Robotic reconstructive urology: possibilities for the urological surgeon beyond the prostate

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The rapid dissemination of robotic-assisted laparoscopic surgery into surgical practice over the past five years has been startling. Urology has been quick to develop robotic-assisted techniques, particularly in the treatment of localised prostate cancer, where large series with excellent outcomes have been reported.\(^1\) The UK currently has 23 da Vinci (Intuitive Surgical, Sunnyvale, CA, USA) surgical systems, with several more planned, and most are primarily used to perform robotic-assisted radical prostatectomy (RARP). However, there are a growing number of other reconstructive urological procedures facilitated by this robotic system, which, although less numerous and thus potentially less financially rewarding than RARP, may also have huge patient benefits.

The da Vinci system is ideally suited to reconstructive procedures due to its ability to permit straightforward, efficient and dextrous suturing. The seated console surgeon is in a comfortable ergonomic position, with three-dimensional stereoscopic vision, tremor filtered, and can use the increased degrees of freedom provided by the Endowrist (Intuitive Surgical) technology. Laparoscopic suturing becomes enjoyable again rather than arduous and although requiring dedicated training, this skill is not limited to those with exceptional laparoscopic skills.

As robotic surgery has become part of mainstream urology, trainees are increasingly keen to learn its techniques. Despite advocating the introduction of an established UK training programme in robotics in 2004,\(^2\) currently few centres are able to offer significant console time to trainees due to the immaturity of individual robotic programmes. With no

Figure 1. The divisions in urological robotic reconstructive techniques
COMMENT

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Laparoscopic partial nephrectomy (LPN) requires advanced suturing skills that many urologists will not achieve outside of dedicated fellowship programmes combined with significant natural talent. As a result, LPN has struggled to gain universal acceptance due to concerns about prolonged warm ischaemic times and the potential for postoperative haemorrhage.

The combination of the precise suture placement possible with the da Vinci system and its ability to facilitate the straightforward and elegant technique of Hem-o-Lok (Teleflex Medical, Research Triangle Park, NC, USA) sliding clip renorraphy has generally overcome these concerns. In this technique, Hem-o-Lok clips are placed on several polyglactin (Vicryl) sutures across the renal defect. The initial clips are slid down the sutures until tightly apposed to the renal parenchyma allowing tension adjustment (sliding). After this, secondary clips are applied to lock the initial clips, achieving a highly reliable and reproducible haemostatic closure.

RAPN is the fastest growing robotic procedure worldwide. It has the considerable advantage over LPN of a shallower 'learning curve' and the ability to permit less experienced surgeons to perform the procedure safely and efficiently. In particular, robotic assistance has made tumour excision and intracorporeal reconstruction easier.

OTHER ROBOTIC-ASSISTED RECONSTRUCTIVE PROCEDURES

Once familiar with the robotic approach and theatre set-up, a range of other less common reconstructive procedures can be done that also benefit from precise suturing techniques. These include diverticulectomy for symptomatic bladder diverticula, ureteric reimplantation after iatrogenic injury and ureterolithotomy for large ureteric calculi where other endoscopic techniques may have failed, and to perform sacrococcygectomy.

CONCLUSION

Robotic-assisted reconstructive urological surgery is developing rapidly and the da Vinci robot should not be viewed as a device for performing RARP alone, as a wide spectrum of urological and other procedures can benefit from robotic assistance. Although financially challenging to purchase a robotic system specifically for reconstructive indications, robots in situ can be made to...

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work harder over a wider range of urological pathology. As centres increase their experience with robotic operating, they should diversify their range of procedures. This will improve robotic and laparoscopic skills, provide improved training opportunities within the less demanding cases and benefit patients hugely.

ACKNOWLEDGEMENTS
Prokar Dasgupta acknowledges financial support from the Department of Health via the National Institute for Health Research (NIHR) comprehensive Biomedical Research Centre award to Guy’s and St Thomas’ NHS Foundation Trust in partnership with King’s College London and King’s College Hospital NHS Foundation Trust. He also acknowledges the support of the MRC Centre for Transplantation.

Declaration of interests: none declared.

REFERENCES