



Step-by-step optimisation of robotic-assisted radical prostatectomy using augmented reality

Jonathan Noël¹, Marcio Covas Moschovas¹, Ela Patel¹, Travis Rogers¹, Jeffrey Marquinez¹, Bernardo Rocco², Alexandre Mottrie³, Vipul Patel¹

¹ AdventHealth Global Robotics Institute, Urology, Celebration, United States of America; ² Università degli Studi di Milano, Urology, Milan, Italy; ³ OLV Hospital ORSI Academy, Urology, Melle, Belgium

ABSTRACT

Introduction: Surgical training will be complemented by digitalisation, as the COVID 19 pandemic continues (1). Proximie is an augmented reality (AR) platform that can display up to 4 native camera views, with live or semi live telementoring. It can optimise ergonomics of the surgeon at the console (2), and robotic instrument orientation. We describe the utilisation of Proximie as a step-by-step guide in a robotic assisted radical prostatectomy (RARP).

Surgical Technique: Author V. P. performed a transperitoneal multiport da Vinci Xi RARP with the Proximie platform: a laptop computer, multiple HD webcams, microphones and speakers. Using an HDMI cable to the Intuitive Surgical tower, output display from the console and an additional laparoscopic tower is shown. Each webcam was mounted to the side armrests of the console, directed at the surgeon's hands. An independent 'drop in' laparoscope via an additional 5mm left upper quadrant port was utilised. Observers can visualise the AR platform's recordings on a laptop and/or smartphone. A PTZ (pan-tilt-zoom) camera can capture the operating room, bedside assistant, ports and patient position. Our video demonstrates three of four camera views for posture, forearm, wrist, hand, and finger orientation, relative to the translated robotic steps. A pincer grasp of the endowrist manipulator during anastomosis allows optimal robotic wrist rotation. The second laparoscopic camera view demonstrated intracorporeal angles of robotic arm and bedside assistant's instrument position for critical steps such as nerve sparing and anastomosis (3). The console time was 100 minutes, no intraoperative complications, or delay in image transmission occurred with utilising the platform.

Considerations: An AR platform can create deeper learning for RARP in real time or recorded sessions. Two-way verbal and visual communication with ability to annotate on screen, allows long distance mentoring. The platform's utility can be accessed in anywhere, to project surgeons beyond their immediate environment. This allows for democratisation of access to high volume institutions and their evolution of techniques (4), to assist patients globally. Potential developments are artificial intelligence (AI) networks analysing repository of such recorded data, to identify intraoperative hand motion and robotic instrument tracking. AR is a pertinent building block to enhance robotic training, skill dissemination, precision medicine (5) and surgery overall.

CONFLICT OF INTEREST

None declared.

REFERENCES

1. Karim JS, Hachach-Haram N, Dasgupta P. Bolstering the surgical response to COVID-19: how virtual technology will save lives and safeguard surgical practice. *BJU Int.* 2020;125:E18-E19.
2. Wee IJY, Kuo LJ, Ngu JC. A systematic review of the true benefit of robotic surgery: *Ergonomics. Int J Med Robot.* 2020;16:e2113.
3. Fossati N, Di Trapani E, Gandaglia G, Dell'Oglio P, Umari P, Buffi NM, et al. Assessing the Impact of Surgeon Experience on Urinary Continence Recovery After Robot-Assisted Radical Prostatectomy: Results of Four High-Volume Surgeons. *J Endourol.* 2017;31:872-7.
4. Bhat KRS, Moschovas MC, Onol FF, Rogers T, Reddy SS, Corder C, et al. Evidence-based evolution of our robot-assisted laparoscopic prostatectomy (RALP) technique through 13,000 cases. *J Robot Surg.* 2021;15:651-60.
5. Brodie A, Dai N, Teoh JY, Decaestecker K, Dasgupta P, Vasdev N. Artificial intelligence in urological oncology: An update and future applications. *Urol Oncol.* 2021;39:379-99.

Submitted for publication:
Janeiro 03, 2022

Accepted:
Janeiro 05, 2022

Published as Ahead of Print:
Janeiro 12, 2022

Correspondence address:

Jonathan Noël, MD
AdventHealth Global Robotics Institute,
Urology, Celebration
FL, United States of America
E-mail: dr.jnoel@gmail.com

ARTICLE INFO

 **Jonathan Noel**

<https://orcid.org/0000-0003-3404-993X>

Available at: http://www.intbrazjurol.com.br/video-section/20229910_Noel_et_al
Int Braz J Urol. 2022; 48 (Video #10): 600-1