# *CONTINENCE, POTENCY AND POSITIVE SURGICAL MARGINS AFTER LAPAROSCOPIC RADICAL PROSTATECTOMY*

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# Abstract

Minimally invasive laparoscopic techniques have revolutionized the operational Urology and are now increasingly in a variety of indications. By contrast, it makes its technical complexity with a long learning curve and the resulting possibilities of complications of a little bit broad application.

Advances in computer technology and robotic surgery have developed new solutions to the limitations of conventional laparoscopic surgery. Technically sophisticated robot-aided surgery as the da Vinci system is designed to help the gap can be bridged between open and laparoscopic surgical technique. They have their work evaluated whether with the inexperienced laparoscopic surgeon with the use of the da Vinci system; the minimally invasive laparoscopic surgery can be made safe and relatively easy access.

***Key words:***

Robotic surgery , da vinci, cancer prostate , radical prostatectomy.

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# HISTORY OF LAPAROSCOPY

The reasonable man adapts himself to the world; the unreasonable one persists in trying to adapt the world to himself. Therefore all progress depends on the unreasonable man.
–George Bernard Shaw

***M***any authors have described the development of operative video-laparoscopic techniques as regard the change to surgery as "revolution of this century as the development of anesthesia was to the last century."[1]

The rapid technological advances and an immeasurable experience and exchange ideas in a globalized world have almost revolutionized the surgical skills in the last two decades. The progress in the development of optical systems and in the miniaturization of surgical instruments have led to an increasing shift away from the traditional open surgery techniques, to minimally invasive surgical approaches.

Urologists have taken in recent decades the technological developments in their reports and operational interventions which become more and more friendly [1]. For example, endtheirological techniques, ranging from simple Urethrocystoscopy, the Ureterorenoscopy to the transurethral and percutaneous pyeloscopic surgical procedures, range from the impossible choice to the everyday urological practice.

The development of these instrumental techniques has revolutionized the field of urology that could be dealt as a separate subject if compared to traditional open procedures as regard the benefit of patients from surgery with minimal or natural approaches. Thus, reduced postoperative pain, improved or preserved cosmetics, quicker recovery and shorter hospital stay distinct advantages in having the same safety and effectiveness [2].

The laparoscopic urological surgery began more than 30 years and has initially developed the surgical urology. However unlike endtheirological surgery or established extracorporeal shock wave lithotripsy , the laparoscopic surgical procedure, despite clear advantages in many urologic indications are considered reluctant for many surgeons being with a steep learning curve. And this even made a real breakthrough of this technology delayed for many years [3].

The beginnings of urologic laparoscopic surgeries were performed in diagnostic and ablative nature (e.g. intra-abdominal testes in search of maldescendend testis, pelvic lymphadenectomy for lymph node staging of prostate cancer). With technological advances, improved minimally invasive surgical skills and operative experience there are better results in the nephrectomy for benign renal disease,and for the radical nephrectomy for renal cell carcinoma and pyeloplasty laparoscopically [2].

Through the reports of laparoscopic radical prostatectomy late 90s by Guillonneau and Vallancien the laparoscopy finally moved into the focus of urological interest, as it was the second most common cancer of men ever to be able to treat with a minimally invasive procedure [4].

Today, there are a wide scale of the secured laparoscopic indications in benign urological diseases including for example, adrenalectomy, nephrectomy, nephrtheireterectomy, Lymphocele de-roofing, Varicocelectomy, diagnostic and therapeutic laparoscopy for cryptorchidism and pyeloplasty . The discussion of these indications in the early 90s with a lack of data available at that time was considered as a risky choice while it is now and after being a complete issue it is considered a favorable choice. The value of laparoscopic procedures in uro-oncologic diseases, however, was until recently still controversial. The available evidence now gives it privilege more than traditional surgeries in certain situations. However, laparoscopic nephrectomy, nephrtheireterectomy, cystectomy and prostatectomy can be compared with the conventional procedure with regard to functional and oncological results, although few prospective randomized clinical trials are available [2].

Compared to open surgery, laparoscopy shows significant limitations that must be overcome. Unlike in some abdominal or gynecological surgeries where are associated with frequent and relatively simple procedures and are available for acquiring basic laparoscopic techniques, on the other hand there is a lack of the corresponding indications at the urology. Thus, the learning curves in laparoscopic urological procedures are long and associated with long operative times and relative increase in rate of complications [5]. It is to be mentioned that especially complex ablative and reconstructive surgical techniques are demanding particular intracorporeal suturing and knot together with other complexes, so that advanced laparoscopic skills of the surgeon is essential.

## ***Historical development of robotic systems in urology:***

The discussion of potential advantages of surgical robotic systems began in the late 80s [7].

The hypothetical benefits were:

- improved accuracy of operations in the three-dimensional space,
- increased reproducibility
- repetitive activities,
- precise movements by scaling operations
- And the possibility of a distance (tele-surgery) to implement [1].

***Offline-systems:***

The first generation of the robotic systems was one of the offline systems. These systems are based on fixed, pre-programmed movements - based on the preoperative imaging.

In the field of urology, the first robot-assisted surgery was done using an offline system in 1988 by Davies et al. It was made using the PUMA 560 (Programmable Universal Machine for Assembly, Connecticut, Connecticut, United States) [8]. Davies defined surgical robot as a "computer-controlled manipulators with artificial perception, which can be programmed to move and hold the surgical instruments for the execution of surgical work" [9].

The second generation of the robotic system was developed by Davies at Guy's Hospital in London in 1989. [10]. This generation was first used in the field of urology in transurethral resection of the prostate which was guided befor and after by trans-rectal imaging, Although this method was proved as safe method,it never came to commercial production [11]. The first remote "telerobotc" system for use in the percutaneous Nephrolitholapaxy was founded in 1996 in Baltimore, United States, the PAKY-RCM developed by the group of Kavoussi and Stoanovici [12-16].

***Online-systems:***

Compared with the offline systems, the on-line systems depends on the surgeons, as it adapts their movements to its real-time input. So these systems could be established, as opposed to the offline systems in daily clinical application.

***Automated camera:***

The first online robots, approved by the American Food and Drug Administration (FDA) for clinical use in laparoscopic surgery was the AESOP camera robot (Automated Endoscope for Optimal Positioning System, Computer Motion Inc., Goleta, California, USA) in 1993. The first AESOP-operated model of the robot surgeon either manually or remotely via a foot pedal or handle. [17].

***Master-slave system:***

The latest development in the field of robotic surgery is the master-slave system, with which the operator has a control console remotely operating robotic arms. These systems have been developed on the labs of both the American military and NASA (North American Space Association) with the aim of soldiers or astronauts with remote robots over long distances to be able to operate. Large investments by the two organizations have finally developed the today's modern master-slave systems.

ZEUS is relatively a simple system (Computer Motion Inc., Goleta, California, USA), and has the voice-AESOP robotic camera. Two additional AESOP similar units were modified to surgical instruments. The surgeon sits away from the patients in the control console. He will have to theyar a glass that supplies a three-dimensional (3D) image . At the console the surgeon can control both the camera and the arms instruments. It also allows the surgeon to do remote operations over long distances with the help of the telecommunications system SOCRATES [17]. In September 2001, by the Caux Mare et al. From New York, USA, a transatlantic cholecystectomy in a patient in Strasbtheirg, France, laparoscopically was done using ZEUS system. [18]. In Germany, the ZEUS system introduced by Reichenspurner in 1998 in the Thoracic Surgery [19].In the urology several smaller operations were performed like laparoscopic Lymphadenectomy[20]. The ZEUS project has been discontinued. Today, the da Vinci system is the leading surgical robot in the world.

The da Vinci is a sophisticated Surgical System , it is composed of a computer protected and managed manipulator system. It is an online system that at any moment can help the operator to intervene.

It consists of 3 main components :

1st The control console which will be manipulated with support from the computer-operator, (master).

2nd is the console built visualization unit, which supplies the surgeon with a 3-D representation of the operation sites, and the 3rd is a mobile unit with 3 tripod robot arms (slave), hold the 3D endoscope (central arm) and the instruments. (Two lateral arms).

***Fig. 1 : Da Vinci control console***

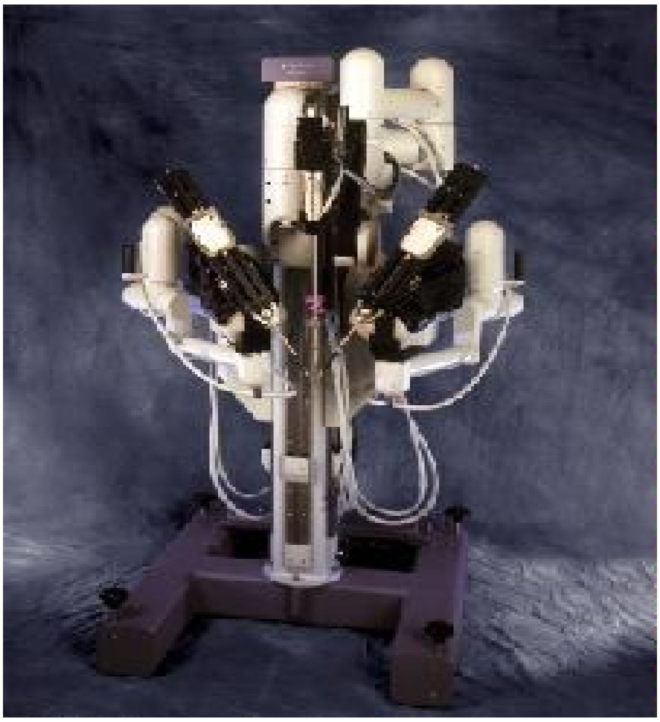

***Fig. 2: Da Vinci tripod unit***.