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INVITED COMMENTARY

Male Health

Commentary on "validation of robot-assisted vasectomy reversal"

Premsant Sangkum, Faysal A Yafi, Wayne JG Hellstrom

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Approximately 6% of men who undergo vasectomy for elective male sterilization request vasectomy reversal (VR). VR is more cost-effective than assisted reproduction techniques (ART), with cumulative pregnancy rates at least as high as with ART.[1] Microsurgical VR (MVR) is recognized as the gold standard technique with patency rates of 80%–90% and pregnancy rates of approximately 50%.[2] However, MVR requires specific microsurgical skills and has a steep learning curve, particularly for microsurgical vaso-epididymostomy. Urologists who are not fellowship-trained in microsurgery often lack the expertise to perform these procedures.

Robot-assisted VR (RAVR) benefits the surgeon in that it eliminates physiologic tremor, provides stability, scalability of motion and three-dimensional high-definition, and provides improved ergonomics, decreased surgeon fatigue, and the use of third retracting arm.[2,3] The latter aspect conceivably circumvents the need for a microsurgical trained assistant. In 2012, Parekattil *et al.* reported a patency rate of 96% in the robot-assisted group compared with 80% in a standard microsurgical group.[4] The present study by Kavoussi reported comparable patency rates between the microsurgical and robot-assisted groups (89% *vs* 92%, $P = 0.72$).[3] Furthermore, there was no statistically significant difference in mean total operative time, postoperative mean sperm concentration, and total motile counts.

There is much discussion regarding the cost-effectiveness and time requirements inherent to robotic surgery. The present study, however, reports a nonstatistical increase of only 10 min in mean operative time and an additional cost of only $315 with RAVR.

In this study, the author used a modified one layer technique for RAVR. Implementing this surgical approach may be met with some resistance by experts in the field with a strong preference for a multilayer anastomosis.[1] While the robotic system was not specifically designed for microsurgery, Santomauro *et al.* recently reported their positive experience with a two-layer anastomosis with RAVR.[5]

Trost *et al.*[6] recently performed the first intracorporeal RAVR for the treatment of bilateral vasal obstruction following bilateral inguinal hernia repairs with mesh placement. This case is relatively uncommon, and the procedure was technically challenging, but successful, with delivery of a healthy child. Intracorporeal RAVR has the advantage of bypassing the inguinal segment, which precludes the need for inguinal dissection, eliminates the risk of recurrent hernia, improves tissue quality of the anastomotic segment, and avoids a very large abdominal incision with standard microsurgical and open approaches.

The learning curve for robotic-assisted microsurgery remains unknown. To date, there have been no studies directly comparing the learning curves between MVR and RAVR. One study aimed to compare outcomes of vascular anastomosis between fully trained surgeons and midlevel surgical residents. Both groups performed standard microsurgical anastomoses and robotic-assisted microsurgical anastomoses. Both were able to master the robotically assisted procedure equally.[7] Similar to the study from Santomauro *et al.*,[5] there was no statistically significant difference in mean console time between fully-trained surgeons and residents for RAVR. As such, one may speculate that RAVR might be mastered without the advanced microsurgical skills required for MVR.

Robot-assisted VR is an intriguing area for future research and may become the standard of care for VR. For that to happen, however, large-scale prospective randomized controlled trials are needed to validate its wider adoption.

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Department of Urology, Tulane University School of Medicine, New Orleans, LA, USA.
Correspondence: Dr. WJG Hellstrom (whellst@tulane.edu)