

## **Prof. M. Wirth - Robotic urological surgery**

Approximately 20 years ago, surgeons began practising a new approach to performing surgery, an approach that came to be known as minimally-invasive surgery. The surgeon operated using a standard 2D monitor instead of looking at his hands. The resulting image flattened the natural depth of vision, and the fixed-wrist instruments limited dexterity. The lack of 3D visualisation of the operative field, the poor ergonomic design, the very long, sometimes fixed instruments and reduced control were major obstacles to further progress. In the late 1990s, another evolutionary stage in the development of surgical technique was achieved with the application of micromanipulators known as “robotics” to surgical technology. The advantages of robotic assistance include increased precision, three-dimensional visualisation, a wider range of movement, and 360° manoeuvrability of the tips of the instruments through the laparoscopic ports. The device offers the ability to perform surgery while sitting at a remote console, with improved ergonomics and translation into easier intracorporeal dissection and suturing. The most advanced surgical robots currently are so-called “master-slave systems”.

Robotic-assisted visualization, dexterity, precision and control can enable a surgeon to perform a wide range of urologic procedures through small incisions including nephrectomies, pyeloplasties, ureteral reimplantations to radical prostatectomies and cystectomies.

Robotic prostatectomy is the fastest-growing treatment for prostate carcinoma. It has grown in the United States over 300% in the past three years. About 8,000 robot-assisted radical prostatectomies were performed in the United States in 2004 and more than 33,000 in 2006. Robotic radical prostatectomy is currently being offered as a viable alternative to open radical prostatectomy in the definitive management of organ-confined prostate cancer. For most patients, robot-assisted radical



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prostatectomy seems to offer substantially less pain and a much shorter recovery period than traditional prostatectomy. Other advantages include a reduced need for blood transfusions; less scarring and a lower risk of wound infection. Moreover, some studies suggest that robotic radical prostatectomy may offer improved cancer control and a lower incidence of impotence and urinary incontinence.

The largest experience of robotic radical prostatectomy was reported from Vattikuti Urology Institute in Columbia, with more than 1,100 cases. The authors from the Vattikuti Institute reported a prospective comparison of radical prostatectomy and robot-assisted prostatectomy. The operative time was comparable for open radical prostatectomy and robotic radical prostatectomy. The estimated blood loss and the need for blood transfusion differed significantly in favour of the robotic approach. The mean hospital stay was longer for open radical prostatectomy ( $p < 0.05$ ), with 93 % of patients after robot-assisted prostatectomy discharged in  $< 24$  h, while none were discharged within this time after open prostatectomy ( $p < 0.001$ ).

In the study of Farnham et al. (2006), a statistically significant difference was found in the median discharge hematocrit and the perioperative change in hematocrit, verifying that robotic radical prostatectomy is associated with less intraoperative bleeding than open radical prostatectomy.

Ahlering et al. from the University of California recently published the results of a comparison of traditional open and robotic prostatectomy by an experienced open surgeon. A total of 60 patients underwent open prostatectomy and 60 underwent robotic prostatectomy. No difference was found between the groups in terms of positive margins or continence. However, the robotic prostatectomy group had a significant advantage in terms of blood loss, hospital stay and change in haemoglobin.

Savera et al. (2006) from Detroit described a new procedure ("Veil of Aphrodite technique") that effectively preserved neurovascular bundles by performing radical prostatectomy.

In conclusion the use of robotics in laparoscopic urological surgery is an interesting and emerging technique, which seems to offer advantages to both patient and surgeon compared to normal laparoscopy. However, the costs of this new technique are high.