



Fertility

Gynaecology Gives a Robotic Hand

Robot-assisted surgery is gaining popularity as a way to treat gynaecological conditions like endometriosis in Singapore

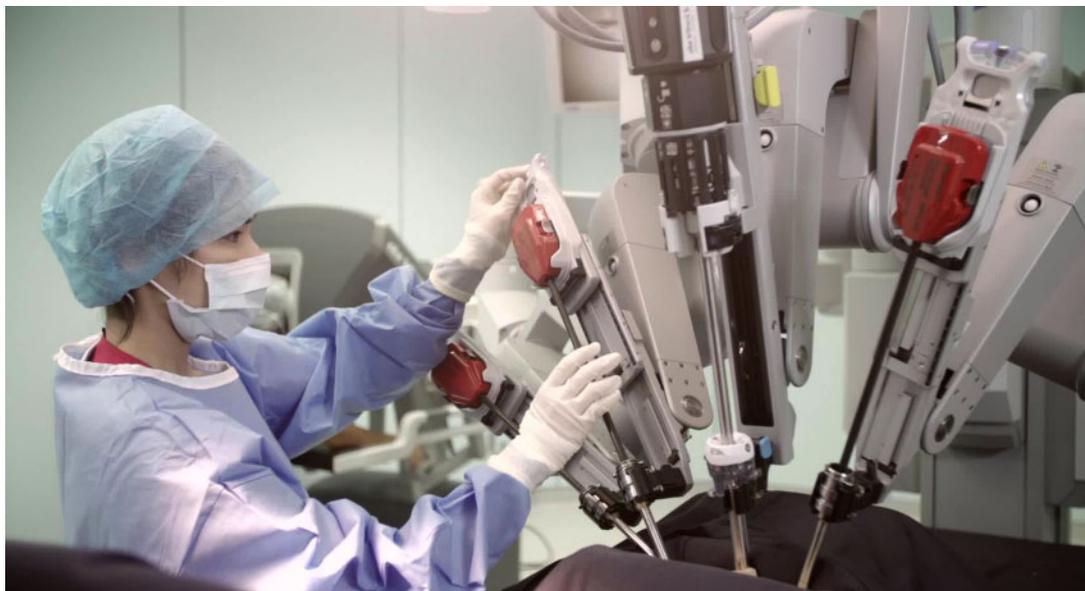


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DA VINCI SURGICAL ROBOT

Robot-assisted surgery allows even the tiniest incisions to be made in a smooth and precise way, compared to the surgeon's limited movements and possible arm tremors during standard laparoscopic or open surgery.

About of abdominal cramps is a familiar experience for many women every month or so. But it may signify something more serious than menstruation. It could be a symptom of endometriosis, and it could be dangerous to ignore it. Endometriosis is a chronic condition in which cells in the womb lining grow outside the womb, near the ovaries or bowel for instance. They may also spread to areas beyond the pelvic region, such as the bladder.

“Many women are told the misleading notion that menstrual cramps are ‘part of growing up’ and that they will outgrow them in time,” says Dr. Fong Yoke Fai, Head and Senior Consultant of the Division of Benign Gynaecology at the National University of Singapore (NUH) Women’s Centre. “But endometriosis is a progressive condition in which the pain can worsen. Symptoms like severe menstrual cramps, an urge to defecate during menses, and bladder pain should not be dismissed,” he emphasises. Yet, endometriosis also often goes undiagnosed for the opposite reason – a woman can suffer from it without feeling any

period-related pains or discomfort.

The misplaced tissue will continue to function in the same way during every menstrual cycle, by thickening and breaking down. But it will stay trapped in the body. What are known as “chocolate cysts” may form as a result. Endometriosis also inflames tissues, leading to scarring, and tissues that stick together, thus affecting fertility. Drugs and medication can provide pain relief, but surgery is often the only solution if the condition gets severe, and when fertility is affected but desired.

Nowadays, laparoscopic surgery is classified as minimally invasive. It has lower complication rates and it causes less blood loss than the traditional open surgery that was performed in the past, which also causes more tissue damage and more pain.

Laparoscopic surgery involves the surgeon inserting a laparoscope camera and small instruments into tiny incisions in the abdomen in order to view blockages and remove them surgically. If the tissues are too severely affected to treat through those small incisions, traditional open surgery is the best solution available.

In Singapore, gynaecological surgery assisted



by robots is now achieving even better results. Robot-assisted laparoscopic surgery via the da Vinci Surgical System improves on both methods by allowing surgeons to carry out more intricate and complex operations with greater precision and control. This is crucially important if the endometriosis has penetrated the walls of the bladder or the intestines.

Furthermore, the high-definition three-dimensional vision provided by robot-assisted surgery greatly enhances surgical visualisation and depth perception, and it is highly intuitive. The robot's mechanical movements follow those of the surgeon's hands communicated via electrical pulses. This allows even the tiniest incisions to be made in a smooth and precise way, compared to the surgeon's limited movements and possible arm tremors during standard laparoscopic or open surgery.

"With robotic surgery, there is usually a lower conversion rate," says Dr. Fong. "This means



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there is less chance you will have to switch from one surgical method to another when you are operating on a patient using robotic surgery, compared to laparoscopy. For instance, a doctor may begin a case via laparoscopic surgery, but, due to the severity of the disease or condition, such as endometriosis, he has to switch to open surgery, as it is technically not feasible to complete the procedure using the same technique."

The advantages of the robot's assistance during gynaecological surgery were demonstrated in an NUH study published in the *International Journal of Gynaecological Cancer* in mid-2012. This compared the use of open and robotic surgery on 124 endometrial cancer patients. The researchers matched the preoperative and postoperative data of 34 patients who underwent robotic surgery with those of 90 patients who underwent open endometrial cancer surgery. The robot-assisted surgery incurred less intraoperative blood loss, a lower rate of postoperative complications, a lower wound complication rate, and a shorter hospitalisation time.

For all its benefits, installing and using robot-assisted surgical technology across the board has several limitations. The higher cost often deters patients, whereas the challenge for surgeons is the high level of knowledge and expertise needed to use it for complicated procedures.

Nevertheless, the advantages of robotic technology appeal to Singapore's gynaecology professionals. "In the four years since 2009, NUH has performed robotic surgery on 40 percent of more than 80 patients suffering from severe endometriosis. This indicates the growing number of patients being treated by robotic surgery," Dr. Fong reports.

The technology is also available at other hospitals in the country, such as the KK Women's and Children's Hospital and Singapore General Hospital. The latter set up a severe endometriosis robotic surgery service in January last year. However, Mount Elizabeth Hospital was the first to introduce the system in Singapore for gynaecological surgery along with other types of surgery.

"We started doing robotic surgery at the end of 2005, because we saw the significant benefit of the da Vinci technology. It is a quantum leap in laparoscopic surgery," says Dr. Suresh Nair, Senior Consultant Obstetrician, Gynaecologist and IVF Specialist at Mount Elizabeth Hospital.

"We have seen the tremendous acquisition and proliferation of robotic surgery in our country over the past eight years. It is now used for nearly every gynaecological procedure. One of the most common of these is the removal of uterine fibroids and endometriosis. The da Vinci robot is also used increasingly to remove cancerous wombs together with the lymph nodes – what is known as a radical hysterectomy. The da Vinci system is therefore very suitable for all major gynaecological procedures. These are now the fastest-growing area of surgery in which the da Vinci robot is being used around the world," Dr. Nair continues.

For all the wonderful technology and regardless of whether the patient undergoes robotic, laparoscopic or open surgery, there is, unfortunately, no permanent cure for endometriosis.

"As long as a woman continues to have a monthly menstrual cycle, the endometriosis will recur indefinitely," says Dr. Yin Nin Chia, a Gynaecological Oncologist at Gleneagles Hospital. "The speed and severity of this recurrence will vary with individuals, and its underlying and determining factors remain unknown.

"With regards to fertility, generally the best time and chance to try to conceive is in the first



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year after surgery. Couples are encouraged to try naturally on their own. Thereafter, when endometriosis recurs, most couples will have to resort to fertility treatment. Sometimes the fallopian tube is too severely damaged by endometriosis and it cannot be restored by surgery. In such cases, the doctor will recommend in-vitro fertilization (IVF) at the outset instead.”

The limitations of robotic-assisted surgery aren't dictated solely by the severity of the medical condition. The rise of robotic-assisted surgery has generated increasing criticism about its purported superiority over laparoscopic surgery in terms of patient outcomes, as well as its cost-effectiveness.

The argument is that the system's advantages stem from its minimally invasive nature, rather than its robotic technology, yet it costs more than minimally invasive laparoscopic surgery. A study published in the *Journal of the American Medical Association* last February by researchers at Columbia University investigated the cases of 264,758 women in the US who had hysterectomies, the removal of the uterus for non-cancerous conditions, between 2007 and 2010.

Of those who underwent laparoscopic surgery, 25 percent spent two more days in hospital, compared to 20 percent of those who underwent robotic surgery. However, the overall complication rate for both groups was identical at 5 percent, and there was no difference in the rates for blood transfusion. Yet robotic hysterectomy cost far more than laparoscopic surgery – US\$8,868 compared to US\$6,679.

Responding to the technology's critics, Dr. Nair points out that the comparison should be with open surgery instead. “The main issue is that, despite laparoscopic surgery being conducted for the past 30 years, the vast majority of women having hysterectomies are undergoing

unnecessary open surgery. That is probably because the challenge of acquiring laparoscopic surgical skills prevents many gynaecologists from performing minimally-invasive surgery.

“Although rigorous and robust RCTs have yet to be done, this has been the case with laparoscopic surgery for many years. Yet it is highly beneficial for a large number of gynaecological conditions. So robotic surgery should be compared to open surgery, although, of course, it must also measure up to laparoscopic surgery.

“To draw an analogy with a real-life situation, imagine if everyone is driving a stick-shift car, the laparoscopic approach, and robotic surgery is a more-expensive automatic car. A small number of good drivers can use the 'stick shift' laparoscopic approach, but the majority cannot. So, there are only a few stick-shift cars on the road, and many other cars have stalled and have their bonnets open, what is otherwise known as open surgery.

“If the more-expensive automatic cars were to become widely available, then nearly everyone could drive a car, and there would be more cars on the road for easy transportation of people. The only limiting factor here would be their affordability. But in many cases it may well be worth the cost, because the surgeon could transport his patient back to good health – freedom from disease – in an 'automatic car' with the da Vinci robot. That overcomes the challenges of 'stick-shift-driving' laparoscopic surgery. I hope that will end the debate about robot-assisted surgery,” he concludes. [GHT](#)

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