

Evaluating the safety of robotic total gastrectomy with D2 lymphadenectomy for gastric cancer against the conventional laparoscopic approach: a systematic review and meta-analysis

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ABSTRACT

Background: The safety of robotic total gastrectomy (RTG) with D2 lymphadenectomy versus laparoscopic total gastrectomy (LTG) remains unclear.
Methods: PRISMA systematic review and meta-analysis (PROSPERO CRD42024606570) of primary studies comparing RTG vs LTG for total gastrectomy with D2 dissection. Outcomes included anastomotic leakage, Clavien–Dindo \geq III complications, conversion, mortality, overall complications, and reoperation. Random-effects ORs with 95% CIs; I^2 assessed heterogeneity; sensitivity analyses performed.
Results: Five studies (n=1,131; RTG 432, LTG 700) showed **no significant differences:** leakage OR 0.79, CD \geq III OR 0.86, conversion OR 0.34, mortality OR 1.78, overall complications OR 0.84, reoperation OR 0.88; all $I^2=0\%$. Sensitivity and fixed-effect analyses were concordant.
Conclusions: RTG and LTG demonstrate **comparable safety** for total gastrectomy with D2 lymphadenectomy. RTG is a viable alternative in experienced centers; robust multicenter RCTs with long-term outcomes are warranted.

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INTRODUCTION

Robotic total gastrectomy (RTG) is increasingly adopted for gastric cancer, but its safety versus conventional laparoscopic total gastrectomy (LTG) with D2 lymphadenectomy remains uncertain.

METHODS AND MATERIALS

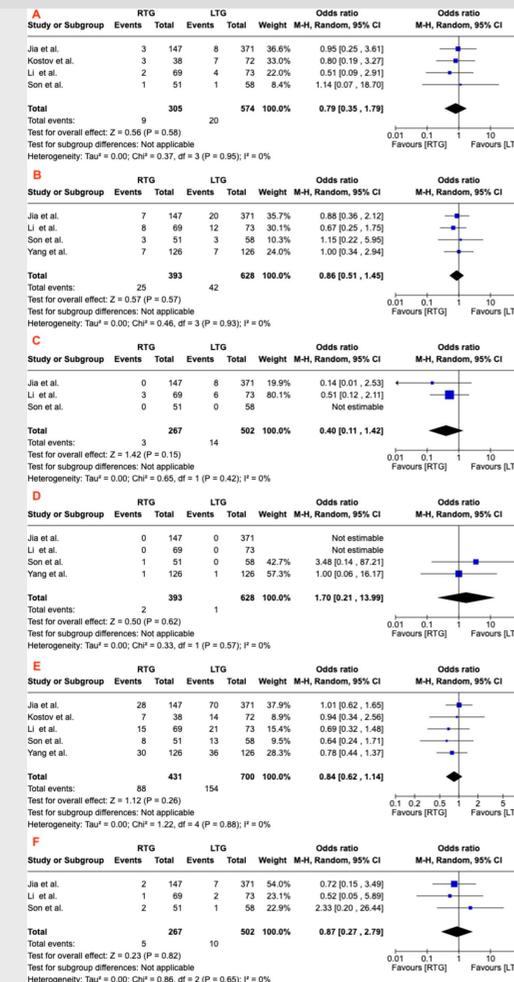
PRISMA-based systematic review and meta-analysis (PROSPERO CRD42024606570). Databases searched to Nov 1, 2024. Primary comparative studies of **RTG vs LTG**, total gastrectomy with **D2** lymphadenectomy. Outcomes: anastomotic leakage, Clavien–Dindo \geq III complications, conversion, mortality, overall complications, reoperation. Random-effects models; ORs with 95% CIs; I^2 for heterogeneity; sensitivity analyses.

RESULTS

5 studies; 1,131 patients (RTG 432, LTG 700). No significant differences:

- Leakage OR 0.79 (95% CI 0.35–1.78; $I^2=0\%$)
 - CD \geq III OR 0.86 (0.51–1.45; $I^2=0\%$)
 - Conversion OR 0.34 (0.10–1.18; $I^2=0\%$)
 - Mortality OR 1.78 (0.23–13.48; $I^2=0\%$)
- Overall complications OR 0.84 (0.62–1.14; $I^2=0\%$)
 - Reoperation OR 0.88 (0.29–2.67; $I^2=0\%$)

Sensitivity and fixed-effect checks: unchanged.



DISCUSSION

Across low-heterogeneity studies, **RTG and LTG show comparable safety** for total gastrectomy with D2 dissection. Any trend favoring RTG is small and non-significant. Variability in techniques, designs, and geographies may limit generalizability; learning curve effects remain relevant.

CONCLUSIONS

RTG is as safe as LTG for total gastrectomy with D2 lymphadenectomy. Adoption can be considered where robotic expertise/resources exist. High-quality multicenter RCTs with standardized techniques and long-term endpoints are needed.