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Editorial

Robotic Surgery in Urology

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Robotic surgery is a minimally invasive technique that is becoming increasingly popular in urology. It is used in many procedures like radical prostatectomies, radical cystectomy, partial nephrectomy, and ureterocystoneostomy. [1] The robotics technology branch at the NASA Johnson Space Center has developed a humanoid robot called Robonaut. The word robot is derived from the Czechoslovakian robota, which means worker. A surgical robot is regarded as a computer-controlled manipulator with artificial sensing that can be reprogrammed to move and position tools to carry out a range of surgical tasks [2,3]. Further study has found by analyzing data from surgeons' early experience in Robot-Assisted Laparoscopic Radical Prostatectomy (RALP), that previous experience in laparoscopic surgery eliminated a significant learning curve in relation to oncological and functional outcomes, as well as minimizing the learning curve in relation to duration of surgery. Formal fellowship training in laparoscopic and/or robotic surgery achieves optimal outcomes for patients when surgeons are transitioning to the robotic interface. [4] Several console-based robots for laparoscopic multi- and single-port surgery are expected to come to market within the next years. The high technical standards of the four da Vinci generations have set a high standard for upcoming devices [5].

As for renal masses, based on literature, the comprehensive meta-analysis indicates that robotic partial nephrectomy delivers mostly superior, and at a minimum equivalent, outcomes compared to open and laparoscopic partial nephrectomy. Robotics has now matured into an excellent approach for performing partial nephrectomy for renal masses. [6] Other cases were reported using the da Vinci SP robotic surgical platform to determine the feasibility and safety of major urologic procedures. Patients were treated with radical prostatectomies, transperitoneal robot-assisted partial nephrectomies, cystectomy with intracorporeal ileal conduit urinary diversion, and ureteral reimplantation. The mean operative time was slightly longer than that reported for the corresponding multiarm robotic procedures in the literature, which can easily be explained by the expected learning curve. Further investigations are awaited [7]. Other authors reported that Single-Port (SP) Robot-Assisted Radical Prostatectomy (RARP) is a feasible and safe surgical option to treat localized prostate cancer. It offers possible advantages such as a small single incision, no additional ports, no Trendelenburg positioning, minimal postoperative pain and use of opioids, and same-day discharge. Further investigations need to be done to validate these advantages. [8] Novel surgical technologies such as the single-port robotic system have been recently applied in the perineal approach enhancing the experience for the operator due to instrument maneuverability and improved high-definition vision while operating through a single keyhole incision. In addition, future trials are warranted to determine the role of perineal radical prostatectomy within the field of minimally invasive urological surgery [9]. It was also found that Robot-Assisted Radical Cystectomy (RARC) with Pelvic Lymph Node Dissection (PLND) is feasible and safe using the da Vinci SP surgical system. [10] The floating docking technique is the technique of docking and port placement during single-port robotic surgery. The Floating docking technique is a simple and effective way to increase the working surgical space, especially in shallow and narrow surgical fields with a target closer than 10 cm from the skin. [11] The advantages of a single incision can be translated into preservation of the patient's body image and self-esteem and cosmesis, which have a great impact on a patient's quality of life [12]. As for ureteral lesions, robot-assisted reconstructive surgery for benign distal ureteric strictures is feasible and safe using the da Vinci SP surgical system. [13] SP platform provides a new approach to single-site laparoscopic or robotic techniques and is demonstrated as a feasible approach for several major robotic urological operations. [14] The idea of robotic intervention in medicine is not recent. In 1960 a preliminary report on robotic angiography was published. In the late 1980s, applications of robotic site stereotactic neurosurgery were explored. In the early 1990s, there were early experiences with robotic-assisted laparoscopy, and during the same period, the first "urologic" robotic system-the Robot-was described by investigators from the Imperial College in London with the purpose of performing transurethral prostate resections. French and German groups reported the first cases of robotic-assisted laparoscopic radical prostatectomy using the first-generation DaVinci system, and soon after the world's first robotic prostate cancer surgery program was established by Dr. Menon and his team in Detroit. [15] Transvesical Radical Prostatectomy

(TVRP) is an alternative approach to Extraperitoneal Radical Prostatectomy (ERP). Both single-port approaches provide patients with same-day hospital discharge and minimal pain. The TVRP approach may allow for earlier catheter removal and shorter recovery time to urinary continence, without early functional or oncological compromise [16].

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