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The da Vinci robotic system

What is the da Vinci robotic system?

The da Vinci robotic system is currently the only technology available to access actual **robotic surgery**.

For **robotic surgery the da Vinci** is the latest innovation in minimally invasive surgery, following laparoscopy, where the surgeon does not operate with his own hands but manoeuvres a robot remotely, while sitting at a console inside the operating room. The computerised system transfers the movement of the hands into pulses that are transmitted to the robotic arms.

How does the da Vinci Xi system work?

Among the da Vinci systems, the **da Vinci Xi robot** is the most advanced platform as well as the most advanced system for **minimally invasive robotic surgery**.

It is made up of three main components:

- **Surgeon console**: this is the control centre. The surgeon controls the endoscope and the instruments through the console using two manipulators and foot pedals.
- **Patient side-cart**: this is the operating component of the da Vinci system and is composed of four moveable and interchangeable arms used to support the endoscope and instruments from 5 mm to a maximum of 8 mm.
- **Vision cart**: this contains the video central processing unit.

Developed according to ***"Immersive Intuitive Interface***" design, it is the only robotic system that:

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- **transfers the movements of the surgeon intuitively**, which allows complete control of the endoscope and instrumentation and avoids complex laparoscopic movements;
- allows an **actual three-dimensional view of the operative field**: the surgeon is literally "immersed", without the use of glasses or other devices, to assess the best anatomical planes for dissection and "live" the surgical procedure as if inside the patient's body.

Moreover, the da Vinci Xi robotic system:

- gives a 3D view with **up to 10 times magnification**, which ensures clarity and precision of the details clearly superior to the laparoscopic technique;
- **filters out physiological tremors** from the hands of the surgeon or involuntary movements;
- has **four interchangeable robotic arms** mounted on a single column;
- is **compatible** with other technologies usually present in operating rooms throughout the world;
- is equipped with a **laser positioning system** which optimises the positioning of the arms according to the type of procedure selected and the position of the trocars, reducing preparation time and operative time;
- utilises **instruments with a diameter of 8 mm up to a maximum of 12 mm**, called ***Endowrist instruments*** because they allow 7 degrees of freedom (in contrast to the 4 degrees from conventional laparoscopic instruments) and almost 360°rotation;
- allows **multi-quadrant surgery**, i.e. can carry out more complex surgery by operating on organs positioned in different anatomical quadrants, with no need to reposition the patient or robot;
- has a **second console** which allows two surgeons to collaborate during the procedure, so as to increase efficiency in training and supervision and reduce the learning curve;
- allows for the best possible **training phase**: through the **virtual simulator**, training courses and Master's programme in Italy and overseas, the operator enhances their knowledge of using the da Vinci system.

In which specialities is it used?

da Vinci robotic surgery is applicable to the following specialities:

- Urology
- General Surgery
- Gynaecologic oncology
- Thoracic surgery
- Cardiac surgery
- Paediatric urology
- Benign gynaecology
- Otorhinolaryngology
- Transplant surgery

What are the benefits of da Vinci robotic surgery?

The da Vinci robotic system offers numerous advantages compared with open surgery, traditional laparoscopic surgery or the most advanced remote assisted laparoscopic surgery, both for surgeons and patients.

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The main **clinical advantages**:

- Radical oncology, i.e. removal
- Ease of access to challenging anatomies
- Excellent visualisation of anatomical findings
- More detailed visualisation of cleavage planes
- Greater precision in demolition procedures
- Greater reconstructive precision
- Option to configure the accuracy of surgeon movement (possible scales 1.5:1; 2:1; 3:1)
- Filtration of physiological tremors
- Lower operative time compared with laparoscopy

Advantages for the patient:

- Small incisions with better aesthetic results
- Less need for transfusions
- Less post-operative pain
- Reduction in length of stay, with discharge in many cases
- Faster resumption of normal activity

What is the distribution across the world and in Spain?

At the end of 2016 there were more than **3,800 da Vinci systems** for robotic surgery installed worldwide.

After the **United States**, where there are more than 2,500 da Vinci robotic systems, **Europe** represents the largest market with 644 robots. Among the EU countries, Spain and Portugal currently have **39 systems**, including 12 da Vinci Xi systems, the latest innovation of the robotic system.

From 2010, Spain and Portugal carried out more than 15,000 robotic procedures. Globally, there were approximately 750,000 procedures performed using the da Vinci robot in 2016 , an increase of more than 15% compared with the previous year. In Spain and Portugal, in 2016, more than 3000 procedures using the da Vinci robot were carried out, an **increase of 15%** compared with 2015.

More than 3000 patients have been operated on using the da Vinci, against the backdrop of 170 surgeons that use it in their medical practice, assisted by 600 anaesthetists, operatin