

## Review

# Endoscopic resection versus radical gastrectomy for early gastric cancer in Asia: A meta-analysis



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## ABSTRACT

**Background:** To compare the efficacy and safety of endoscopic resection (ER) and radical gastrectomy (RG) for early gastric cancer (EGC) in Asia.

**Materials and methods:** We systematically searched relevant articles published before September 1, 2017. We evaluated the quality of the included non-randomized studies using the Newcastle-Ottawa Scale (NOS). Meta-analysis was carried out using RevMan 5.3 software. The odds ratio (OR) with 95% confidence intervals (CI) were used for the dichotomous data.

**Results:** Fifteen retrospective studies were included in this analysis (3737 patients in the ER group and 4246 patients in RG group). No significant differences in the three-year survival rate (OR, 0.87; 95%CI, 0.50–1.53) and five-year survival rate (OR, 0.81; 95%CI, 0.58–1.13) between the ER and RG groups were observed. Although patients undergoing ER had a higher risk of recurrence (OR, 6.07; 95%CI 4.17–8.84) and the occurrence of metachronous cancer (OR, 8.35; 95%CI, 5.48–12.75), recurrent or metachronous gastric cancers following ER were successfully detected and removed using the endoscopic technique. Higher recurrence in the ER group may be associated with its lower en bloc resection rate (OR, 0.05; 95%CI, 0.02–0.14) and complete resection rate (OR, 0.03; 95%CI, 0.01–0.08). Importantly, although the three-year survival and five-year survival were similar in the two groups, the complication rate in the ER group was significantly lower than that in the RG group.

**Conclusion:** ER is a good choice for patients with small EGC lesions ( $\leq 2$  cm) without lymph node metastasis, especially in elderly patients with various medical comorbidities and in patients who cannot tolerate abdominal surgery or who meet the criteria but decline surgery. In contrast, RG is recommended when the diameter of the tumor is large ( $> 2$  cm) and preoperative examination suggests the possible presence of lymph node metastasis.

## 1. Introduction

Gastric cancer is one of the most significant diseases threatening public health. The morbidity and mortality associated with gastric cancer is decreasing; however, gastric cancer remains one of the most common malignant tumors globally with morbidity ranked fifth and mortality ranked second worldwide [1,2]. Due to the development of endoscopic devices and improvements in diagnostic technologies, the detection rate of early gastric cancer (EGC) has increased [3].

The standard treatment for curing EGC is tumor resection with lymph node dissection, which is also referred to as radical gastrectomy (RG) [4]. Patients who have undergone RG tend to have a favorable

prognosis, but with comparatively greater damage, inferior quality of life and slow recovery [5,6]. Recently, endoscopic resection (ER) has been used in Japan and is now a common surgical technique. ER includes endoscopic mucosal resection (EMR) and endoscopic submucosal dissection (ESD). This technique is mainly used for EGC without lymph node metastasis [7,8]. ER, a less invasive technique with fewer costs, can reduce surgical risks in patients and improve the quality of life [8,9]. Several studies have compared ER and gastrectomy for EGC [10–24]; however, the results were inconsistent. Treatment methods for patients with gastric cancer vary in Japan and Western countries due to differences in diagnostic criteria [25]. In addition, the difficulty and complexity of the surgical procedure may be increased due to the

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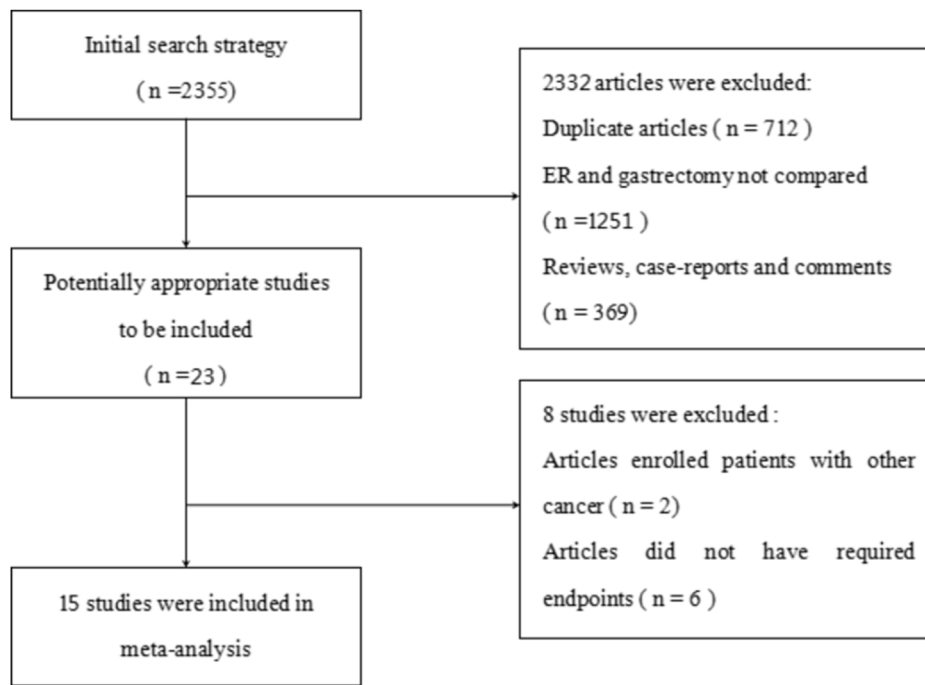


Fig. 1. Selection of studies for the meta-analysis.

weight index difference between Western and Eastern patients. Thus, given these differences, a systematic review and meta-analysis was carried out, specifically focusing on Asian patients, to determine the advantages and disadvantages of both techniques in the treatment of EGC.

## 2. Materials and methods

### 2.1. Search strategy

We systematically searched PubMed, Embase, China National Knowledge Infrastructure (CNKI) and Web of Science databases for relevant articles published before September 1, 2017. The following subject terms were used to carry out the literature search: “early gastric cancer”, “endoscopic resection”, “endoscopic mucosal resection”, “endoscopic submucosal dissection” and “gastrectomy”. The bibliography of all retrieved articles was investigated in order to identify additional potentially relevant studies.

### 2.2. Inclusion criteria

The inclusion criteria were as follows: all studies comparing ER vs. RG for EGC; studies on Asian patients; studies analyzing the following endpoints: en bloc resection, complete resection, complications, recurrence, metachronous cancer, three-year survival, and five-year survival. Metachronous cancer was defined as new adenocarcinoma in different areas from the initial cancer occurring at least 1 year after the initial ESD or RG [26]. Local recurrence was defined as adenocarcinoma detected at the resection site at least 12 months after ESD or RG with two negative results in previous follow-up esophagogastroduodenoscopy [27].

### 2.3. Exclusion criteria

The exclusion criteria were as follows: guideline articles, comments, reviews; studies on other gastric lesions, such as: recurrent EGC and other gastrointestinal lesions, other than EGC; low-quality studies without adequate data relating to the required characteristics, such as: studies that obtained scores of < 5 were considered as low quality

studies; only the most informative and most recent published articles were chosen, if the studies were carried out by the same authors.

### 2.4. Data extraction and study quality assessment

Two authors independently extracted the relevant data from the articles. The extracted data included the characteristics of the study, participants in each group, subject terms, and endpoints which were determined from the titles and abstracts, and full articles were obtained when necessary. The results were compared and the quality of the studies was evaluated. If there was disagreement, this was resolved by a third investigator. Quality of the studies was evaluated using the Newcastle-Ottawa Scale (NOS).

### 2.5. Statistical analysis

Meta-analysis was carried out using RevMan 5.3 software. The odds ratio (OR) with 95% confidence intervals (CI) were used for the dichotomous data. The chi-square test was used to assess heterogeneity in the study results. If the results were statistically homogeneous ( $P > 0.1$ ,  $I^2 \leq 50\%$ ), then the fixed-effects model was selected for meta-analysis. The random-effects model was used for meta-analysis when the study results were statistically heterogeneous ( $P < 0.1$ ,  $I^2 > 50\%$ ).

## 3. Results

Our search strategy yielded a total of 2355 articles (Fig. 1). Duplicate articles (of which there were 712) were excluded after browsing the title; 1251 were excluded as they did not compare ER and RG and 369 were excluded because they were comments, case-reports or reviews. Of the remaining 23 articles, 8 were excluded: 2 due to enrolled patients having another type of cancer and 6 articles did not have the required endpoints. Of the remaining 15 studies, 12 were from Korea, 2 were from Japan, and 1 study was from China. These 15 studies [10–24] included a total of 7983 patients: 3737 in the ER group and 4246 in the RG group. All of the articles were full texts of retrospective case-control studies. The key characteristics and quality assessments of the studies are listed in Table 1. The clinical endpoints of ER compared

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