

India's own surgical robot boasts cheaper price tag

SSI Mantra has already been used for 22 complex procedures at Delhi hospital

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India now has a homegrown robotic surgery system that holds out promise of less prohibitive costs in a niche category of medical treatment, thanks to the efforts of a US returnee cardiac surgeon and his tech team.

Designed in India, the SSI Mantra aims to rival the widely popular da Vinci surgical system, which is manufactured by global market leader Intuitive Surgical, and costs less than a third of the latter. The SSI Mantra costs around ₹4.5 crore and da Vinci ₹15 crore. It is already being deployed at the Rajiv Gandhi Cancer Institute and Research Centre in New Delhi, where it was installed last month and has so far performed 22 complex surgeries.

Sudhir Srivastava, a cardiac surgeon who was working in Texas, decided to come back to India in 2011. In 2014, he started SS Innovations with a team of 10 engineers. Srivastava, the founder chairman and CEO of SS Innovations, claims that he invested his life's savings of around \$7.5 million into building the company.

"There came a time when I had to sell my car and furniture to take care of the team I had put together. I borrowed money from friends in the US. In 2017, we were able to raise overseas funding of around \$33 million. Within the next two years, we had the prototype of Mantra ready," says Srivastava, who owns 90 percent in SS Innovations.

How did he conceive the idea to build an indigenous robotic surgery system when heavyweights such as Intuitive Surgical (da Vinci), J&J and Medtronic already existed in this space?

Recalling his experiences in Texas, Srivastava observes that around 20 per cent of the cardiac



■ SS Innovations, founded by Sudhir Srivastava, has built SSI Mantra

■ A robotic surgery using SSI Mantra is likely to cost ₹40,000–60,000 more than a normal surgery

■ Only 140 robotic surgery systems installed across 70,000 hospitals in India

■ SS Innovations in talks with Motherson Group for manufacturing support

■ SSI Mantra costs ₹4.5 crore, one-third of the global cost

■ It also plans to do 5G-enabled remote robotic surgeries using SSI Mantra

bypass surgery patients could return home the next day, and around 50 percent left the hospital in two days. The patients would be back to work or playing golf in about a week to 10 days.

Instead of cutting open the sternum (central bone of the chest wall), a robotic surgery system could perform a minimally invasive heart bypass surgery. It reduced the average length of stay in the hospital for a patient to 3.2 days from 10-15 days in case of a regular procedure. Srivastava was then using the da Vinci robotic surgery system, which has sold more than 6,730 units and has been used for over 10 million procedures across the globe.

However, even in the US which has over 5,000 robotic surgery systems, the level of penetration of such technology

is only 30 per cent, according to Srivastava. Most patients either do not have access to it across the world or they simply cannot afford it.

Srivastava wanted to build a more affordable robotic surgery system, as he felt that it would increase access to the high-end procedures.

India has 70,000 hospitals, of which about 25,000 are multi-specialty ones with around 150 beds and above, Srivastava says, adding that if the robotic surgery system became affordable every hospital could potentially include it.

At present, India has only 140 robotic surgery systems across hospitals, of which around 100

are estimated to be da Vinci makes. With 10,000-12,000 robotic surgeries every year, India accounts for less than 0.1 per cent of the global numbers.

"We are applying for USFDA (United States Food and Drug Administration) and EU (European Union) certifications this year," says Srivastava, adding: "This would take a year or more. We are trying to raise funds as well to

take the venture to the next stage — increase our scale of production as well as conduct clinical trials for these regulated markets."

His team of 100 people

operates out of a 30,000 square feet Gurugram facility, where they assemble components that they procure from vendors all over India. Some components (such as drives and motors) are imported.

Srivastava says that they are in talks with the Motherson Group, "who will initially make all the components of the Mantra system for us, and our team will assemble them". Eventually, he adds, they could have a strategic tie-up with Motherson to manufacture the entire units for SS Innovations.

At the moment, he has purchased orders for four or five SSI Mantras and is getting more queries. By March 2023, SS Innovations aims to sell 35 SSI Mantra systems, and thereafter sell 100 systems every year. "In the next five years, we aim to sell 2,000 SSI Mantras, as by then the US and EU approvals should also come in," Srivastava says.

While India is the focus market, he has identified around 55 countries that have less stringent regulatory requirements and around 19,000 hospitals in India that can afford the system.

"It's not only the low- and medium-income countries, but robotic surgery systems are few even in high-income geographies. EU, for example, has 1,100 systems only, Canada has 25-30," he adds.

For now, around 300 million surgical procedures (robotic and non-robotic) take place around the world annually. This is expected to go up to 590 million by 2030. Many surgeries could shift to robotic systems if there is access.

"Around 50-60 per cent of the cardiac procedures can be done robotically. It will reduce blood loss, complications, and aid faster recovery. The mortality rate in robotic cardiac surgeries is only 0.7 to 0.8 per cent," Srivastava points out.

Sudhir Rawal, medical director and chief of genito uro-oncology services, Rajiv Gandhi Cancer Institute and Research Centre, says that patients operated upon by the SSI Mantra have had fast recovery. "They tend to go back home in two to three days instead of, say, two weeks of stay at the hospital. I think this system will change the scene of robotic surgery in India."

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