THE FUTURE IS NOW: **SURGICAL ROBOTICS FIGHTING CANCER**

DID YOU KNOW?

The world market for abdominal surgical robots stood at $2.9 billion in 2017. The robotic-surgery-equipment industry revenue is projected to increase to $12.9 billion by 2022.
– WinterGreen Research study (2017) [http://wintergreenresearch.com/abdominal-surgical-robots]

Increasingly, science fiction is becoming science fact, thanks to robotic surgical systems offering life-saving surgery to cancer patients. Meet the latest addition to the growing class of medical robots in South Africa: the da Vinci X. By **Carla Hüsselmann**

It feels like you've stepped straight into the wonder of a sci-fi film when robotic and laparoscopic urological surgeon Dr Conray Moolman introduces you to his new robotic surgical 'assistant', the da Vinci X, in an operating theatre at Life Kingsbury Hospital in Cape Town.

Seated at a sleek computer console, Dr Moolman places his skilled hands into controllers that direct his new robo-assistant's dexterous metal arms. With his assistant's precise scalpel work and a high-definition 3D monitor that visually immerses the surgeon in his patient's abdomen, Dr Moolman is able to perform minimally invasive surgery with just a few tiny incisions, removing a patient's cancerous prostate gland or kidney tumour.

One of the world's most advanced surgical systems, the da Vinci X is the first of its kind in South Africa. 'It's truly an exciting time to be a urological

Fascinating FACT

The first urologic robotic program in the world was built at the Henry Ford Hospital in Detroit, Michigan in the US in 2000 under surgical innovator Dr Mani Menon for radical prostatectomies.

[Source: The National Center for Biotechnology Information: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4791673]

surgeon. I'm passionate about this innovation, as it's benefited more than three-million patients worldwide,' enthuses Dr Moolman, who first trained on telerobotics in Belgium in 2014.

'The cure rates of prostate cancer by robotic-assisted surgery are excellent, and it's a powerful tool too for treating kidney cancer. Patients can benefit from reduced post-operative pain, as well as shorter hospital stays and recovery times, among other benefits.'

In a country where prostate cancer is the leading cancer among men and sees 4 000 new cases diagnosed every year, and often too late, says Dr Moolman, he's proud to offer his patients the best chance they have for a cure with what is arguably a technological miracle.

How the da Vinci X works

Thanks to advanced computer software and technology, the da Vinci X machine is an extension of a surgeon's hands and eyes; it has no autonomy and is always under the surgeon's control. It has two sections: the tower and the console. The tower is made up of four metal arms; three of them hold minuscule surgical instruments and one an endoscope (a thin tube containing a tiny high-definition 3D camera and light).

'I operate the robot's arms and controls from the console with its two master controllers while looking into a monitor, which allows me a high-definition 3D view of my patient's abdomen. This image is magnified 10 times, so the instruments look normal-sized to me,' explains Dr Moolman. Even the greatest surgeon has off days and hand tremors, but with the da Vinci X's dexterity, a surgeon's hand is always steady and their invaluable skills are augmented with even greater precision.

This model in the da Vinci robotic system range, the da Vinci X, costs approximately R25 million and offers improved functionality and high-definition vision, voice and laser guidance, and a fully integrated endoscope. 'Its arms also provide a longer reach and a narrower profile to perform intricate surgery, including robotic prostatectomies for prostate cancer and robotic partial nephrectomies for kidney cancer,' says Dr Moolman. 'This technology is so advanced that although I'm always in the theatre with my patient, technically I could be directing the surgery on a different continent if I had a superfast internet connection.'

The benefits of robotic surgery with the da Vinci X

Dr Moolman has performed close to 300 robotic prostatectomies and partial nephrectomies (kidney surgery) and has seen great long-term results. His patients experience less post-operative pain; a lower risk of infection, complications or blood loss; a quicker recovery time; a faster return to normal activities, including urinary continence and erectile function; and minimal scarring.

With traditional open surgery, patients generally need to stay in hospital for up to a week, but after a robotic prostatectomy, about 75% of his patients go home the day after surgery and 95% go home a day or two after surgery, says Dr Moolman. 'My robotic partial nephrectomy patients spend an average of two days in hospital. Patients are encouraged to walk around from day one, and in most cases are ready to go back to work and normal activities within 10 to 14 days after surgery. Compare that to the six weeks of recovery it takes with traditional open surgery.'

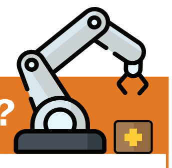
Are you an ideal candidate for robotic surgery?

The ideal candidate for a robotic prostatectomy has localised prostate cancer and locally advanced cancer, but they can't be operated on if they have metastatic cancer. 'A patient's suitability is determined with a magnetic resonance imaging (MRI) scan and a bone scan, and sometimes a positron emission tomography (PET) scan,' he says. 'A kidney-cancer patient's suitability is determined by the position and size of their tumour and with a computerised tomography (CT) scan.'

Fortunately, the risks of these surgeries are very low. But are there any precautions you can take pre-op? Be as physically fit as possible, as you recover much faster, advises Dr Moolman.

Thankfully, as robotic surgery has been shown to be the gold-standard treatment of intermediate and high-risk prostate and kidney cancer, all major medical aids do cover them. However, a co-payment may be necessary. ■

Main image: Dr Moolman is seen here at a robotics symposium in France with the da Vinci Xi, the next model in the range. At Life Kingsbury Hospital, the current system is the da Vinci X, but the tower and console are Xi. The functions, however, are the same.



Why 'da Vinci'?

The robotic-surgery system was named after Leonardo da Vinci's robot, the first robot in human history, which was built by the Renaissance genius in Milan, Italy, in 1495. He created a robotic knight that could stand, sit and lift his visor, thanks to hidden pulleys and cables. Today the knight can be viewed at the Museo Galileo in Florence.

MEET OUR EXPERT

Dr Conray Moolman obtained his undergraduate medical degree at the University of the Free State. He worked in general medicine in the UK before completing his urology training at Groote Schuur Hospital and his master's degree at the University of Cape Town. He then went on to complete his advanced laparoscopic urological training in France and then became a fully qualified da Vinci robotic surgeon and training proctor in Belgium. He performs surgery at Life Kingsbury Hospital. For more information, visit **https://www.lifehealthcare.co.za/hospitals/western-cape/cape-town/life-kingsbury-hospital/**