures that you are performing robotically?**

We have a "robotic first" program, which is to say that we try to do cases using the robot first. We've done bifurcations. We have not done chronic total occlusions yet. We are doing more complex patients than those with just your standard type-A lesions. I think the robotic technology is accelerating at a rapid pace, and so I expect that over the next few years we'll be able to tackle even more complex procedures.

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—Sunil V. Rao, MD

**How has your program grown since you began and what improvements in the technology with the second generation have made the most impact on your program?**

I think the GRX has really been the biggest impact because it allows for guide catheter manipulation, particularly when you're dealing with heavily calcified lesions or tortuous blood vessels, where you need more guide support.

Having that independent ability to manipulate the guide along with the stents and balloons makes a big difference. That's really what we've noticed. The GRX system allows us to tackle more complex lesions because it allows for that independent guide catheter manipulation.

**Where do you see the future of robotic PCI heading? How could it, in your opinion, impact access to care, cath lab efficiencies, and automation?**

Robotic technology is very exciting right now. It's accelerating at a remarkable pace. The future of it is really what I think most people want to see with robotics, which is to do what we call remote PCI. That is, have an operator at a hub hospital assisting robotically another operator at a spoke hospital. That's really what I think will allow us to expand access to PCI, particularly in remote or rural areas where there are fewer hospitals and where the risk of having an MI or a heart attack is very high, just simply because a hospital lacks the expertise in doing PCI. To me, that's really where the technology is headed, and that's a very exciting development.

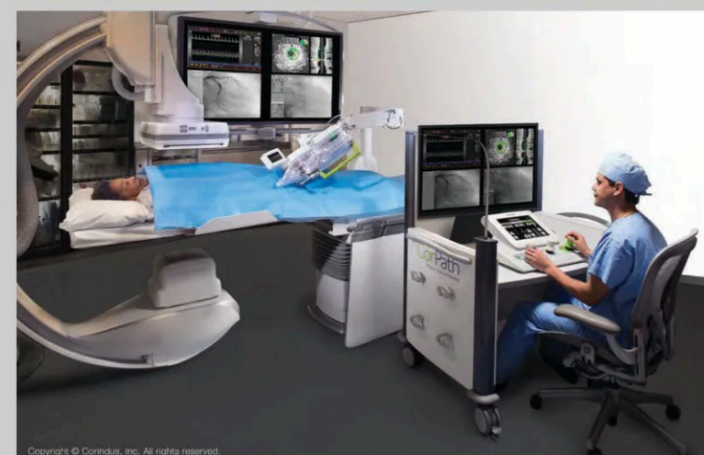
In terms of cath lab efficiencies, it's like any other new program. I think that as people overcome the learning curve of using robotic PCI, I believe the efficiency will certainly go up. This applies to the cath lab staff who are setting up the robot, and even the operators, as they learn how to manipulate wires, balloons, stents and guide catheters using a robotic system. Once they overcome that learning curve, the efficiency dramatically increases.

I think the future of PCI really is around automation. We're not at the point yet where we have robotic assisted vascular access, but one can imagine a scenario or a future where large parts of our procedures are, in fact, automated, leading to safer procedures for operators as well as for patients.

**What advice do you have for physicians interested in starting a robotic PCI program?**



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The CorPath GRX System

The biggest piece of advice I would have is to keep an open mind and have a problem-solving attitude. This is very similar to starting a radial program, for example. It's something new, and there is a learning curve associated with it. You have to train the staff and you have to keep an open mind so that you can overcome that learning curve. ■

#### DISCLOSURES

Dr. Rao reports no relevant financial disclosures.

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