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## Robotic surgery in ureteral reconstruction

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Urology has traditionally been a technically driven specialty. Minimally invasive surgical procedures aim to reduce collateral surgical damage while optimizing functional and oncological results. Improvement of magnification, 3D imaging, articulated instruments, depth perception, and precise motor control are prerequisites to achieve these goals. Robotic technology has overcome most of these potential limitations and presently allows challenging laparoscopic interventions, not only in a few experts' hands but also among a broad spectrum of urologists and patients who can benefit. Robot-assisted surgery presently operates on a "master–slave relationship basis," and the primary system is the Da Vinci robot (Intuitive Surgical, Sunnyvale, Calif.). Urology is the leading field in robotic surgery, with radical prostatectomy being the most often performed robotic-assisted intervention.

The paper by Sim et al. [1] presents a new unique experience using minimally invasive techniques for ureteral surgery in patients with long or multiple ureteric strictures. The technique described in the paper showed excellent results and looks very promising. Available publications concerning this topic are limited to the description of a distal ureteral reimplantation case series. In this context, the current article has a great impact for reconstructive urology. Presently, in spite of increasing popularity of minimally invasive pelvic surgery, such as laparoscopy and robotics, iatrogenic ureteric injury is still present. Moreover, this complication may also take place during ureteroscopy. The distal part of the ureter is the most commonly injured place due to its anatomical location. In the majority of cases, the ureter is injured during attempts to ligate branches of the internal iliac vessels, and the injured ureter may have an even more tenuous blood supply than usual after these maneuvers.

Impaired ureteral patency is a serious condition in which the majority of cases requires ureteral reconstruction to restore normal renal drainage. Depending on the type, timing and location of the ureteral injury, surgery options include removal

of the ligature to perform ureterocystoneoanastomosis or scrappy plastic fragment ureter bladder [2]. No doubt the length of the ureteral injury plays an important role for the determination of the most appropriate procedure for ureteral reconstruction. In fact, reimplantation by ureterocystotomy is usually indicated for short defects of 4 to 5 cm in the distal part of ureter, while larger defects need either the psoas hitch and/or Boari flap. Ureteral lesions between 6 and 10 cm could be bridged by a psoas hitch, while longer lesions of up to 15 cm can be treated by the additional performance of a Boari flap [3]. As the blood supply of the damaged distal ureteral segment may be disrupted, ureteroneocystostomy is an ideal option for distal ureteral repair [4]. However, we are often unable to perform this technique due to the complicated dissection and isolation of the isthmus of the ureter due to adhesions, urine or blood collection in abdominal or retroperitoneal cavities. The need for adequate exposure of the lesion and the subsequent management of the involved structures results in a large abdominal incision. The latter is associated with significant morbidity [3].

The majority of the papers devoted to reconstructive surgery of the upper urinary tract with the use of the da Vinci system are limited to case reports. Megan O. Schimpf et al, demonstrated a series of 11 patients with iatrogenic injury of the distal ureter who were treated with robotic ureteroneocystostomy both for isolated iatrogenic distal ureter and in combination with ureteral stricture due to different reasons, such as ureteral cancer [5]. Patil NN with colleagues presented an experience in treating 12 patients with robotic ureteral reimplantation in various medical centers [6]. A recently published report by Musch M et al., describes the largest series of 16 patients who underwent a variety of robot-assisted reconstructive surgeries on the distal third of the ureter. Among them, 6 operations were performed by the Boari technique [3].

In the Urology clinic of Moscow State University of Medicine and Dentistry, a robotic program was started in 2008 [7] and has also great deal with

reconstructive surgery of the upper urinary tract due to iatrogenic injury. Robotic surgery seems to have its greatest benefit in procedures requiring fine operative movements, where range of motion is limited, and where visibility is impeded [8]. In our opinion, due to “gentle” dissection, precision stitching in necessary structures, minimum traction and

displacement of surrounding organs and tissues, this approach allows for easy access to the exact point of the urethral lesion and implementing the direct ureterocystoneoanastomosis. That could be a strong alternative to traditional laparoscopic and open techniques [9]. Future prospective comparative controlled studies are needed.

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