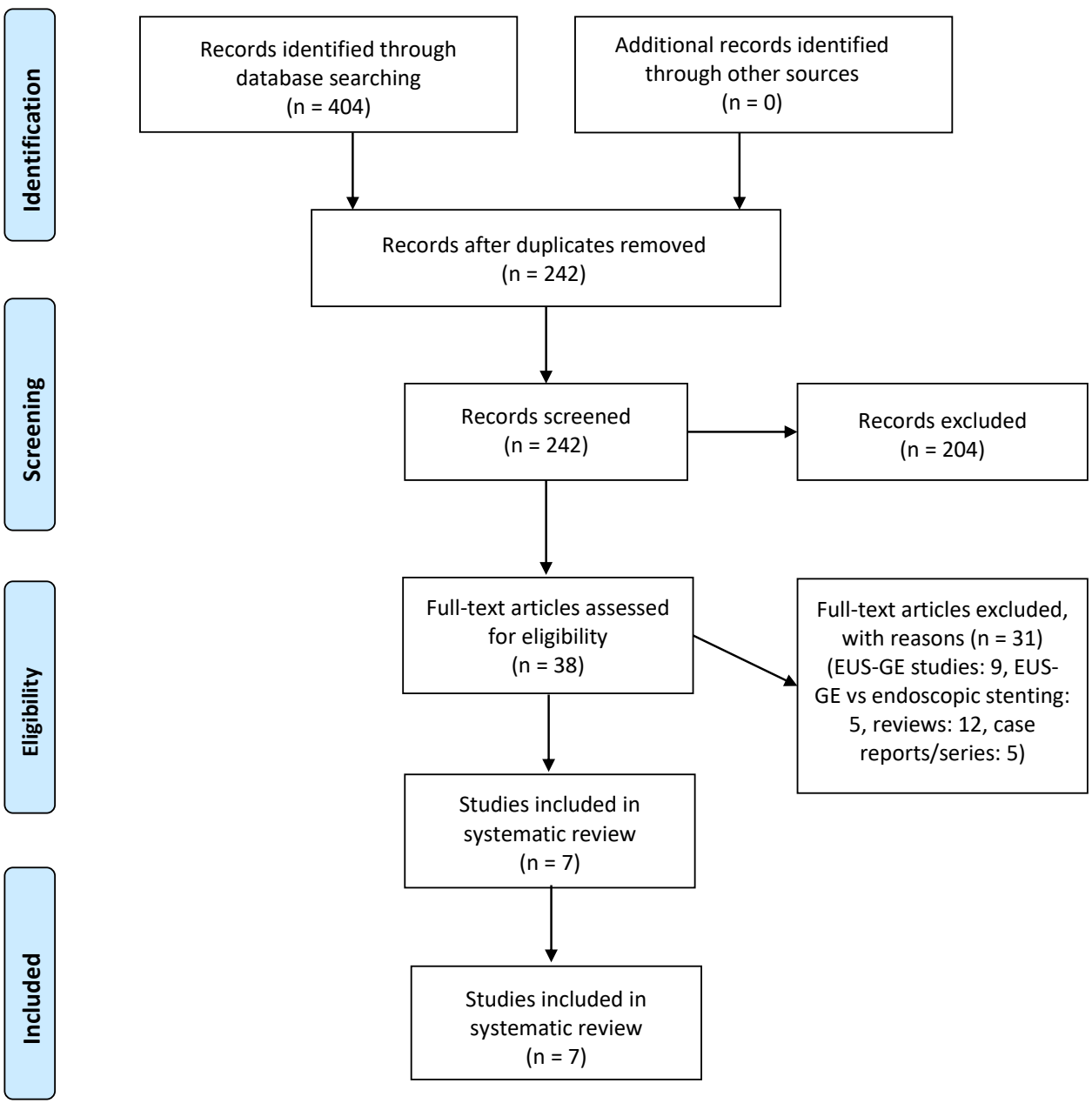
Supplementary material

Supplementary figure 1: Study selection flow diagram



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APPENDIX 1: Literature search strategy

All EBM Reviews via Ovid (Cochrane Database of Systematic Reviews (2005+), ACP journal Club (1991+), Cochrane Central Register of Controlled Trials (CCTR, 1991+), Cochrane Clinical Answers (CCA], Cochrane Methodology Register {2012+), Database of Abstracts of Reviews of Effects {DARE,2016+), Health Technology Assessment Database {HTA,2016+), National Health Service Economic Evaluation Databases (NHSEED, 2016+)):

("gastric outlet obstruction*" or pylorostenosis or ({pylor* or stomach) adj2 (obstruction* or stenos*))).ab,hw,ti. AND (surg* or laparoscop*).ab,hw,ti AND ((gastroenterostom* or gastro-enterostom* or gastroenteric-anastomosis or gastroenteroanastomosis or Billroth* or gastroduodenostom* or gastro·duodenostom* or gastrojejunostom* or gastro-jejunostom*).ab,hw,ti. AND (echoendoscop* or endoscopic-echography or endoscopic-ultraso* or endosonograph* or EUS·guided or ultrasound-guided or echo-endoscop* or ultrasonic-endoscop*).ab,hw,ti.)

Embase via Ovid (1974+):

((exp pylorus stenosis/ or ("gastric outlet obstruction*" or pylorostenosis or ((pylor* or stomach) adj2 (obstruction* or stenos*))).ab,kw,ti.) AND (exp surg*/ or laparoscop*.ab,kw,ti.) AND ((exp gastroenterostomy/ or (gastroenterostom* or gastro·enterostom* or gastroenteric-anastomosis or gastroenteroanastomosis or Billroth* or gastroduodenostom* or gastro-duodenostom* or gastrojejunostom* or gastro-jejunostom*).ab,kw,ti.) AND (exp endoscopic ultrasonography/ or (echoendoscop* or endoscopic-echography or endoscopic-ultraso* or endosonograph* or EUS guided or ultrasound -guided or echo·endoscop* or ultrasonic·endoscop*).ab,kw,ti.))) NOT (exp animal/ not exp human/,exp child/ not exp adult/, "case report".pt,ti.) Limit to English

MEDLINE via Ovid (1946+ and Epub Ahead of Print, In-Process & Other Non-Indexed Citations and Ovid MEDLINE(R) Daily):

({exp Gastric Outlet Obstruction/ or ("gastric outlet obstruction*" or pylorostenosis or ((pylor* or stomach) adj2 (obstruction* or stenos*))).ab,kf,ti.) AND (exp surg*/ or laparoscop*.ab,kf,ti.) AND ((exp Gastroenterostomy/ or (gastroenterostom* or gastro-enterostom* or gastroenteric-anastomosis or gastroenteroanastomosis or Bill roth* or gastroduodenostom* or gastro-duodenostom* or gastrojejunostom* or gastro-jejunostom*).ab,kf,ti.) AND (exp Endosonography/ or (echoendoscop* or endoscopic- echography or endoscopic-ultraso* or endosonograph* or EUS·guided or ultrasound· guided or echo·endoscop* or ultrasonic endoscop*).ab,k f,ti.))) NOT (exp Animals/ not Humans/, exp CHILD/ not exp ADULT/, "case report".pt,ti.) Limit to English

Scopus via Elsevier (1970+):

((TITLE·ABS-KEY (gastric-outlet-obstruction* OR pylorostenosis) OR TITLE·ABS-KEY ((pylor* OR stomach) W/2 (obstruction* OR stenos*)))) AND (TITLE-ABS-KEY (surg* OR laparoscop*)) AND ((TITLE-ABS-KEY (gastroenterostom' OR gastro-enterostom* OR gastroenteric-anastomosis OR gastroenteroanastomosis OR Billroth* OR gastroduodenostom* OR gastro·duodenostom* OR gastrojejunostom* OR gastro-jejunostom*) AN D TITLE-A BS·KEY (echoendoscop* OR endoscopic-

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echography OR endoscopic-ultraso* OR endosonograph* OR eus-guided OR ultrasound-guided OR echo endoscop* OR ultrasonic·endoscop*))) AND (LIMIIT-TO (LANGUAGE, "English"))

Web of Science Core Collection via Clarivate Analytics (1975+):

TOPIC: (gastric-outlet-obstruction* or pylorostenosis) OR TOPIC: ((pylor* or stomach) NEAR/2 (obstruction* or stenos*)) AND TOPIC: (surg* OR laparoscop*) AND TOPIC: (gastroenterostom*or gastro·enterostom* or gastroenteric-anastomosis or gastroenteroanastomosis or Billroth*or gastroduodenostom* or gastro-duodenostom* or gastrojejunostom *or gastro-jejunostom*) AND TOPIC: (echoendoscop* or endoscopic echography or endoscopic-ultraso* or endosonograph* or EUS·guided or ultrasound-guided or echoendoscop* or ultrasonic-endoscop*) Limit to English

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APPENDIX-2: PRISMA Checklist

Section and Topic	Item #	Checklist item	Page #
TITLE			
Title	1	Identify the report as a systematic review.	1
ABSTRACT			
Abstract	2	See the PRISMA 2020 for Abstracts checklist.	3-4
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of existing knowledge.	5-6
Objectives	4	Provide an explicit statement of the objective(s) or question(s) the review addresses.	6
METHODS			
Eligibility criteria	5	Specify the inclusion and exclusion criteria for the review and how studies were grouped for the syntheses.	8
Information sources	6	Specify all databases, registers, websites, organisations, reference lists and other sources searched or consulted to identify studies. Specify the date when each source was last searched or consulted.	7
Search strategy	7	Present the full search strategies for all databases, registers and websites, including any filters and limits used.	7
Selection process	8	Specify the methods used to decide whether a study met the inclusion criteria of the review, including how many reviewers screened each record and each report retrieved, whether they worked independently, and if applicable, details of automation tools used in the process.	7-8
Data collection process	9	Specify the methods used to collect data from reports, including how many reviewers collected data from each report, whether they worked independently, any processes for obtaining or confirming data from study investigators, and if applicable, details of automation tools used in the process.	7-8
Data items	10a	List and define all outcomes for which data were sought. Specify whether all results that were compatible with each outcome domain in each study were sought (e.g. for all measures, time points, analyses), and if not, the methods used to decide which results to collect.	9
	10b	List and define all other variables for which data were sought (e.g. participant and intervention characteristics, funding sources). Describe any assumptions made about any missing or unclear information.	7-9
Study risk of bias assessment	11	Specify the methods used to assess risk of bias in the included studies, including details of the tool(s) used, how many reviewers assessed each study and whether they worked independently, and if applicable, details of automation tools used in the process.	10
Effect measures	12	Specify for each outcome the effect measure(s) (e.g. risk ratio, mean difference) used in the synthesis or presentation of results.	9-10
Synthesis methods	13a	Describe the processes used to decide which studies were eligible for each synthesis (e.g. tabulating the study intervention characteristics and comparing against the planned groups for each synthesis (item #5)).	7-9
	13b	Describe any methods required to prepare the data for presentation or synthesis, such as handling of missing summary statistics, or data conversions.	9-10
	13c	Describe any methods used to tabulate or visually display results of individual studies and syntheses.	10
	13d	Describe any methods used to synthesize results and provide a rationale for the choice(s). If meta-analysis was performed, describe the model(s), method(s) to identify the presence and extent of statistical heterogeneity, and software package(s) used.	10
	13e	Describe any methods used to explore possible causes of heterogeneity among study results (e.g. subgroup analysis, meta-regression).	10
	13f	Describe any sensitivity analyses conducted to assess robustness of the synthesized results.	13-14
Reporting bias	14	Describe any methods used to assess risk of bias due to missing results in a synthesis (arising from reporting biases).	10

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Section and Topic	Item #	Checklist item	Page #
assessment			
Certainty assessment	15	Describe any methods used to assess certainty (or confidence) in the body of evidence for an outcome.	10
RESULTS			
Study selection	16a	Describe the results of the search and selection process, from the number of records identified in the search to the number of studies included in the review, ideally using a flow diagram.	11
	16b	Cite studies that might appear to meet the inclusion criteria, but which were excluded, and explain why they were excluded.	11
Study characteristics	17	Cite each included study and present its characteristics.	11, tables 1&2
Risk of bias in studies	18	Present assessments of risk of bias for each included study.	NA
Results of individual studies	19	For all outcomes, present, for each study: (a) summary statistics for each group (where appropriate) and (b) an effect estimate and its precision (e.g. confidence/credible interval), ideally using structured tables or plots.	12-13, suppl table 2
Results of syntheses	20a	For each synthesis, briefly summarise the characteristics and risk of bias among contributing studies.	NA
	20b	Present results of all statistical syntheses conducted. If meta-analysis was done, present for each the summary estimate and its precision (e.g. confidence/credible interval) and measures of statistical heterogeneity. If comparing groups, describe the direction of the effect.	12-13, suppl table 2
	20c	Present results of all investigations of possible causes of heterogeneity among study results.	18-19
	20d	Present results of all sensitivity analyses conducted to assess the robustness of the synthesized results.	14
Reporting biases	21	Present assessments of risk of bias due to missing results (arising from reporting biases) for each synthesis assessed.	NA
Certainty of evidence	22	Present assessments of certainty (or confidence) in the body of evidence for each outcome assessed.	12-13
DISCUSSION			
Discussion	23a	Provide a general interpretation of the results in the context of other evidence.	15-17
	23b	Discuss any limitations of the evidence included in the review.	18
	23c	Discuss any limitations of the review processes used.	18-19
	23d	Discuss implications of the results for practice, policy, and future research.	19

From: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med 6(7): e1000097. doi:10.1371/journal.pmed1000097

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APPENDIX-3: MOOSE Checklist

Item No	Recommendation	Reported on Page No
Reporting of background should include		
1	Problem definition	6
2	Hypothesis statement	6
3	Description of study outcome(s)	9
4	Type of exposure or intervention used	8-9
5	Type of study designs used	7-8
6	Study population	7-8
Reporting of search strategy should include		
7	Qualifications of searchers (eg, librarians and investigators)	8
8	Search strategy, including time period included in the synthesis and key words	7
9	Effort to include all available studies, including contact with authors	8
10	Databases and registries searched	7
11	Search software used, name and version, including special features used (eg, explosion)	7
12	Use of hand searching (eg, reference lists of obtained articles)	-NA-
13	List of citations located and those excluded, including justification	10-11, Suppl Fig 1
14	Method of addressing articles published in languages other than English	-NA-
15	Method of handling abstracts and unpublished studies	7
16	Description of any contact with authors	-NA-
Reporting of methods should include		
17	Description of relevance or appropriateness of studies assembled for assessing the hypothesis to be tested	7-8
18	Rationale for the selection and coding of data (eg, sound clinical principles or convenience)	7-8

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19	Documentation of how data were classified and coded (eg, multiple raters, blinding and interrater reliability)	9-10
20	Assessment of confounding (eg, comparability of cases and controls in studies where appropriate)	9-10
21	Assessment of study quality, including blinding of quality assessors, stratification or regression on possible predictors of study results	11, Suppl table 1
22	Assessment of heterogeneity	14
23	Description of statistical methods (eg, complete description of fixed or random effects models, justification of whether the chosen models account for predictors of study results, dose-response models, or cumulative meta-analysis) in sufficient detail to be replicated	9-10
24	Provision of appropriate tables and graphics	Tables 1-3, Figs 1-3
Reporting of results should include		
25	Graphic summarizing individual study estimates and overall estimate	Fig 1-3
26	Table giving descriptive information for each study included	Table 1-2
27	Results of sensitivity testing (eg, subgroup analysis)	14
28	Indication of statistical uncertainty of findings	14

From: Stroup DF, Berlin JA, Morton SC et al. for the Meta-analysis Of Observational Studies in Epidemiology (MOOSE) Group. Meta-analysis of Observational Studies in Epidemiology. A Proposal for Reporting. JAMA. 2000;283(15):2008-2012. doi: 10.1001/jama.283.15.2008

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Supplementary Table 1: Newcastle-Ottawa Scale - Study quality assessment

STUDY	SELECTION				COMPARABILITY	OUTCOME			SCORE	QUALITY
	Representativeness of the average adult in community	**Cohort size**	**Information on clinical outcomes**	**Outcome not present at start**	**Factors comparable between the groups**	**Adequate clinical assessment**	**Follow up time**	**Adequacy of follow-up**		
	Population based: 1; Multi-center: 0.5; Single-center: 0	**>40 patients: 1; 39 to 20: 0.5; <20: 0**	**Information with clarity: 1; Information derived from percentage value: 0.5; Unclear: 0**	**not present: 1; present: 0**	**yes: 1; no: 0**	**yes: 1; no: 0**	**yes: 1; not mentioned: 0**	**All patients followed up: 1; >50% followed up: 0.5; <50% followed up OR not mentioned: 0**	**MAX=8**	**HIGH>6, MEDIUM 4 to 6, LOW <4**
Perez-Miranda, 2017	0.5	1	1	1	1	1	1	1	7.5	**HIGH**
Khashab, 2017	0.5	1	1	1	1	1	1	1	7.5	**HIGH**
Widmer, 2019 (abs)	0	0.5	1	1	1	1	1	1	6.5	**HIGH**
Marya, 2020 (abs)	0	1	1	1	1	1	1	1	7	**HIGH**
Bondi, 2020 (abs)	0	1	1	1	1	1	0	1	6	**MEDIUM**
Kouanda, 2021	0	1	1	1	1	1	1	1	7	**HIGH**
Bronswijk, 2021 (abs)	0	0.5	1	1	1	1	0	1	5.5	**MEDIUM**

From: Stang A. Critical evaluation of the Newcastle-Ottawa scale for the assessment of the quality of nonrandomized studies in meta-analyses. Eur J Epidemiol. 2010;25(9):603-5. doi:10.1007/s10654-010-9491-z.

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Supplementary table 2: Pooled outcomes of EUS-GE vs SGE

Outcomes	Pooled OR (EUS-GE vs SGE)	Pooled proportions (EUS-GE vs SGE)
Technical success	0.19 (95% CI 0.06-0.60; I^2 0%; Q=2.1, p=0.90); **p=0.005**	93.6% (95% CI 89.3-96.2) vs 98.5% (95% CI 95.9-99.5)
Clinical success	4.73 (95% CI 1.83-12.25, I^2 18%; Q=7.3, p=0.29); **p=0.001**	96.4% (95% CI 93.2-98.2) vs 86.4% (95% CI 77.0-92.4)
All adverse events	0.20 (95% CI 0.10-0.37, I^2 39%; Q=9.8, p=0.13); **p<0.001**	11.5% (95% CI 6.4-19.9) vs 38.5% (95% CI 24.8-54.3)
Severe adverse events	0.89 (95% CI 0.11-7.36, I^2 67%; Q=9.1, p=0.03); p=0.91	3.7% (95% CI 1.5-8.6) vs 5.4% (95% CI 1.3-20.4)
Recurrence or Reintervention	0.49 (95% CI 0.18-1.38, I^2 49%; Q=9.8, p=0.08); p=0.18	10.1% (95% CI 2.8-30.2) vs 18.2% (95% CI 10.4-29.9)
Outcomes	**Pooled standardized mean difference (EUS-GE vs SGE)**	**Pooled means (EUS-GE vs SGE)**
Procedure time	-2.4 (95% CI -4.1, -0.75, I^2 95%; Q=41.8, p<0.01); **p=0.004**	57 (95% CI 53-62) mins vs 167 (95% CI 80-254) mins
LOS	-0.49 (95% CI -0.94, -0.03, I^2 78%; Q=21.2, p<0.01); **p=0.037**	7.3 (95% CI 5.2-9.4) days vs 10.6 (95% CI 8.1-13.2) days
OR: Odds ratio; 95% CI: 95% Confidence Interval; I^2 and Q are measures of heterogeneity		

