International Platform of Registered Systematic Review and Meta-analysis Protocols

INPLASY

Predictive model for the risk of developing low anterior resection syndrome after rectal cancer surgery: a systematic review and meta-analysis

INPLASY202580080
doi: 10.37766/inplasy2025.8.0080
Received: 26 August 2025
Published: 26 August 2025

Wang, YL; Zhang, C; Li, YJ; Zhao, XL; Huang, MJ.

Corresponding author:
Wang Yaolan

wyl202125@163.com

Author Affiliation:
West China school of nursing, SIchuan university.

ADMINISTRATIVE INFORMATION

Support - No.

Review Stage at time of this submission - Data extraction.

Conflicts of interest - None declared.

INPLASY registration number: INPLASY202580080

Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 26 August 2025 and was last updated on 26 August 2025.

INTRODUCTION

Review question / Objective To systematically evaluate risk prediction models for LARS after rectal cancer surgery and conduct a meta-analysis of the predictive performance and predictive factors of these models, thereby providing evidence-based guidance for the selection and application of LARS risk prediction models in clinical practice.

Condition being studied Low anterior resection syndrome (LARS) refers to intestinal dysfunction such as frequent bowel movements and urgency experienced by rectal cancer patients after sphincter-preserving surgery. LARS has a high incidence rate (48%–82.6%) and long duration (4–15 years), significantly impacting patients' quality of life. Identifying high-risk populations for LARS is crucial for prevention and intervention. While existing studies have established various predictive models for LARS, there is a lack of systematic summarization and comparative evaluation of these models.

METHODS

Search strategy Databases: PubMed、Web of Science、Embase、Cochrane Library、Scopus、CINHAL、CNKI、CBM and WangFang Data.
Terms: ((Topic: rectal cancer OR colon cancer OR colorectal cancer OR rectal neoplasms OR colon neoplasms OR colorectal neoplasms OR rectal tumor OR colon tumor OR colorectal tumor) AND (anus-preserving operation OR After low anterior resection OR postoperative)) AND (Topic:Low anterior resection syndrome OR intestinal dysfunction OR intestinal symptoms OR defecation dysfunction OR LARS) AND (Ttopic:Risk prediction model OR risk prediction score OR prediction model OR risk prediction OR risk model OR prediction tool OR nomogram OR risk factors).

Participant or population Patients with rectal cancer after anus-preserving surgery.

Intervention Established a predictive model.

Comparator Not applicable.

Study designs to be included Cohort studies, cross-sectional studies, and case-control studies.

Eligibility criteria Inclusion criteria: ① Study population: Patients who underwent sphincter-preserving surgery for rectal cancer; ② Study content: Development, validation, and evaluation of a predictive model for the risk of LARS occurrence in patients who underwent rectal cancer surgery; ③ Outcome measure: Occurrence of LARS; ④ Study Types: Including cohort studies, cross-sectional studies, and case-control studies; Exclusion Criteria: ① Studies that only reported risk factors without constructing a model; ② Models with fewer than 2 predictive factors; ③ Non-English or non-Chinese language literature; ④ Literature where the full text is unavailable; ⑤ Duplicated publications; ⑥ Conference abstracts, reviews, etc.

Information sources Databases: PubMed、Web of Science、Embase、Cochrane Library、Scopus、CINHAL、CNKI、CBM and WangFang Data.

Main outcome(s) The occurrence of low anterior resection syndrome (LARS score greater than or equal to 21 points).

Data management We develope a checklist for critical appraisal and data extraction for systematic reviews of prediction modeling studies (CHARMS) based on the prediction model. CHARMS) to extract data, including first author, publication year, country, study design, study type, study population, data source, follow-up period, candidate variables, sample size, missing data, modeling method, model presentation format, model performance, validation method, and final included predictive factors.

Quality assessment / Risk of bias analysis Two researchers independently assess the risk of bias and applicability of the included studies and cross-checked the results. In case of disagreement, a third researcher will be consulted to reach a consensus. The risk of bias and applicability will be assessed using the Prediction Model Risk of Bias Assessment Tool (PROBAST).

Strategy of data synthesis We will primarily use descriptive statistical analysis to describe the model construction, performance, and predictive factors. Then, we use the metafor and metamisc packages in R Studio 4.4.3 to conduct a meta-analysis of the model's predictive performance and predictive factors. The significance level (α) for the meta-analysis is set at 0.05.

The meta-analysis of predictive performance primarily includes model discrimination (assessed using the C-index/AUC) and model calibration (assessed using the O:E ratio, i.e., the ratio of observed events to predicted events). A C-index/AUC 0.8 indicates good discrimination. An O:E = 1 indicates that the actual observed values are completely consistent with the predicted values, indicating accurate model prediction. An O:E > 1 indicates that the actual results are higher than the predicted values, suggesting the model may have underestimated the risk. An O:E < 1 indicates that the actual results are lower than the predicted values, suggesting the model may have overestimated the risk.

Subgroup analysis Subgroup analyses will be conducted based on study design (model development and validation), prediction timeframe (6 months post-surgery vs. 1 year post-surgery), and algorithm type (traditional statistical models vs. machine learningmethods).

Sensitivity analysis Sensitivity analyses will be performed using the stepwise exclusion method.

Country(ies) involved China.

Keywords rectal cancer, low anterior resection syndrome, risk prediction model, systematic review, meta-analysis.

Contributions of each author

Author 1 - Wang Yaolan.
Email: wyl202125@163.com
Author 2 - Zhang Chun.
Author 3 - Li Yujie.
Author 4 - Zhao Xinglei.
Author 5 - Huang Mingjun.