

# Health Technology Assessment of Robot-Assisted Versus Laparoscopic Low Anterior Resection for Middle and Low Rectal Cancer: A Prospective Cohort Study

Xufeng Hu<sup>1</sup>,Ziting Wu<sup>1</sup>, Zerong Cai<sup>2</sup>, Beini Lyu<sup>1</sup>, Gordon G. Liu<sup>1</sup>

1.Institute for Global Health and Development, Peking University, Beijing, Beijing, China.2.Colorectal Surgery, the Sixth Affiliated Hospital of Sun Yat-sen University; Guangdong Provincial Institute of Gastroenterology; Guangdong Provincial Key Laboratory of Colorectal and Pelvic Floor Diseases, Guangzhou, GuangDong, China.

## INTRODUCTION

- **Laparoscopic surgical robots** have been widely used in clinical fields, particularly in colorectal cancer surgery.
- Compared to traditional surgical methods, **robot-assisted surgery** has the advantages of clearer vision and more precise operation, albeit at a higher cost.
- Colorectal cancer is one of the most common malignant tumors of the digestive tract in China.
- To date, **low anterior resection** is the most widely performed sphincter-preserving operation.

## OBJECTIVE

- Evaluate the differences in clinical efficacy and health outcomes between **robot-assisted surgery and traditional laparoscopic/open abdominal surgery**.
- Assess the economic costs from various aspects, including **direct medical costs, direct non-medical costs, and indirect costs, during the observation period of the study**.
- Compare the **cost-effectiveness** of different types of surgery from a societal perspective.

## RESEARCH DESIGN

- A nationwide multicentre prospective cohort study.
- The subject population of this study consists of patients with rectal cancer who undergo radical low anterior resection surgery, with surgical methods including surgical robots, traditional laparoscopy, or open surgery.
- The study plans to enroll 1,200 patients, with 540 patients in each of the **robotic surgery group** and **laparoscopic surgery group**, and 120 patients in the **open surgery group**.

## METHOD

- The study will enroll patients aged **18-75 years old** and undergone radical anterior resection for mid-low rectal cancer (**RAS, laparoscopic, or open surgery**).
- Patients will be followed for **3 years**, with follow-up every 3 months during the first year and **every 6 months in 2nd and 3rd year**.
- Demographic, socioeconomic status, lab tests, and oncologic characteristic will be collected.

- Outcome Indicators:**
- **Clinical Indicators:** Operating time.Length of hospital stay Complications, Blood loss,30-day readmission rate after surgery,30-day mortality rate after surgery,Positive rate of circumferential resection margin, Success rate of anal sphincter preservation
  - **Health Outcome Indicators:** Recurrence-free survival,Overall survival
  - **Quality of Life Indicators:** EQ-5D-5L European Quality of Life Questionnaire,Amsterdam Preoperative Anxiety and Information Scale
  - **Resource Consumption Indicators:** Direct medical costs,Direct non-medical costs,Indirect costs
  - **Physician Comfort Indicators:** Work comfort and workload evaluation scale.



Distribution of each sub center.

## RESEARC PROGRESS

The first patient has been enrolled in the study.  
follow-up schedule:

| Follow-up survey:From 1 to 36 months after surgery,the follow-up indicators were as follows: |   |   |   |   |    |    |    |    |
|----------------------------------------------------------------------------------------------|---|---|---|---|----|----|----|----|
| Follow-up indicators                                                                         | 1 | 3 | 6 | 9 | 12 | 18 | 24 | 30 |
| Health outcome                                                                               | √ | √ | √ | √ | √  | √  | √  | √  |
| quality of life                                                                              | √ | √ | √ | √ | √  | √  | √  | √  |
| direct medical costs                                                                         |   |   | √ |   | √  | √  | √  | √  |
| direct non medical costs                                                                     | √ | √ | √ | √ | √  | √  | √  | √  |
| indirect cost                                                                                | √ | √ | √ | √ | √  | √  | √  | √  |
| Satisfaction with diagnosis and treatment                                                    |   |   | √ |   | √  | √  | √  | √  |
| Personal/family socioeconomic information                                                    |   |   |   |   | √  |    | √  |    |

## REFERENCES

● Hu KY, Wu R, Szabo A, Ridolfi TJ, Ludwig KA, Peterson CY. Laparoscopic Versus Robotic Proctectomy Outcomes: An ACS-NSQIP Analysis. J Surg Res 2020; 255: 495-501.

● Chen ST, Wu MC, Hsu TC, et al. Comparison of outcome and cost among open, laparoscopic, and robotic surgical treatments for rectal cancer: A propensity score matched analysis of nationwide inpatient sample data. J Surg Oncol 2018; 117(3): 497-505.

● Shi JF, Wang L, Ran JC, et al. Clinical characteristics, medical service utilization, and expenditure for colorectal cancer in China, 2005 to 2014: Overall design and results from a multicenter retrospective epidemiologic survey. Cancer 2021; 127(11): 1880-93.

● Quijano Y, Nuñez-Alfonse J, Ielpo B, et al. Robotic versus laparoscopic surgery for rectal cancer: a comparative cost-effectiveness study. Tech Coloproctol 2020; 24(3): 247-54.

● Feng Q, Yuan W, Li T, et al. Robotic versus laparoscopic surgery for middle and low rectal cancer (REAL): short-term outcomes of a multicentre randomised controlled trial. Lancet Gastroenterol Hepatol 2022; 7(11): 991-1004.

● Jayne D, Pigazzi A, Marshall H, et al. Efficacy and Mechanism Evaluation. Robotic-assisted surgery compared with laparoscopic resection surgery for rectal cancer: the ROLARR RCT. Southampton (UK): NIHR Journals Library; 2019.

● Simianu VV, Curran T, Gaertner WB, et al. A Cost-Effectiveness Evaluation of Surgical Approaches to Proctectomy. J Gastrointest Surg 2021; 25(6): 1512-23.

● Zhang C, Liu X, Hu T, Zhang F, Wang Z. Development and psychometric validity of the Perioperative Anxiety Scale-7 (PAS-7). 2020.

● Gordon, G., Liu, et al. Chinese Time Trade-Off Values for EQ-5D Health States. Value in Health 2014.