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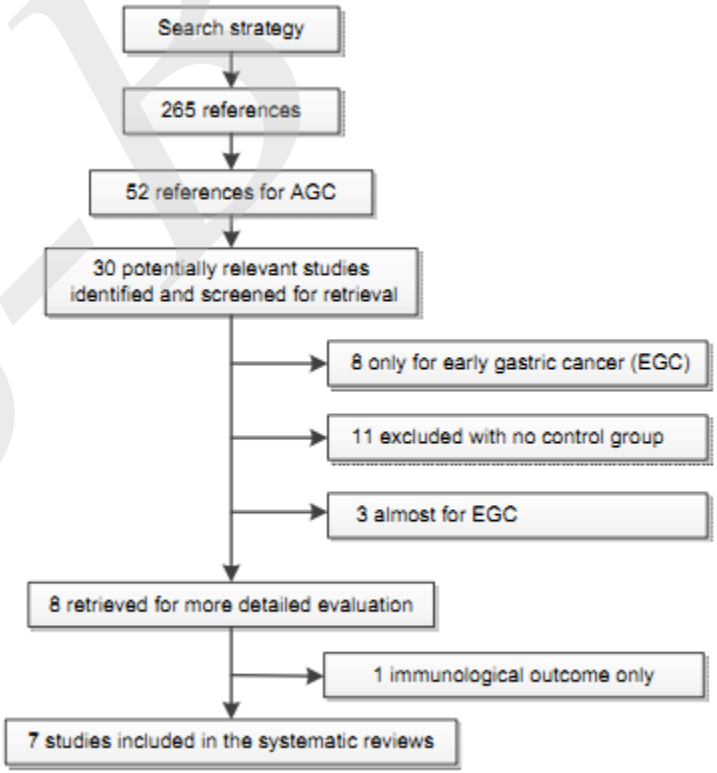
Systematic review of laparoscopy-assisted versus open gastrectomy for advanced gastric cancer

进展期胃癌腹腔镜切除的系统性综述

Key words: *Gastric cancer, Laparoscopic gastrectomy, Meta-analysis, Mortality, Recurrence*
关键词：胃癌，腹腔镜胃癌切除，Meta分析，死亡率，复发率

- In the recent randomized controlled trials (RCTs), Kitano et al. (2002), Lee et al. (2005), and Hayashi et al. (2005) have reported several benefits of LAG for treating early gastric cancer (EGC), compared with the open gastrectomy (OG) in short-term outcomes. Meanwhile, after five-year follow-up, Huscher et al. (2005) and Kim et al. (2008) showed no significant difference in the five-year outcomes, such as tumor recurrence or overall mortality. Therefore, LAG is considered to be accepted for EGC, although the long-term results of the multi-institutional randomized prospective trials are yet to be published, such as Korean Laparoscopic Gastrointestinal Surgery Study Group (KLASS) (Kim et al., 2010).
- However, many controversies remain on whether this technique could be applied in advanced gastric cancer (AGC), including the technical difficulty of extraperigastric lymphadenectomy and insufficient data related to the procedure's oncologic



- **The aim of the study is to perform an updated systematic review including all the available randomized and observational trials limited solely to AGC, providing the initial experience of LAG in the treatment of AGC.**

Table 2 Characteristics of studies in the meta-analysis

Reference	Follow-up	Number of patients			Level of lymph node dissection	Laparoscopy technique
		Total	LAG	OG		
Hamabe *et al*., 2012	5 years	167	66	101	D2	LAG
Cai *et al*., 2011*	4–36 months	96	49	47	D2	LAG
Shuang *et al*., 2011	23–50 months	70	35	35	D2	LADG
Huang *et al*., 2010	1–19 months	135	66	69	D2	LADG
Hwang *et al*., 2009	9–40 months	128	45	83	D2, D1+α, D1+β	LADG
Du *et al*., 2009	4–58 months	168	78	90	D2	LADG
Hur *et al*., 2008	6–47 months	51	26	25	D2	LADG

*RCT study. LAG: laparoscopy-assisted gastrectomy; LADG: laparoscopy-assisted distal gastrectomy

Table 3 Surgical outcomes of laparoscopy-assisted gastrectomy (LAG) and open gastrectomy (OG)

Reference	Operating time (min)		Estimated blood loss (ml)		Lymph nodes excised	
	LAG	OG	LAG	OG	LAG	OG
Hamabe *et al*., 2012*	283.1	225.9			63.7[a]	44.0
Cai *et al*., 2011*	270.51	187.66	293.67	344.47	22.98	22.87
Shuang *et al*., 2011#	320[a]	210	200[a]	300	35	38
Huang *et al*., 2010*	266.05[a]	223.78	131.91[a]	342.30	25.81	27.47
Hwang *et al*., 2009*	255.5[a]	208.3	333.3[a]	440.6	35.6	38.3
Du *et al*., 2009*	245	220	110[a]	196	23.5	21.0
Hur *et al*., 2008#	255[a]	190	160[a]	215	30.5	35.0

[a]Statistically significant difference vs. OG. *Values are means; #Values are medians

Table 5 Analysis of postoperative morbidity

Outcome	n_{trial}	n_{event}		$n_{patient}$		OR (95% CI)	Interpretation	Test for heterogeneity
		LAG	OG	LAG	OG			
Overall complications	7	38	60	365	450	0.78 (0.50, 1.202) Z=1.14, P=0.256	LAG=OG	χ^2=3.78, df=6, p=0.706, I^2=0
Wound infection	5	5	10	254	266	0.55 (0.19, 1.57) Z=1.12, P=0.262	LAG=OG	χ^2=0.29, df=4, p=0.991, I^2=0
Anastomotic leakage	4	2	5	219	263	0.79 (0.16, 3.81) Z=0.30, P=0.767	LAG=OG	χ^2=2.63, df=3, p=0.452, I^2=0
Pulmonary infection	3	2	13	141	141	0.19 (0.05, 0.68) Z=2.54, P=0.011	LAG<OG	χ^2=0.05, df=2, p=0.976, I^2=0
Ileus	3	2	5	210	260	0.71 (0.16, 3.13) Z=0.45, P=0.653	LAG=OG	χ^2=1.34, df=2, p=0.513, I^2=0
Anastomotic stenosis	2	4	3	144	191	1.89 (0.41, 8.67) Z=0.82, P=0.411	LAG=OG	χ^2=0.17, df=1, p=0.679, I^2=0

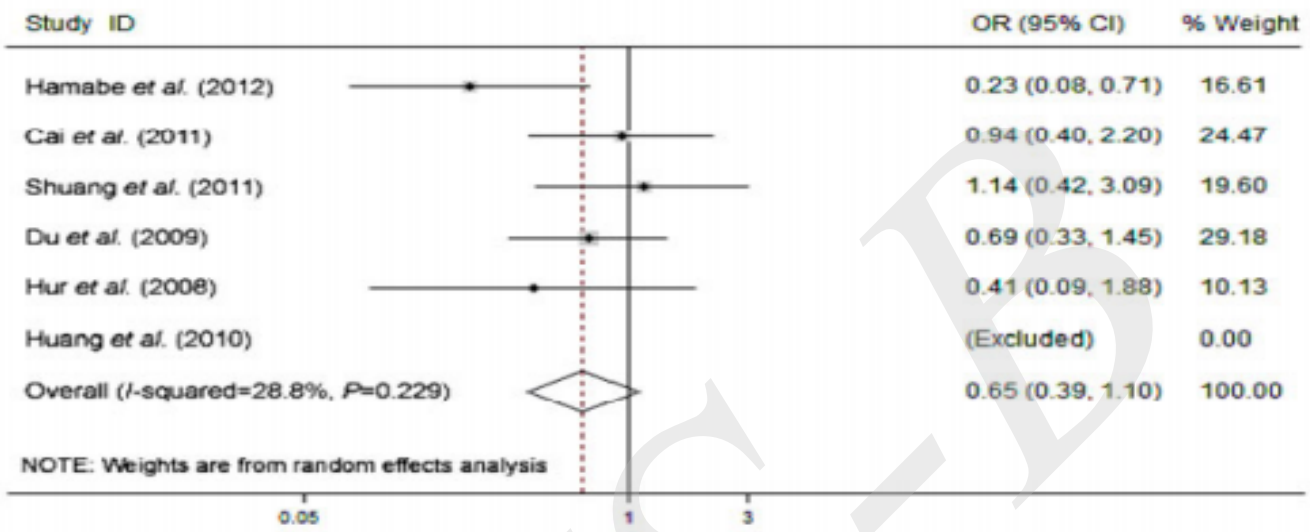


Fig. 4 Meta-analysis of overall mortality after laparoscopy-assisted gastrectomy (LAG) versus open gastrectomy (OG) for advanced gastric cancer (AGC)

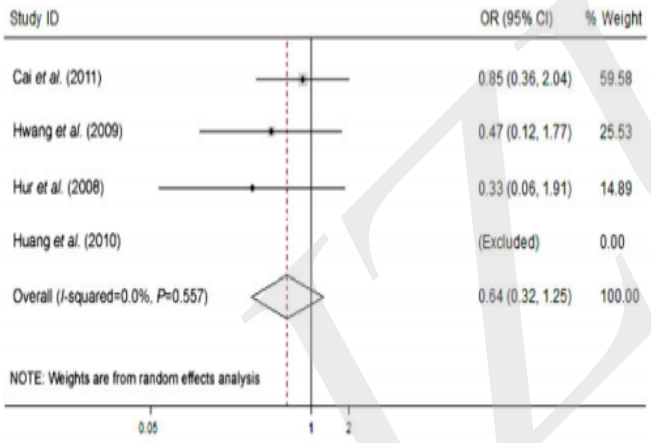


Fig. 5 Meta-analysis of cancer-related mortality after laparoscopy-assisted gastrectomy (LAG) versus open gastrectomy (OG) for advanced gastric cancer (AGC)

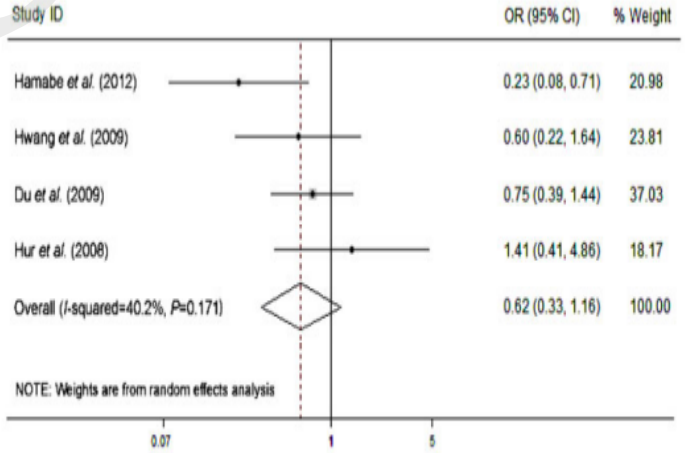


Fig. 6 Meta-analysis of recurrence after laparoscopy-assisted gastrectomy (LAG) versus open gastrectomy (OG) for advanced gastric cancer (AGC)

- In conclusion, after analyzing seven studies, the indications for LAG with extended lymphadenectomy could be expanded in the treatment of locally AGC. In China, where most gastric cancers present at an advanced stage, the results are encouraging. For LAG to be widely accepted, concerns for feasible and oncologic results must be addressed, which indicates that this surgical approach maintains surgical safety and curability. A larger RCT in multicenter comparing the LAG with OG will be recommended.