



Role of prophylactic antibiotics in patients undergoing endoscopic ultrasound–directed transgastric interventions in Roux-en-Y gastric bypass and endoscopic ultrasound gastroenterostomy

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Background and Aims: The infection risk associated with EUS-directed transgastric intervention (EDGI) and EUS-guided gastroenterostomy (EUS-GE) is unknown. We aim to investigate the effect of prophylactic antibiotics in EDGI and EUS-GE on infection-related outcomes.

Methods: A multicenter retrospective chart review was conducted among patients who had undergone EDGI or EUS-GE between June 2017 and September 2023. Statistical significance was set at $P < .05$.

Results: A total of 263 patients (147 EUS-GE and 116 EDGI) were identified. Prophylactic antibiotics were given in 58.9% of patients. There was no significant difference in the rate of transient (17.4% vs 12.0%; $P = .23$) or persistent signs of infection (4.5% vs 3.7%; $P = 1.00$) in patients with and without prophylactic antibiotics, respectively. The length of stay and readmission rates were also not significantly different between the 2 groups.

Conclusions: Prophylactic antibiotics for EDGI and EUS-GE did not significantly improve infection-related outcomes. (Gastrointest Endosc 2026;104:452-6.)

INTRODUCTION

The indications for using lumen-apposing metal stents (LAMSs) have expanded beyond drainage of peripancreatic fluid collections to include EUS-directed transgastric intervention (EDGI) and EUS-guided gastroenterostomy (EUS-GE). In both of these procedures, a conduit between 2 adjacent lumens is made with a LAMS via EUS.

Although there are data on the risk of stent migration and perforation, data are lacking on the incidence of infection after EDGI and EUS-GE procedures.¹ The practice guidelines from the American Society for Gastrointestinal

Endoscopy did not comment on the infection rate of EUS-GE and EDGI or make a suggestion for the use of periprocedural prophylactic antibiotics.¹ Endoscopic practices vary with regard to administering prophylactic antibiotics.

Although the procedure risks are not the same, guidelines on the use of prophylactic antibiotics in other endoscopic procedures such as EUS-FNA for pancreatic cysts recommend giving antibiotics based on low-quality evidence.¹ In 1 international consensus review, periprocedural antibiotics were recommended for peripancreatic collection drainage with LAMSs.² The European Society of Gastrointestinal Endoscopy acknowledges a lack of data for prophylactic

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antibiotics for therapeutic EUS but recommends them in those with ascites (strong recommendation) and in all other cases (weak recommendation).³ Therefore, the purpose of this study was to investigate whether prophylactic antibiotics in patients undergoing EDGI or EUS-GE procedures have any effect on the rate of infection-related outcomes.

METHODS

We conducted a retrospective multicenter cohort study among patients who had undergone EDGI or EUS-GE between June 2017 and September 2023 at 7 tertiary care medical centers. EDGI was used as an umbrella term for LAMS-based interventions in patients with Roux-en-Y gastric bypass, including ERCP (which is referred to as endoscopic ultrasound-directed transgastric ERCP [EDGE]), EUS, or other luminal procedures. Step 1 involves placement of a LAMS, followed by intervention through the LAMS (step 2), which can occur in the same session or on a different day (staged). EUS-GE is performed in patients with gastric outlet obstruction, where a LAMS is placed between the stomach and small bowel distal to the site of obstruction, providing an endoscopic bypass and allowing quick resumption of oral nutrition.

Periprocedural antibiotics were defined as any antibiotic administered on the same day of the procedure, and the length of therapy was at the discretion of the endoscopist. Patients receiving antibiotics on the same day as the procedure were classified as the “prophylactic antibiotics” group. Patients with intraprocedural perforations or those who received antibiotics before the day of the procedure (≥ 1 day) for other causes were excluded. For 2-stage EDGI procedures, antibiotics were typically administered during LAMS placement (step 1). Collected data included procedure type, indication, signs of infection such as fever or elevation in white blood cell (WBC) count, presence of ascites, and the American Society of Anesthesiologists (ASA) class. Other adverse events, including abdominal pain, bleeding, or cardiopulmonary events, were recorded. Readmissions and mortality within 14 days of LAMS placement were noted.

Outcomes

Outcomes include transient (<48 hours) and persistent (>48 hours) signs of infection, length of stay (LOS), and readmission within 14 days. Signs of infection were defined as a rise in WBC count above the upper limit of normal laboratory values or a new fever (temperature $>38^{\circ}\text{C}$) after the procedure.

Sample size calculation

Pooled adverse event rates for EUS-GE and EDGI are reported to be approximately 10% to 12% and 14% to 17%, respectively, but the specific rate of infection or definition of infection is not separately specified and is considered rare compared with other adverse events.⁴⁻⁷ All the published studies report using prophylactic antibiotics. There-

fore, the infection rate with EUS-GE and EDGI procedures without antibiotic prophylaxis is unknown. Hence, no relevant sample size calculation was feasible, and an exploratory retrospective study was performed.

Statistical analysis

Fisher exact test, chi-square test, *t* test, and Mann-Whitney *U* test were applied as appropriate using SPSS version 28 (International Business Machines Corporation, Armonk, NY, USA). Percentages and SDs were provided as applicable. A *P* value of $<.05$ was considered statistically significant.

RESULTS

A total of 263 patients were included. The indications for EUS-GE and EDGI procedures are described in [Table 1](#). A total of 147 patients underwent EUS-GE for gastric outlet obstruction (89.8% for malignancy) and 116 underwent EDGI, most of which were EDGE and performed for choledocholithiasis (52.6%).

Periprocedural antibiotics were given in 155 patients (58.9%). Indications, age, ASA class, presence of ascites, LAMS size, single- versus 2-step EDGI, LAMS fixation, location of proximal/distal flanges of the LAMS, and dilation of the LAMS were not significantly different between the antibiotic and no-antibiotic groups ([Table 1](#)).

[Table 2](#) demonstrates the outcomes of patients after EUS-GE and EDGI within the study. There were 40 (25.8%) total adverse events in the antibiotic group and 25 (24.1%) in the no-antibiotic group ($P = .75$). Administration of periprocedural antibiotics was not associated with a reduction in the incidence of transient signs of infection (17.4% in the antibiotics group vs 12.0% in the no-antibiotics group; $P = .23$). Similarly, administration of periprocedural antibiotics was not associated with a reduction in the incidence of persistent signs of infection (4.5% in the antibiotics group vs 3.7% in the no-antibiotics group; $P = 1$). Patients with ASA 1 to 2 had lower rates of transient (3.6%) and persistent (0%) signs of infection than those with ASA 3 to 4 (16.6%, 4.7%, respectively); however, the difference was not statistically significant ($P = .09$ and $P = .61$, respectively). The presence of ascites was not significantly associated with transient (17.4%) or persistent signs (6.5%) of infection compared with no ascites (14.7%, 3.7%; $P = .65$ and $P = .41$).

In the subgroup analysis, examining EUS-GE and EDGI procedures separately, there was no significant difference in the rates of transient ($P = .29$ and $P = .54$, respectively) or persistent signs of infection ($P = 1.00$ and $P = .66$, respectively) between patients who did and did not receive periprocedural antibiotics ([Supplementary Tables 1 and 2](#), available online at www.giejournal.org).

Readmission for sepsis between the antibiotic and no-antibiotic groups was not significant (5.2% vs 3.7%; $P = .77$). LOS was not significantly different (2.7 vs 3.4 days; $P = .23$) in the antibiotic group compared with the no-antibiotic group

TABLE 1. Baseline characteristics, indications, and procedural details of EUS-GE and EDGI

Patient and procedure variable	Prophylactic antibiotics		P value
	Antibiotics (n = 155), n (%)	No antibiotics (n = 108), n (%)	
Procedure indications			
EUS-GE	79 (51.0)	68 (63.0)	–
Malignant	74 (47.7)	58 (53.7)	.09
Benign	5 (3.2)	10 (9.3)	
EDGI	76 (49.0)	40 (37.0)	–
Choledocholithiasis	37 (23.9)	24 (22.2)	.23
Dilated biliary ducts/stricture/SOD	28 (18.1)	15 (13.9)	
Pancreatic/luminal evaluation	10 (6.4)	1 (0.9)	
Bile duct leak	1 (0.6)	0 (0)	
Single-/2-step EDGI	21 (13.5)/55 (35.5)	9 (8.3)/31 (28.7)	.55
Size of LAMS			
10 mm	1 (0.6)	0 (0)	.65
15 mm	32 (20.6)	20 (18.5)	
20 mm	122 (78.7)	88 (81.5)	
LAMS dilation			
Yes	130 (83.9)	85 (78.7)	.29
No	25 (16.1)	23 (21.3)	
Fixation of LAMS			
Yes	21 (13.5)	15 (13.9)	.92
No	134 (86.4)	93 (86.1)	
Age			
Mean (SD)	65.65 (11.9)	64.43 (12.3)	.42
Presence of ascites			
Yes	25 (16.1)	21 (19.4)	.49
No	130 (83.9)	87 (80.6)	
ASA			
1	1 (0.64)	0 (0)	.80
2	17 (11.0)	10 (9.3)	
3	122 (78.7)	86 (79.6)	
4	15 (9.7)	12 (11.1)	

–, Unavailable; ASA, American Society of Anesthesiologists; EDGI, EUS-directed transgastric intervention; EUS-GE, EUS-guided gastroenterostomy; LAMS, lumen-apposing metal stent; SOD, sphincter of Oddi dysfunction.

(Table 2). There were 6 deaths within 14 days of LAMS placement, including LAMS migration (1), sepsis from pneumonia (1), bacteremia from FNA biopsy after LAMS (1), gastric perforation (1), and transition to palliation because of worsening cancer (2).

DISCUSSION

EUS-GE and EDGI are procedures that have a potential for infection. Published endoscopic literature on rates of infection is scarce and variable.^{4,8,9} Antibiotic practices from surgical or interventional radiology literature may not be directly applicable to EUS-guided transluminal procedures because of technical differences. Unlike surgery or interventional radi-

ology, which involves prolonged peritoneal exposure or wire-guided manipulation, EUS-guided interventions with cautery-enhanced stents created a controlled transluminal anastomosis with immediate tissue apposition, limiting peritoneal contamination and infection risk.

All published studies on EUS-GE and EDGI used prophylactic antibiotics. In our large multicenter study with 263 patients undergoing EDGI and EUS-GE, only 58% of patients received prophylactic antibiotics, highlighting varied clinical practices. There was no statistically significant difference in the numbers of transient or persistent infection between patients receiving and not receiving antibiotics.

Our study demonstrates that the use of antibiotics in patients undergoing EDGI and EUS-GE may be unnecessary.

TABLE 2. Outcomes of patients after EUS-GE or EDGI procedures

Outcomes	Prophylactic antibiotics, n (%)	No prophylactic antibiotics, n (%)	P value
No. of patients: total (EUS-GE, EDGI)	155 (79, 76)	108 (68, 40)	–
Adverse events, n (%)	40 (25.8)	26 (24.1)	.75
None	115 (74.2)	82 (75.9)	
Fever (temperature >38 °C)	10 (6.4)	5 (4.6)	
Elevated WBC	24 (15.5)	12 (11.1)	
Abdominal pain	15 (9.7)	12 (11.1)	
Cardiopulmonary	1 (0.6)	3 (2.8)	
Bleeding	3 (1.9)	6 (5.6)	
Transient fever or WBC elevation (%)—overall	27 (17.4)	13 (12.0)	.23
EUS-GE	17 (11.0)	10 (9.3)	.29
EDGI	10 (6.4)	3 (2.8)	.54
Persistent signs/symptoms of infection (%)—overall	7 (4.5)	4 (3.7)	1.00
EUS-GE	3 (1.9)	3 (2.8)	1.00
EDGI	4 (2.6)	1 (0.9)	.66
Readmission for sepsis (%)	8 (5.2)	4 (3.7)	.77
LOS			
Mean (SD)	2.7 (5.0)	3.4 (5.0)	.23
Mortality (%)	4 (2.6)	2 (1.8)	1.00

–, Unavailable; EDGI, EUS-directed transgastric intervention; EUS-GE, EUS-guided gastroenterostomy; LOS, length of stay; WBC, white blood cell.

Antibiotic use may increase the potential for medication side effects, anaphylaxis, costs, secondary infections, and microbial resistance.

This retrospective study has a few limitations. Although the sample size and limited patient variables precluded propensity score matching, several selection biases were accounted for through nonsignificant distribution of most patient and procedural factors as described in Table 1. Although the antibiotics group did not have the administration of antibiotics (type/class or timing) standardized, we excluded patients who were already on antibiotics before the day of the LAMS placement to remove patients with clinical suspicion of infection. The lack of WBC and fever trends represents a limitation of this chart review–based study and reflects variability in documentation and laboratory reference points. Although this may have provided additional insights into the data, it is less likely to change the main conclusion of our study. The rates of signs of infection as defined in our outcomes were higher than those reported in the literature because of the use of measures such as fever and leukocytosis. However, definitions were consistent between both groups, and no significant differences were observed. In fact, there were numerically lower rates in the no-antibiotics group. Although including patients from multiple centers introduces heterogeneity, it improves the generalizability of our study results in a real-world setting while addressing a relevant clinical question.

In summary, for EUS-GE and EDGI, prophylactic antibiotics did not significantly reduce the rate of transient or persistent signs of infection, LOS, or need for readmission within

14 days. Our large retrospective multicenter study provides compelling evidence to consider a noninferiority randomized control trial to clarify the role of prophylactic antibiotics in reducing the rate of infection in EUS-GE and EDGI.

DISCLOSURE

The following authors disclosed financial relationships: L. D'Souza: Consultant for BSC, Creo Medical, and Olympus. M. Bilal: Consultant for Boston Scientific, Steris Endoscopy, and Cook Medical. I. Waxman: Consultant for Medtronic, Microtech, BSCI, Cook, and Magentiq Eye. A. Singh: Consultant for BSCI, Creo Medical, and Olympus. A. Schlachterman: Consultant for Olympus, Fujifilm, and Boston Scientific. T. Kowalski: Consultant for Boston Scientific. A. Kumar: Consultant for Olympus, Boston Scientific, Pentax, and Conmed. All other authors disclosed no financial relationships.

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Abbreviations: ASA, American Society of Anesthesiologists; EDGE, EUS-directed transgastric ERCP; EDGI, EUS-directed transgastric intervention; EUS-GE, EUS-guided gastroenterostomy; LAMs, lumen-apposing metal stents; LOS, length of stay; WBC, white blood cell.



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0016-5107/\$36.00

<https://doi.org/10.1016/j.gie.2026.02.023>

Received August 18, 2025. Accepted February 16, 2026.

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SUPPLEMENTARY TABLE 1. Outcomes of patients after EUS-GE

Outcomes	Periprocedural antibiotics	No periprocedural antibiotics	P value
No. of patients (EUS-GE), <i>n</i> = 147	79	68	–
Adverse events, <i>n</i> (%)	25 (31.6)	18 (26.5)	.49
None	54 (68.3)	50 (73.5)	
Fever (temperature >38 °C)	6 (7.6)	3 (4.4)	
Elevated WBC	14 (17.7)	9 (13.2)	
Abdominal pain	9 (11.4)	7 (10.3)	
Cardiopulmonary	0 (0)	1 (1.5)	
Bleeding	2 (2.5)	2 (2.9)	
Transient fever or WBC elevation (%)	17 (21.5)	10 (14.7)	.29
Persistent signs/symptoms of infection (%)	3 (3.8)	3 (4.4)	1
Readmission for sepsis (%)	6 (7.6)	4 (5.9)	.75
LOS (mean)	3.85	4.21	.50
Mortality (%)	3 (3.8)	2 (2.9)	1

–, Unavailable; EUS-GE, EUS-guided gastroenterostomy; LOS, length of stay; WBC, white blood cell.

SUPPLEMENTARY TABLE 2. Outcomes of patients after EDGI

Outcomes	Periprocedural antibiotics	No periprocedural antibiotics	P value
No. of patients (EDGI), <i>n</i> = 116	76	40	–
Adverse events, <i>n</i> (%)	25 (32.9)	18 (45.0)	.20
None	61 (80.3)	32 (80.0)	
Fever (temperature >38 °C)	4 (5.3)	2 (5.0)	
Elevated WBC	10 (13.2)	3 (7.5)	
Abdominal pain	6 (7.9)	5 (12.5)	
Cardiopulmonary	1 (1.3)	2 (5.0)	
Bleeding	1 (1.3)	4 (10.0)	
Transient fever or WBC elevation (%)	10 (13.2)	3 (7.5)	.54
Persistent signs/symptoms of infection (%)	4 (5.3)	1 (2.5)	.66
Readmission for sepsis (%)	2 (2.6)	0 (0)	.54
LOS (mean)	1.58	1.86	.80
Mortality (%)	1 (1.3)	0 (0)	1

–, Unavailable; EDGI, EUS-directed transgastric intervention; LOS, length of stay; WBC, white blood cell.