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## Platinum Priority – Editorial

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# Is Robotic Kidney Transplant the Near Future?

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This issue of *European Urology* includes a systematic review of minimally invasive, laparoscopic, and robotic-assisted techniques versus open techniques for kidney transplant recipients by Wagenaar et al [1].

Our first remark on the topic is the scarce data found by the authors, as well as the low quality of the studies included in the systematic review. Thus, 18 studies were found, among which only one was a randomised controlled trial (RCT) but did not target the main question of the study of whether laparoscopic kidney transplant (LKT)/robotic kidney transplant (RKT) was superior to conventional open kidney transplant (OKT); instead, whether the incision length in OKT impacts on short and long-term outcomes was assessed. Clearly, with this low level of evidence, a meta-analysis was not feasible and therefore a systematic review was performed, applying the most advanced and precise methodology. Only weak conclusions have been made owing to the limitation of the available data. First, minimally invasive techniques showed promising results with regard to complications and recovery, and they could be considered for clinical use. Second, for open surgery, which is clearly the standard, the smallest possible Gibson incision appeared to yield the most favourable results, which is a sensible conclusion. However, a couple of remarks are warranted. A Gibson or Gibson-like incision used to be the traditional open approach, understood as an oblique incision from the symphysis in the midline and curving in a lateral and superior direction to the iliac crest. This incision, which splits the different muscle layers of the abdominal wall in the direction of the fibres, has been replaced in recent years by the pararectal hockey stick-shaped incision to allow better exposure. However, it is hampered by wall relaxation in one out of four patients and incisional hernia in one out of six [1]. As in many other

surgical procedures, the pressure on open surgeons because of the arrival of minimally invasive techniques (LKT/RKT), together with new data, like those reported by Wagenaar et al, should make us return to a small Gibson-like incision.

We would like to concentrate on the main question: LKT/RKT or OKT? The primary treatment in end-stage renal disease is kidney transplant. Therefore, the most important postoperative outcomes are graft and patient survival. Data from the studies included in the meta-analysis were not sufficient to answer the question, and they merely indicated that these techniques are promising. In brief, LKT/RKT should still be considered experimental.

The first question is whether use of minimally invasive techniques in transplant surgery makes sense. The answer is yes, for two reasons. First, it has been systematically proven that laparoscopy, whether robot-assisted or not, is less invasive than open surgery for any procedure in terms of not only the biological inflammatory response [2] but also clinical outcomes, such as less postoperative pain, early recovery, and better cosmesis [3], something that would also apply to LKT/RKT [4] in comparison to OKT. Second, patients with end-stage renal disease who are candidates for transplant are more frail than conventional patients who usually undergo laparoscopic/robotic surgery. In addition, such patients will require immunosuppressive induction and postoperative treatment using, among others, mTOR inhibitors and steroids that delay wound healing. In summary, there is important room for improvement that can be filled by LKT/RKT techniques.

Transplantation is a conservative area in terms of introducing new techniques. It took 10 yr from the first laparoscopic living donor nephrectomy in 1995 [5] until its recognition as a standard technique along with open nephrectomy according to clinical guidelines [6]. Nowadays,

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it is the technique most commonly used worldwide. Once its feasibility and safety were proven, the world experience was collected, including a few small RCTs that showed equal efficacy and less invasion, and the approach became the standard of care.

After many years of experimental work on LKT, including our own, and several attempts in a small number of patients, only one group was able to establish a stable and durable program [7]. These authors recognised the extreme difficulty of the technique and recorded loss of two grafts in their early experience. Renewed enthusiasm emerged with the arrival of robotics. Nowadays, LKT has been replaced by RKT. The use of articulated instruments, together with three-dimensional vision (already available in laparoscopy), potentially allows a reduction in warm ischaemia time (WIT) by reducing the revascularisation suture time.

The world experience is actually recent. It begun in 2009, since then more than 500 RKT procedures have been performed. However, approximately 70% of the world experience is concentrated in two Indian institutions, the Mehta Institute (Ahmedabad) and Medanta Hospital (Gurgaon) [8], with the support of the Vattikuti Urology Institute (Detroit, MI, USA) [9]. Several institutions in Europe have implemented the procedure, mainly using the Medanta technique, and a European register (ERUS) has been created that already includes 100 patients who have received a transplant.

From the European experience, including our own department, it can be said that RKT is a technique that is already systematised, is reproducible, and has yielded equivalent results to OKT in terms of graft and patient survival. As a result of the longer WIT and the probably negative effect of pneumoperitoneum, slower recovery of renal function can be observed, but there are no differences after 3 mo. Cooling of the kidney during the procedure is probably the most important unsolved problem that hampers speed in revascularising the kidney, with all the associated complications in terms of stress and quality of the sutures.

RKT allows early recovery, especially in obese patients, and better cosmesis, mainly because of the smaller incision used exclusively to introduce the kidney into the abdominal cavity. This incision can be avoided in some women by using a transvaginal approach, a route for which there is wide experience for kidney retrieval [10].

**Conflicts of interest:** The authors have nothing to disclose.

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