INPLASY PROTOCOL

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The authors declare that there are no conflicts of interest regarding this study.

Preoperative computed tomography-assessed sarcopenia as a predictor of complications and long-term prognosis in patients with colorectal cancer: a systematic review and meta-analysis

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Review question / Objective: **The relationship between computed tomography (CT)-assessed sarcopenia and colorectal cancer (CRC) prognosis varies in different studies. This systematic review aimed to examine the impact of postoperative CT-assessed sarcopenia on complications and long-term survival in CRC patients.**
Information sources: **The PubMed, Web of Science, Cochrane Library, and Embase databases were searched for relevant literature up to September 10, 2020. Data and characteristics for each study were extracted.**

INPLASY registration number: This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 06 December 2020 and was last updated on 06 December 2020 (registration number INPLASY2020120033).

INTRODUCTION

Review question / Objective: **The relationship between computed tomography (CT)-assessed sarcopenia and colorectal cancer (CRC) prognosis varies in different studies. This systematic review aimed to examine the impact of postoperative CT-assessed sarcopenia on complications and long-term survival in CRC patients.**

Condition being studied: Colorectal cancer (CRC), one of the most common gastrointestinal cancers, has a high incidence and mortality rate, with an estimated incidence of 1.8 million cases (10.2% of all new cases) and a mortality of 861, 000 cases (9.2% of all cancer deaths) globally in 2018. Sarcopenia is a syndrome characterized by progressive and systemic skeletal muscle mass loss. The most common measure of sarcopenia is the muscle mass of the third lumbar vertebra (L3) measured by computed tomography (CT). Patients with gastrointestinal tumors are commonly malnourished and are more prone to skeletal muscle loss. Many studies have shown that CT-assessed sarcopenia has an important role in CRC patients. However, there were some limitations due to the small number of studies included. Moreover, many new studies on the relationship between CT-assessed sarcopenia and CRC have emerged in the past years. Therefore, it is necessary to conduct the latest meta-analysis on the basis of existing evidence to investigate the value of postoperative CT-assessed sarcopenia in assessing complications and long-term prognosis in CRC patients.

METHODS

Participant or population: Colorectal cancer patients undergoing surgery were included.

Intervention: Colorectal cancer patients with CT-assessed sarcopenia.

Comparator: Colorectal cancer patients without computed tomography-assessed sarcopenia.

Study designs to be included: The study design was limited to comparative studies (randomized controlled trials, case-control studies, retrospective studies, and prospective studies).

Eligibility criteria: Included criterias: (1) Patients underwent CRC resection, no other combined tumors and no distant metastasis; (2) Reporting the prognostic value of CT-assessed sarcopenia on postoperative complications, overall survival (OS), cancer-specific survival (CSS), disease-free survival (DFS), and recurrence-free survival (RFS); (3) The dichotomy cut-off value of the L3 skeletal mass index (SMI) is reported; (4) The hazard ratio (HR) and corresponding 95% confidence interval (CI) is provided, or can be estimated from Kaplan-Meier survival curve; (5) Study design was limited to comparative studies (randomized controlled trials, case-control studies, retrospective studies, and prospective studies). Excluded criterias: (1) CRC patients with other combined tumors or metastases; (2) Sarcopenia was not defined using CT-measured L3SMI; (3) Studies with insufficient data or no goal outcomes; (4) Studies with a sample size less than 100; (5) Animals studies, review, conference abstract, or letter. When there are studies with the same center and the same period, the study with the largest sample size is selected.

Information sources: The PubMed, Web of Science, Cochrane Library, and Embase databases were searched for relevant literature up to September 10, 2020. Data and characteristics for each study were extracted.

Main outcome(s): Overall survival (OS) and complications.

Additional outcome(s): Cancer-specific survival (CSS), disease-free survival (DFS), recurrence-free survival (RFS).

Quality assessment / Risk of bias analysis: Two independent evaluators used the Newcastle-Ottawa Scale (NOS) to evaluate the methodological quality of included studies. The NOS score range from 0 to 9, and a study with NOS score ≥ 6 is considered high quality. Potential publication bias was evaluated using Begg's and Egger's tests. If publication bias was present, the trim-and-fill method was used to further evaluate the stability of the results.

Strategy of data synthesis: The comprehensive odd ratio (OR) and 95% confidence interval (CI) were used to assess the role of CT-assessed sarcopenia in assessing the risk of postoperative complications in CRC patients. The comprehensive hazard ratio (HR) and 95% CI were used to evaluate the long-term prognostic effect of CT-assessed sarcopenia in CRC patients, including OS, CSS, DFS, and PFS. Heterogeneity between studies was tested by Higgins I^2 statistics and Cochran's Q test. If $I^2 \geq 50\%$ or $PQ<0.05$, the random effects model was used for statistics; otherwise, the fixed effects model was performed. To explore source of potential heterogeneity, we performed subgroup analysis and meta-regression analysis. Sensitivity analysis assesses the reliability of the study by omitting one study at a time and examining the impact of each study on the comprehensive results. Potential Publication bias was evaluated by Begg's and Egger's tests. If there is publication bias, the trim-and-fill method is used to further evaluate the stability of the results. A two-sided p value < 0.05 was considered significant. All statistical analyses were carried out using Stata 12.0 software (Stata Corp, College Station, TX).

Subgroup analysis: If necessary, a subgroup analysis will be performed based on the heterogeneity of the data.Then we plan to conduct subgroup analysis of different countries, study type, publishing time, etc.

Sensibility analysis: Sensitivity analysis assessed study reliability by omitting one study at a time and examining the impact of each study on the comprehensive results.

Language: Limited to English studies.

Country(ies) involved: China.

Keywords: Colorectal cancer, Computed tomography-assessed sarcopenia, Complications, Prognosis, Meta-analysis.

Contributions of each author:

Author 1 - Hailun Xie - The author drafted and revised the manuscript.
Author 2 - Lishuang Wei - The author drafted and revised the manuscript.
Author 3 - Mingxiang Liu - The author performed the statistical analysis.
Author 4 - Guanghui Yuan - The author performed the data extraction.
Author 5 - Shuangyi Tang - The author reviewed the the manuscript.
Author 6 - Jialiang Gan - The author designed this research.