



## Robotic Colorectal Surgery Advance or Expense?

Rahila Essani, MD<sup>1</sup>, Roberto Bergamaschi, MD, PhD, FRCS\*

Division of Colon & Rectal Surgery, State University of New York, Nichols Road, Stony Brook, NY 11794-819, USA

### Keywords

- Robotic colorectal surgery • Colorectal surgery • Laparoscopic colorectal surgery
- Hand-sewn ileocolic anastomoses • Rectal cancer
- Circumferential resection margin • Quality of total mesolectal excision

### Key points

- Robotic colorectal surgery offers most of the advantages of laparoscopy with additional increased features, particularly in colorectal surgery.
- The current disadvantages of robotic colorectal surgery include high cost, large size, complex setup, limited range of surgical field, and the lack of haptic interface.
- The cost may make up for the clinical advantages it provides in terms of improved circumferential resection margin in rectal cancer surgery as well as the ability to facilitate intracorporeal hand-sewn bowel anastomosing.

## INTRODUCTION

The introduction of robotic surgery has been slow, and the use of robots to assist in performing surgical tasks has been developing over the past 20 years. Colorectal surgery in the era of laparoscopy presents a few unique challenges, such as difficulty of operating in the confines of a narrow bony pelvis, particularly in obese men with radiated low rectal cancer.

Furthermore, performing intracorporeal ileocolic anastomosis laparoscopically is technically difficult and has never been broadly implemented with

---

The authors have nothing to disclose.

<sup>1</sup>Present address: 116 Vista Lane, Georgetown, TX 78633.

\*Corresponding author. Division of Colon & Rectal Surgery, State University of New York, Health Science Center T18, Suite 046B, Stony Brook, NY 11794-8191. *E-mail address:* rcMBERGAMASCHI@gmail.com

the exception of a few centers. Similarly, the urologic community has embraced robotic surgery to circumvent the difficulties of laparoscopic hand-sewn urethra-vesical anastomosis. Robots are defined as “a machine capable of automatically carrying out a complex series of movements, especially one which is programmable” (Oxford Dictionary). Thomas Sheridan, the “Father of automation and robotics” from the Massachusetts Institute of Technology used automation and robotics interchangeably: “Automation includes all those things that computers and machines can do to perform tasks for people faster, more accurately, and more efficiently (in terms of time, resources, and human labor) than if they were done directly by people.” Robots have been used in many industries such as manufacturing cars, planes, and computers for many decades. Robots do not tire and operate at a level of precision and accuracy with dedicated motions scalable in speed and force unreachable for human beings [1]. Although this technology is not new to the operating room, there are several factors that differentiate the adoption process of current robots and their use from the other surgical technologies. Currently, there is only one dominant company that produces and sells a surgical robot. Both purchasing and operation of these robots is expensive, making the robotic platform unaffordable for most hospitals. The cost of the robot is around \$1.65 to \$2 million; disposable robotic instruments cost \$2000 each as well as the yearly maintenance cost \$150,000 [2]. Furthermore, the various vessel sealers and staplers used widely in laparoscopic surgery are incompatible with the current robot platform, leading to the need to either invest in these instruments or have an assistant by the patient’s side to perform this task. In addition, because of the depreciation over 5 years with 150 procedures a year, the robotic system is 2.7 times more expensive [3]. It has been highlighted that caution needs to be taken when interpreting costs because it may differ significantly between hospitals [4]. Different health care systems between countries will also have an impact on costs. However, maximizing the use of the robot by different surgical subspecialties within the hospital might increase savings to the overall running costs. A bias of all of the cost studies is that all cost assumptions were largely based on operating time and depreciation of the robotic system calculation [4]. Despite the increase in cost, robotic systems offer most advantages of laparoscopic surgery with additional features particularly useful in colorectal surgery.

### **OPERATING IN CONFINES OF NARROW BONY PELVIS**

Robotic rectal surgery has potential advantages over laparoscopic rectal surgery: increased degree of freedom (DOF) of the operating instruments, surgeon motion filter for tremor-free surgery, high-definition 3-dimensional (3D) images, and surgeon-controlled camera on a stable platform. One important limitation of laparoscopic surgery is the loss of 2 of the 6 movements of the surgeon’s hands. In fact, there are concerns that laparoscopic proctectomy may decrease the width of the radial margin as a result of restricting movements of the surgeon’s hand when performing proctectomy for cancer in a

Download English Version:

<https://daneshyari.com/en/article/4277237>

Download Persian Version:

<https://daneshyari.com/article/4277237>

[Daneshyari.com](https://daneshyari.com)