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### **What is a da Vinci robot?**

The da Vinci is the creation of a Californian based company named Intuitive. The technology was originally developed by the American Military in the hope of using it to deal with war casualties. The device consists of a surgical cart which supports the working arms and sophisticated camera and a console at which the surgeon sits which controls minutely every move the robotic arms make. More detailed information is available on [www.intuitivesurgical.com](http://www.intuitivesurgical.com).

### **Why is this robot especially useful for prostate cancer surgery?**

The da Vinci device functions most effectively within a confined space inside the body. Access to the pelvis, where the prostate lies at the base of the bladder, is gained through 6 small incisions through the abdominal wall. Around 4 litres of CO<sub>2</sub> gas are then used to inflate the abdominal cavity. The pressure inside the abdomen is then maintained around 15 mms of Mercury. This is enough to prevent the bleeding from veins which is usually so troublesome in prostate surgery.

### **How does robotic radical prostatectomy differ from the laparoscopic and open versions of the operation?**

Robotic radical prostatectomy for prostate cancer is performed through similar keyhole abdominal entry sites to the laparoscopic version of the operation. By contrast, the open operation requires a sizable incision which results in greater blood loss and a longer convalescence. The 10 times magnification that the da Vinci robot affords is much greater than the laparoscopic cameras and the 3 D visualisation makes the operation easier to perform and teach. The 7mm robotic arms have more degrees of freedom than the human wrist, and this facilitates the technically difficult preservation of the nerves which are important for penile erection and the anastomosis, or join, between the bladder and urethra once the prostate has been removed.

### **Do these advantages really translate into benefits for patients?**

Yes, early results suggest that they do, but remember that robotic radical prostatectomy has only been performed in the UK for just over a year. As mentioned above the major advantage is reduced blood loss and quicker recovery; however this is also true of the laparoscopic approach. The greater magnification, 3D visualisation and very precise control of the instruments probably allows better nerve sparing and a more accurate anastomosis (join). This should translate into a higher rate of post-operative potency, less stress urinary incontinence and a lower risk of scarring at the join between the bladder neck and urethra. Early data from Detroit where the robotic procedure was conceived and refined suggests that this is indeed the case.

### **Does robotic radical prostatectomy achieve adequate cancer control?**

Data from a number of US centres confirms that cancer control rates with robotic surgery, as judged by the number of cases in which tumour is present at the edge of the prostate that has been removed, is similar or even slightly superior to the open and laparoscopic techniques. With the robot it is possible to “steer” surgically very precisely away from the site of a positive biopsy or a nodule which can be felt within the prostate. Furthermore, the incidence of recurrence, as judged by the reappearance of prostate specific antigen (PSA) in the blood stream after the operation, is no different from that after the open or laparoscopic technique.