GAYATRI ACHARYA: Greetings. I'm Dr. Gayatri Acharya, cardiology fellow at Mayo Clinic. Today, we'll be discussing robotic percutaneous coronary interventions. I'm joined by my colleague, Dr. Gurpreet Sandhu, director of the Cardiac Catheterization Lab at Mayo Clinic. Welcome, Dr. Sandhu.

GURPREET SANDHU: Thank you, Gayatri. This is a great topic to be discussing today.

GAYATRI ACHARYA: We've seen that robotic percutaneous coronary intervention has already been introduced into the Interventional Cardiology Lab. But what are the benefits to the operator?

GURPREET SANDHU: Well, this is very promising new technology, and the biggest benefit I think that we will see will be improved safety in the cath lab. As you know right now, we're exposed to radiation doses constantly across our entire lifetime in the lab. So this will help reduce radiation exposure for the interventionalist as well as other personnel. And also, there is a higher risk of orthopedic injuries from wearing heavy lead aprons. If we can get rid of those, that would be helpful as well.

GAYATRI ACHARYA: That sounds very promising. When we think about benefits to the operator, we also think about benefits to the patient. So what benefits will we see for patient safety?

GURPREET SANDHU: At this time, the studies are still early stage. They are small studies that mostly will focus on feasibility, and we don't really have enough data regarding outcomes of patient safety. The technology also, at this point, just permits the use of a single wire and a single device, such as a balloon or a stent. So the lesions addressed are also reasonably straightforward. So I think it would be a while before we actually see any outcomes data.

GAYATRI ACHARYA: Sure. What do we know so far about the efficacy of using robotic PCI?

GURPREET SANDHU: So with this technology, it is a cassette that allows you to manipulate a wire and also allows you to advance and redraw a stent or a balloon. So in terms of efficacy, this can create straightforward lesions type A, type B. But anytime you're looking at complex bifurcations, CDOs, you're going to need additional guide support, or you need a second wire or a second device. Those areas, it can't be used in its current format.

GAYATRI ACHARYA: As a fellow, it's of great interest to me to know what skill set I'll need to operate this technology. How does the technology learning curve differ from that of traditional PCI?

GURPREET SANDHU: I would say from a fellow's perspective and from a trainee perspective, this doesn't provide you the same tactile feedback as you get with a manual PCI. Also, the technology has joysticks as opposed to what I would consider normal hand movements as you see with other robotic devices. So from a learning perspective for a trainee, it's best to learn manually first. But for an experienced interventionalist, I think five or six cases is probably all you need in terms of overcoming the learning curve.

GAYATRI ACHARYA: When we think of incorporating this into labs across the country, what sort of infrastructure changes will be required to make this more mainstream?

GURPREET SANDHU: The infrastructure changes, in our case, were actually pretty simple. The most we needed was space to park the actual cabinet, or the cockpit, as they call it. And then we had to put some additional wiring to integrate it with our existing systems.

GAYATRI ACHARYA: When we think about making changes to the infrastructure, incorporating new technology for patients, how will this impact health care costs?

GURPREET SANDHU: That is actually a critical question and a very, very important question. So anytime you bring in a new technology, it costs, as you know, several hundred thousand just to get the device there. And then with each procedure that you do, it's probably an additional thousand dollars of expense that currently is not reimbursed. And this will be an issue. However, if you rate this against the safety of the operators and the safety of the other personnel in the lab, I think it will balance out over time.

GAYATRI ACHARYA: And that seems to be a very critical balance to strike, given that interventionalists do this for many years of their lives.

GURPREET SANDHU: Absolutely.

GAYATRI ACHARYA: Are there any other applications to this technology?

GURPREET SANDHU: So I can foresee some futuristic applications. At this time, you have to be physically present inside a room to do an intervention. But what about remote human habitations? How about large cruise ships where you have someone who has an MI, and there is no personnel available or no easy transportation facilities? Potentially with this, what you could foresee is if you have any medical personnel capable of putting in a central line or putting in a sheath in an artery, you could do more PCI from a distance and use this as a lifesaving technology.

GAYATRI ACHARYA: That would be a great application as we go forward and improve on this technology. Are there any other improvements that need to be made to this technology before we make it more mainstream?

GURPREET SANDHU: I think, realistically, what we need is an ability to control more devices. And then besides more devices, what needs to happen in the future is predictive capabilities, more computerized interfaces, so this can actually predict a lesion type or automatically advance a wire or a device and be able to improve patient outcomes.

GAYATRI ACHARYA: Thank you, Dr. Sandhu. Any other thoughts on this topic?

GURPREET SANDHU: No, this was great, Gayatri. It was wonderful to discuss this today. Thank you.

GAYATRI ACHARYA: Great. Well, thank you for those very important insights, and thank you for joining us on theheart.org on Medscape.

GURPREET SANDHU: Thank you.