


BMJ Open Robotic versus laparoscopic gastrectomy for gastric cancer: protocol for umbrella review of systematic reviews and meta-analyses

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ABSTRACT

Introduction Laparoscopic surgery has been adopted in some parts of the world as an innovative approach to the resection of gastric cancers. However, in the modern era of surgical oncology, to overcome intrinsic limitations of the traditional laparoscopy, the robotic approach is advocated as able to facilitate the lymph node dissection and complex reconstruction after gastrectomy, to assure oncologic safety also in advanced gastric cancer patients. Previous meta-analyses highlighted a lower complication rate as well as bleeding in the robotic approach group when compared with the laparoscopic one. This potential benefit must be balanced against an increased time of intervention. The aim of this umbrella review is to provide a comprehensive overview of the literature for surgeons and policymakers in order to evaluate the potential benefits and harms of robotic gastrectomy (RG) compared with the laparoscopic approach for gastric cancer.

Methods and analysis We will perform a comprehensive search of the PubMed, Cochrane and Embase databases for all articles published up to May 2019 and reference list of relevant publications for systematic review and meta-analyses comparing the outcomes of RG and laparoscopic gastrectomy in patients with gastric cancer. Studies will be selected by two independent reviewers based on prespecified eligibility criteria and the quality will be assessed according to AMSTAR (A MeaSurement Tool to Assess systematic Reviews) checklist. All information will be collected using piloted and standardised data-extraction forms in DistillerSR developed following the Joanna Briggs Institute's recommended extraction items.

Ethics and dissemination This umbrella review will inform clinical and policy decisions regarding the benefits and harms of RG for treating gastric cancer. The results will be disseminated through a peer-reviewed publication, conference presentations and the popular press. Formal ethical approval is not required as primary data will not be collected.

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INTRODUCTION

Standard gastrectomy with D2 lymphadenectomy is the recommended surgical procedure for resectable gastric cancer (GC) patients so far.¹ D2 procedure is recommended as

Strengths and limitations of this study

- This will be a comprehensive review assessing the reliability of current evidence on robotic surgery in the management of gastric cancer compared with laparoscopic approach.
- This protocol was designed following Joanna Briggs Institute's guidelines for umbrella reviews and reported following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses statement.
- The results will affect clinical and policy decisions regarding the benefits and harms of robotic gastrectomy for treating gastric cancer.
- Exclusion of papers not published in English may represent a limitation of this study.

the standard of surgical treatment with curative intent by the Japanese, Korean, Italian, German and British national guidelines, by the European Society for Medical Oncology (ESMO) guidelines, as well as the joint ESMO—European Society of Surgical Oncology—European Society of Radiotherapy and Oncology guidelines.² During the last decades, several studies have provided evidence that laparoscopic surgery for GC is technically safe and that it yields better short-term outcomes than conventional open gastrectomy for early-stage GC.^{3–12} However, a safer D2 spleen-preserving laparoscopic gastrectomy (LG) for the treatment of advanced GC did not meet the same success and is currently available only in high-volume centres. Technical difficulties due to total gastrectomy procedure as well as D2 lymphadenectomy, entailing the removal of node stations along the celiac trunk, left gastric artery and hepatic pedicle, are advocated as limiting factor of laparoscopic surgery diffusion.^{13 14} In the modern era of surgical oncology, to overcome some intrinsic limitations of the traditional laparoscopy, robotic

approach is advocated by some authors as able to facilitate complex reconstruction after gastrectomy and the lymph node dissection, so as to assure oncologic safety also in advanced GC patients.^{15–17} Since the first report of robotic gastrectomy (RG) by Hashizume and Sugimachi,¹⁸ many observational studies have reported the effectiveness and safety of RG.^{19–23} Previous meta-analyses^{24–26} highlighted a lower complication rate as well as bleeding in the robotic approach group when compared with the laparoscopic one. This potential benefit must be balanced against an increased time of intervention.

Aim

Surgeons and policymakers require a comprehensive overview of the depth and strength of the scientific evidence in order to evaluate the potential benefits and harms associated with the RG for GC. To this end, we will perform a comprehensive umbrella review to collect and assess information from previous systematic reviews that have compared the laparoscopic with RG. We will seek to answer the following question using the findings of high-quality systematic reviews: What are the benefits and harms of RG compared with laparoscopic approach? Umbrella reviews are syntheses of existing systematic reviews and/or meta-analyses providing an ideal method to comprehensively review the evidence base and to explore the contradictory findings of previous reviews.²⁷ Since a number of previous systematic reviews on this topic are available and timely evidence is required to inform scientific community, undertaking a de novo systematic review would not be appropriate. An umbrella review design will allow us to explore the reasons for discrepant findings in previous systematic reviews and to provide clinicians and policymakers with evidence in a timely manner.

METHODS AND ANALYSIS

This umbrella review was designed using the methodology guidelines for umbrella reviews provided by the Joanna Briggs Institute.²⁷ As well, we followed the Preferred Reporting Items for Systematic review and Meta-Analyses guidelines and the extension for protocols.²⁸

Search strategy

We will search for systematic review and meta-analysis comparing the outcomes of RG and LG in patients with GC. A literature search will be conducted in PubMed, Cochrane and Embase databases for all articles published up to May 2019 with the Medical Subject Headings (MeSH) and keywords ‘gastrectomy’, ‘gastric cancer’, ‘gastric adenocarcinoma’, ‘robotic’, ‘laparoscopic’, ‘systematic reviews’. The key words will be used in all possible combinations to obtain the maximum number of articles. The ‘related article’ function from PubMed will be used to further identify potential articles that were eligible for inclusion in the review. The bibliography of all selected articles will be hand searched to identify additional articles that met our inclusion criteria.

Inclusion criteria

We set the inclusion criteria for this umbrella review according the population, intervention, context, outcome format²⁹ :

Population: Adult patients with diagnosis of resectable GC.

Intervention: Robotic total/subtotal gastrectomy with curative intent.

Comparison: Laparoscopic total/subtotal gastrectomy with curative intent.

Outcomes: The primary outcome of interest will be the short-term outcomes of robotic surgery compared with laparoscopic approach in terms of operation time, blood loss, number of harvested lymph nodes and length of hospital stay. Additionally, overall survival for patients submitted to robotic approach compared with laparoscopic approach will be a secondary aim.

All outcomes will be assessed based on the definitions applied in the selected meta-analyses. Studies will not be included or excluded on the basis of reported outcomes.

Study designs

Systematic evidence syntheses that included retrospective as well as prospective studies compared different surgical outcomes following RG or LG will be eligible for inclusion. To be eligible for inclusion, studies must be adhered to a systematic process to the literature search and study selection. Studies must report the data separately for the robotic and laparoscopic groups. Only meta-analyses in English language will be used during the screening or study-selection process.

Study selection

The eligibility criteria will be applied to each title and abstract identified in the literature search by two independent reviewers (LM and DF) in a standardised procedure. All records identified by at least one author as potentially relevant will be obtained in full-text format. The eligibility criteria will then be applied to the full-text records, and a final decision will be made for inclusion. Conflicts will be resolved by discussion.

Quality assessment

Two independent reviewers (LM and DF) will assess the quality of the included studies using the appropriate AMSTAR (A MeaSurement Tool to Assess systematic Reviews)³⁰ checklist, and any disagreements will be resolved by consensus. Any included reviews that do not meet these minimum requirements will remain excluded: use of a comprehensive search strategy involving two or more electronic databases; use of an explicit statement describing the inclusion criteria applied to patient groups; use of a formal critical appraisal or quality assessment process for all included studies and report the outcome of that process; report findings on outcomes of interest using details on the study and patient characteristics of two or more studies and provide the direction of the findings from any pooled analyses (narrative or

meta-analysis) carried out, including direction of effect and any statistical significance. In the event that included reviews report significantly overlapping lists of included studies reporting the same outcome(s), we will report findings from every studies.

Data collection

Data were extracted by two authors, who independently reviewed and screened all eligible studies for content according to the inclusion criteria above indicated. Any disagreements will be resolved by consensus when possible; otherwise, the judgement of a third reviewer will be considered final. Data recorded included: study design, review method, country of origin, year of publication, sample size, demographic features, clinicopathological characteristics, total number of patients assessed in survival analysis, total number of retrieved lymph nodes, median or mean duration of follow-up and overall survival outcomes. We will extract the effect estimates for the outcomes of interest for the whole population, as well as the method of synthesis (eg, meta-analysis and network meta-analysis). The authors' overall conclusion or recommendation will also be extracted.

All informations will be collected using piloted and standardised data abstraction forms in DistillerSR, an online systematic review software. Extraction forms will be developed following the Joanna Briggs Institute's recommended extraction items.²⁷

Data summary

The aim of this umbrella review is to present a summary of the existing research syntheses addressing the comparison between RG and LG for GC. The findings will be summarised from the most recent high-quality systematic reviews using a narrative approach. A tabular summary of review characteristics (year of publication, country of origin, number of included studies, setting and/or context and interventions) will be provided. Outcome data will be summarised with respect to the number of included studies, number of participants, effect estimates and heterogeneity. Strengths and limitations of the included studies, as assessed by AMSTAR, will also be presented.

Patient and public involvement

Patients and or public were not involved for this study protocol.

DISSEMINATION

In this umbrella review, we will undertake a comprehensive overview of the literature in order to evaluate the potential benefits and harms of RG compared with the laparoscopic approach for GC. The results of our review will be of interest to surgeons and policymakers. Our data will be disseminated through a peer-reviewed publication, conference presentations and the popular press. Formal

ethical approval is not required as primary data will not be collected.

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Contributors LM and FR conceived the study. LM drafted the protocol manuscript. DF, VS, LV, DM, AN and FR revised the manuscript for important intellectual content as well as contributed to the methodology including search strategy, study selection, data extraction and data analysis. FR is the clinical lead and DM is the guarantor of the review.

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