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Antibiotic prophylaxis for gastrointestinal endoscopic procedures

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INTRODUCTION

The value of antibiotic prophylaxis for gastrointestinal (GI) procedures has been debated for many years. Previously, antibiotic prophylaxis was recommended for many GI procedures in patients with high-risk cardiac conditions to protect against infective endocarditis. However, practices have substantially changed, in part due to the low incidence of infective endocarditis following GI procedures and the lack of randomized trials supporting the benefit of antibiotic prophylaxis. Furthermore, the indiscriminate use of antibiotics can be associated with the development of resistant organisms, *Clostridioides difficile* colitis, unnecessary expense, and drug toxicity. (See "[Clostridioides difficile](#) infection in adults: Epidemiology, microbiology, and pathophysiology", section on 'Antibiotic use'.)

Recommendations for antibiotic prophylaxis prior to GI procedures will be reviewed here. General issues related to prophylaxis for bacterial endocarditis are discussed separately. (See "[Prevention of endocarditis: Antibiotic prophylaxis and other measures](#)".)

The [American Society for Gastrointestinal Endoscopy](#) has published guidelines on antibiotic prophylaxis for GI procedures [1]. In addition, guidelines were published by the American Heart Association [2] and by the British Society of Gastroenterology [3]. The discussion that follows is generally consistent with these guidelines.

PATHOGENESIS

Infections following endoscopic procedures are rare and are presumably the result of bacteremia induced during the procedure or, in the case of procedures such as pancreatic cyst aspiration, the result of inoculation with bacteria during the procedure.

Bacteremia results from translocation of endogenous bacteria into the blood stream via mucosal trauma, whereas inoculation of sterile tissues or spaces (eg, cysts) occurs from direct contact with a contaminated endoscope or endoscopic accessory. Contrast injection may also result in bacteria being introduced into a previously sterile space (eg, the biliary tree during endoscopic retrograde cholangiopancreatography).

The concern with regard to bacteremia is that the bacteria may colonize a remote site, such as a diseased heart valve or a prosthetic joint, resulting in infection. However, it is likely that this is **not** a significant problem with regard to gastrointestinal (GI) procedures.

As an example, there is only a weak association of GI procedures with infective endocarditis, and data are lacking to support a causal link [1]. A literature review by the American Society for Gastrointestinal Endoscopy found only 25 cases of infective endocarditis following endoscopic procedures, which included esophageal dilation, sclerotherapy, gastroscopy, sigmoidoscopy, and colonoscopy [1]. In addition, antibiotic prophylaxis has not been shown to prevent endocarditis following GI procedures.

RATES OF BACTEREMIA AND INFECTION

The rates of bacteremia following gastrointestinal (GI) procedures are generally lower than those seen following routine daily activities such as eating and defecating, and rarely result in clinically evident infection. Furthermore, bacteremia due to organisms capable of causing endocarditis occurs in less than 5 to 10 percent of cases [4-6].

Routine activities — Transient bacteremia is commonly seen following routine daily activities, with rates as high as 68 percent [1]. Some activities associated with bacteremia include:

- Brushing and flossing: 20 to 68 percent
- Using toothpicks: 20 to 40 percent
- Chewing food: 7 to 51 percent

These observations should be considered when evaluating the incidence of transient bacteremia associated with GI endoscopic procedures.

High-risk procedures — The following endoscopic procedures are considered high risk for bacteremia:

- **Dilation of an esophageal stricture** – The risk of bacteremia with esophageal bougienage has been estimated to be 12 to 22 percent [7,8]. Factors that may increase the risk include multiple passes of the dilator and dilation of malignant strictures [8].
- **Endoscopic sclerotherapy of varices** – The mean reported rate of bacteremia is 15 percent (range 0 to 52 percent) with sclerotherapy [1]. Endoscopic variceal ligation is not considered high risk for bacteremia (risk estimated at 9 percent [range 1 to 25 percent]).
- **Endoscopic retrograde cholangiopancreatography (ERCP)** – The risk of bacteremia with ERCP depends upon whether the bile duct is obstructed [9,10]. In one review, the rate was 6 percent in the absence of obstruction and 18 percent in the presence of obstruction [9]. The incidence of post-ERCP cholangitis is also increased in patients with obstruction. (See ["Infectious adverse events related to endoscopic retrograde cholangiopancreatography \(ERCP\)"](#).)

Other procedures are considered high risk for infection unrelated to bacteremia:

- **Endoscopic ultrasound with fine-needle aspiration (EUS-FNA)** – The reported rate of bacteremia associated with EUS-FNA ranges from 4 to 6 percent [1], making it a low-risk procedure with regard to bacteremia. However, the overall infection risk is probably higher. The risk of infection depends on the type of lesion being sampled. Limited data suggest that solid lesions are at low risk for infection (0.01 to 2 percent) [1,11]. The risk of infection following EUS-FNA of cystic lesions is less clear, with reported rates ranging from less than 1 percent to 14 percent [1,4]. Patients undergoing EUS-FNA of mediastinal cysts may be at higher risk for infection, with several case reports and case series reporting infection following EUS-FNA [12,13], some occurring despite the use of antibiotics [1]. (See ['Endoscopic ultrasound'](#) below.)
- **Percutaneous endoscopic gastrostomy (PEG) or jejunostomy (PEJ) tube placement** – In a Cochrane analysis of 12 randomized trials of 1271 patients undergoing PEG tube placement, patients who received antibiotic prophylaxis had a significant reduction in peristomal infections compared with those who did not receive prophylactic antibiotics (pooled odds ratio 0.36) [14]. The procedure to place a PEJ tube is similar to PEG tube placement, though the use of prophylactic antibiotics in this setting has not been studied.

Low-risk procedures — Routine upper endoscopy, colonoscopy, and flexible sigmoidoscopy are all considered to be low-risk procedures with regard to bacteremia and infection. This includes

patients undergoing endoscopic biopsies or polypectomy. The mean reported rates of bacteremia have been estimated to be 4 percent for both gastroscopy without biopsy and colonoscopy, and 0 to 1 percent for flexible sigmoidoscopy [1]. (See '[Patient factors](#)' below.)

WHEN TO USE ANTIBIOTIC PROPHYLAXIS

Recommendations for antibiotic prophylaxis are based on the risks related to specific procedures, as well as patient factors that may predispose to infection ([table 1](#) and [table 2](#)). Gastrointestinal (GI) procedures are low risk for bacterial endocarditis and therefore antibiotic prophylaxis to prevent endocarditis is not recommended, even in patients with the highest-risk cardiac conditions (such as prosthetic valves or prior endocarditis) [1]. Antibiotic prophylaxis is indicated in other settings, such as prior to percutaneous endoscopic gastrostomy (PEG) and jejunostomy (PEJ) tube placement.

Specific procedures

Routine upper endoscopy, colonoscopy, and flexible sigmoidoscopy — Antibiotic prophylaxis is not required for routine endoscopic procedures associated with a low risk of bacteremia. This includes patients undergoing endoscopic biopsies or polypectomy. In addition, antibiotic prophylaxis is not required for most patients undergoing high-risk procedures performed during routine endoscopy (eg, esophageal stricture dilation). (See '[Low-risk procedures](#)' above and '[High-risk procedures](#)' above.)

However, antibiotic prophylaxis is suggested for patients with severe neutropenia (absolute neutrophil count <500 cells/mm³), advanced hematologic malignancies, or cirrhosis with ascites undergoing procedures such as esophageal dilation or endoscopic sclerotherapy, though data to support this recommendation are lacking. (See '[Immunocompromised states](#)' below and '[Cirrhosis](#)' below.)

Endoscopic retrograde cholangiopancreatography (ERCP) — Antibiotics are required for patients with cholangitis as part of their routine care, so additional prophylactic antibiotics are not needed. Prophylactic antibiotics are recommended for patients with biliary obstruction that is unlikely to be drained [1,15-18]. In one trial, the two factors associated with infection following ERCP were incomplete biliary drainage (odds ratio [OR] 5.0) and failure to give antibiotic prophylaxis (OR 6.7). Conditions that make successful drainage less likely include malignant hilar obstruction and primary sclerosing cholangitis. If drainage is not successful, antibiotics should be continued for three to five days following the procedure. We also suggest giving antibiotic prophylaxis to patients at high risk for infection (eg, those with severe

neutropenia, advanced hematologic malignancy, or cirrhosis with ascites). (See ['Immunocompromised states'](#) below and ['Cirrhosis'](#) below.)

Antibiotic prophylaxis is not required in the absence of cholangitis, if biliary drainage is likely to be successful, and for patients undergoing ERCP for reasons other than biliary obstruction.

Finally, patients with inadequate endoscopic biliary drainage following ERCP should receive antibiotics due to the high risk of post-ERCP cholangitis in this setting. Once drainage has been established, antibiotics can be discontinued if there is no evidence of cholangitis. (See ["Infectious adverse events related to endoscopic retrograde cholangiopancreatography \(ERCP\)", section on 'Acute cholangitis'.](#))

Endoscopic ultrasound — Antibiotic prophylaxis is not recommended for most patients undergoing endoscopic ultrasound with fine-needle aspiration (EUS-FNA) of solid lesions. However, it is suggested for patients with severe neutropenia, advanced hematologic malignancies, or cirrhosis with ascites. (See ['Immunocompromised states'](#) below.)

The American Society of Gastrointestinal Endoscopy (ASGE) suggests antibiotic prophylaxis for EUS-FNA of cystic lesions, including pancreatic cysts [1]. However, with the exception of EUS-FNA of mediastinal cysts and EUS-FNA in patients at increased risk of infection, we do not agree with this recommendation. We support the use of antibiotic prophylaxis in patients with mediastinal cysts because these cysts seem to have a higher risk of infection, even when prophylactic antibiotics are used [1]. On the other hand, we believe there are insufficient data to support the routine use of prophylactic antibiotics for EUS-FNA of other cystic lesions [4,19,20]. For example, in a trial including 226 patients with pancreatic cysts who underwent EUS-FNA, postprocedure infection rates were not significantly different for patients given [ciprofloxacin](#) prophylaxis versus placebo (none versus one patient [0.9 percent]) [20]. In addition, rates of other adverse events (eg, fever) were not significantly different between groups. However, since data regarding the potential benefits and harms of antibiotics prior to EUS-FNA of pancreatic cysts are accumulating, prophylactic antibiotic therapy for some patients is a reasonable alternative (eg, patients with incomplete cyst aspiration, cysts associated with pancreatitis, and mucinous cysts) [21].

We give prophylactic antibiotics to all patients undergoing interventional EUS procedures, such as drainage of walled-off pancreatic necrosis, biliary drainage, and fine-needle injection of cysts/tumors. The antibiotic is given before the procedure and typically continued for three to five days after the procedure [1].

Percutaneous endoscopic gastrostomy or jejunostomy placement — Prophylactic antibiotics are recommended for all patients prior to placement of a PEG tube since meta-

analyses of randomized trials have demonstrated that they substantially reduce the risk of peristomal wound infection [14,22]. Antibiotics are also recommended prior to PEJ tube placement.

While prophylactic antibiotics are typically given intravenously (IV), a study from Sweden found that a single 20 mL dose of an oral solution of sulfamethoxazole (800 mg) and trimethoprim (160 mg) deposited in the PEG catheter immediately after insertion was as effective as a single dose of antibiotic IV before the procedure [23].

The emergence of methicillin-resistant *Staphylococcus aureus* (MRSA) as a major pathogen causing PEG-site infections in some centers has raised concerns about the effectiveness of prophylaxis with cephalosporins [24]. We agree with the ASGE guideline recommendation for preprocedural screening for MRSA in areas where MRSA is endemic and attempting decontamination before placing the feeding tube [1]. (See "[Methicillin-resistant Staphylococcus aureus \(MRSA\) in adults: Prevention and control](#)", section on 'Targeted decolonization'.)

Patient factors

Cardiac conditions — Certain cardiac lesions such as prosthetic valves or prior endocarditis have been classified as high risk for infective endocarditis for some procedures (eg, dental work). However, they are **not** considered indications for antibiotic prophylaxis for GI procedures [1,2]. In addition, antibiotic prophylaxis is not recommended for patients with nonvalvular cardiovascular devices such as pacemakers, defibrillators, and cardiac stents [1]. Patients with high-risk cardiac lesions who have active GI infections that are likely to be associated with enterococci (eg, cholangitis) should receive antibiotics active against enterococci. (See "[Acute cholangitis: Clinical manifestations, diagnosis, and management](#)", section on 'General measures'.)

The American Heart Association (AHA) guidelines recommend that antimicrobial prophylaxis be given to patients with high-risk heart valve lesions if they undergo procedures that are likely to result in bacteremia with a microorganism that has the potential ability to cause endocarditis [2]. They do not consider any GI procedure high risk for bacteremia with microorganisms that can cause endocarditis, and therefore do not recommend the routine use of antibiotic prophylaxis, even in patients with high-risk valvular lesions. However, they do note that it is reasonable to administer antibiotic therapy in high-risk patients with established GI tract infections, and the ASGE guidelines recommend that patients with high-risk cardiac lesions receive antibiotics that are active against enterococci if they have infections likely to be associated with enterococci [1].

A potential source of confusion and concern for some patients with cardiac lesions is that they may have been told in the past that they must have antibiotic prophylaxis for all procedures. We recommend that patients be reassured that the recommendations to not give antibiotic prophylaxis come from several professional societies, including the ASGE and the AHA [1,2].

For heart transplant recipients on immunosuppressive therapy who are undergoing endoscopy, we consult with the transplant team and infectious disease specialist for risk assessment and guidance on antibiotic prophylaxis prior to endoscopy.

Immunocompromised states — The use of prophylactic antibiotics in patients who are severely neutropenic (absolute neutrophil count <500 cells/mm³) or who have advanced hematologic malignancies has not been well studied. However, these patients are at increased risk for infection after GI endoscopy [1]. We agree with the recommendation of the ASGE that antibiotic prophylaxis be given to patients with severe neutropenia or advanced hematologic malignancies who are undergoing procedures associated with a high risk of bacteremia. For patients undergoing low-risk procedures, we do not routinely give antibiotic prophylaxis. However, these patients should be under closer post-procedure surveillance for infection. (See ['High-risk procedures'](#) above.)

Whether patients with other causes of immunocompromise (including those on high doses of glucocorticoids) benefit from antibiotic prophylaxis is unclear [25,26]. Currently, routine administration of prophylactic antibiotics is not recommended for patients who are immunocompromised but do not have severe neutropenia or an advanced hematologic malignancy [1].

Cirrhosis — Patients with cirrhosis and acute GI bleeding should receive antibiotic prophylaxis. Antibiotic prophylaxis in this setting is discussed in detail elsewhere. (See ["Overview of the management of patients with variceal bleeding"](#).)

Limited data are available to guide recommendations on antibiotic prophylaxis for patients with cirrhosis and ascites who do not have acute GI bleeding. One study of 244 positive ascitic fluid cultures found that prior GI endoscopy was associated with spontaneous bacterial peritonitis on univariate but not multivariate analysis. Because patients may be at risk for bacterial translocation during endoscopic procedures, we suggest antibiotic prophylaxis for patients with cirrhosis and ascites who are undergoing procedures that are high risk for bacteremia, particularly if the patient is unlikely to tolerate an infection (eg, patients with decompensated cirrhosis). (See ['High-risk procedures'](#) above and ['Low-risk procedures'](#) above.)

Synthetic vascular grafts — We typically do not use antibiotic prophylaxis for patients with synthetic vascular grafts, and this approach is supported by society guidelines [1]. However, we

suggest that elective procedures be performed before a synthetic graft is placed or delayed for six months following placement to permit time for endothelialization of the graft. If a procedure is necessary within six months of graft placement, we generally will give antibiotic prophylaxis for high-risk procedures. (See '[High-risk procedures](#)' above.)

If the decision is made to give prophylactic antibiotics, the regimens recommended for patients who are immunocompromised are appropriate choices ([table 2](#)).

Prosthetic joints — Antibiotic prophylaxis is not recommended for patients with prosthetic joints because data supporting a benefit are limited. However, a case-control study suggested upper endoscopy may increase the risk of infection in patients undergoing upper endoscopy within two years of a joint replacement (adjusted odds ratio 4, 95% CI 1.5-10) [27]. Currently, antibiotic prophylaxis is not recommended by the ASGE or the American Society of Colon and Rectal Surgeons [1,28]. In addition, it is no longer recommended in guidelines from the American Academy of Orthopedic Surgeons [29]. Our approach to a patient whose surgeon has recommended antibiotics is to discuss the issue with the patient. If the patient still wishes to receive antibiotics after the discussion, we will provide antibiotic prophylaxis [30]. This recommendation may change if more data become available suggesting an increased risk of infection following prosthetic joint placement.

Peritoneal dialysis — For peritoneal dialysis patients, we agree with a working group recommendation that the abdomen is emptied of fluid prior to any procedure (eg, upper endoscopy, colonoscopy) involving the abdomen or pelvis [31].

Whether to give antibiotic prophylaxis prior to endoscopic procedures for patients undergoing peritoneal dialysis is uncertain. There have been several case reports of peritonitis in patients undergoing peritoneal dialysis following colonoscopy, particularly after polypectomy (presumably because of bacterial translocation into the peritoneal cavity) [32-36], but there are no high-quality data to guide decision-making. Based on the available data, the International Society for Peritoneal Dialysis (ISPD) and ASGE recommend antibiotic prophylaxis for patients undergoing colonoscopy. We agree that this is a reasonable approach, while randomized trials are needed to further inform practice. The choice of preprocedure antibiotic therapy in this setting is discussed separately [1,31]. (See "[Risk factors and prevention of peritonitis in peritoneal dialysis](#)", section on '[Prophylactic treatment with procedures](#)'.)

We do not use antibiotic prophylaxis prior to upper endoscopy because evidence of a benefit is lacking.

ANTIBIOTIC REGIMENS

The choice of antibiotics will depend on the procedure being performed and patient factors such as allergies. Antibiotic regimens are presented in the table ([table 2](#)).

SOCIETY GUIDELINE LINKS

Links to society and government-sponsored guidelines from selected countries and regions around the world are provided separately. (See "[Society guideline links: Endoscopy preparation, sedation, and special considerations](#)".)

SUMMARY AND RECOMMENDATIONS

- **General principles** – Recommendations for antibiotic prophylaxis for gastrointestinal (GI) procedures, as well as specific antibiotic regimens, are summarized in the tables ([table 1](#) and [table 2](#)). (See '[When to use antibiotic prophylaxis](#)' above.)

The majority of patients undergoing endoscopic procedures do not require antibiotic prophylaxis, including patients with valvular heart disease or prosthetic joints. (See '[Routine upper endoscopy, colonoscopy, and flexible sigmoidoscopy](#)' above and '[Cardiac conditions](#)' above and '[Prosthetic joints](#)' above.)

Antibiotic prophylaxis is only required for procedures associated with a significant risk of infection, or in patients with conditions that make them more susceptible to infection who are undergoing procedures associated with a high risk of bacteremia. (See '[High-risk procedures](#)' above.)

- **Procedures that may require prophylaxis**
 - **Percutaneous endoscopic gastrostomy (PEG) or jejunostomy (PEJ) tube placement** – We recommend antibiotic prophylaxis for all patients undergoing PEG or PEJ tube placement (**Grade 1A**). Prophylactic antibiotics given in this setting substantially reduce the risk of peristomal wound infection. (See '[Percutaneous endoscopic gastrostomy or jejunostomy placement](#)' above.)
 - **Endoscopic retrograde cholangiopancreatography (ERCP)** – For patients with biliary obstruction that is unlikely to be successfully drained endoscopically, we suggest

antibiotic prophylaxis prior to ERCP (**Grade 2C**). (See ['Endoscopic retrograde cholangiopancreatography \(ERCP\)](#)' above.)

Antibiotic prophylaxis is **not** required if the obstruction is likely to be drained during ERCP and the patient does not have cholangitis. Patients with cholangitis should be receiving antibiotics as part of their routine treatment and do not require additional antibiotic prophylaxis.

- **Endoscopic ultrasound with fine-needle aspiration (EUS-FNA)** – For patients with pancreatic cysts undergoing EUS-FNA or ERCP, we suggest **not** giving prophylactic antibiotics (**Grade 2C**). We believe there are insufficient data to support their use in this setting. However, since the data regarding the potential benefits and harms of prophylactic antibiotics in such patients are accumulating, giving prophylactic antibiotics is a reasonable alternative (especially if the cyst is not fully aspirated) and is consistent with American Society of Gastrointestinal Endoscopy (ASGE) guidelines. (See ['Endoscopic ultrasound'](#) above.)

For patients undergoing EUS-FNA of mediastinal cysts, we suggest giving antibiotic prophylaxis (**Grade 2C**). There are some data to suggest that mediastinal cysts have a greater risk of infection.

For patients undergoing EUS-FNA of other cystic lesions along the GI tract, we suggest **not** giving antibiotic prophylaxis (**Grade 2C**). We believe there are insufficient data to support the use of prophylactic antibiotics in this setting.

For patients undergoing EUS-FNA of solid lesions, we suggest **not** giving antibiotic prophylaxis (**Grade 2C**).

Antibiotics are typically given to all patients undergoing interventional EUS procedures such as drainage of walled-off pancreatic necrosis, biliary drainage, fine-needle injection of cysts/tumors, and fiducial placement.

- **Patients who may require prophylaxis because of underlying medical conditions**
 - **Patients who are immunocompromised** – We suggest antibiotic prophylaxis be given to patients with severe neutropenia (absolute neutrophil count <500 cells/mm³) or advanced hematologic malignancies who are undergoing procedures associated with a high risk of bacteremia (**Grade 2C**). (See ['Immunocompromised states'](#) above and ['High-risk procedures'](#) above.)

We do **not** routinely give antibiotic prophylaxis to patients who are immunocompromised but do not have severe neutropenia or an advanced hematologic malignancy.

- **Patients with cirrhosis** – Antibiotics are recommended for patients with cirrhosis and acute GI bleeding, regardless of whether an endoscopy is performed. (See "[Overview of the management of patients with variceal bleeding](#)".)

For patients with cirrhosis who do not have acute GI bleeding, we suggest antibiotic prophylaxis if the patient has ascites and is undergoing a procedure associated with a high risk of bacteremia (**Grade 2C**). (See '[Cirrhosis](#)' above and '[High-risk procedures](#)' above.)

- **Patients with synthetic vascular grafts** – For most patients with synthetic vascular grafts, we suggest **not** giving antibiotic prophylaxis (**Grade 2C**). When possible, elective procedures should be performed before a synthetic graft is placed or delayed for six months following graft placement. If a procedure is necessary within six months of graft placement, we generally will give antibiotic prophylaxis for high-risk procedures. (See '[Synthetic vascular grafts](#)' above.)
- **Patients undergoing peritoneal dialysis** – For peritoneal dialysis patients who are undergoing an endoscopic procedure, the peritoneum should be empty. For patients who are having an upper endoscopy, we suggest **not** giving prophylactic antibiotics (**Grade 2C**). For patients undergoing colonoscopy, society guidelines suggest antibiotic prophylaxis. We agree that this is a reasonable approach, while randomized trials are needed to further inform practice. (See '[Peritoneal dialysis](#)' above.)

The choice of preprocedure antibiotic therapy in this setting is discussed separately. (See "[Risk factors and prevention of peritonitis in peritoneal dialysis](#)", section on '[Prophylactic treatment with procedures](#)'.)

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GRAPHICS

Patients who require antibiotic prophylaxis for endoscopic procedures

Patient group	Procedures that require prophylaxis	Comments*
Specific patient groups		
Patients with cirrhosis and acute GI bleeding	All endoscopic procedures	Patients with cirrhosis and acute GI bleeding require antibiotics as part of their routine treatment, even if they are not undergoing an endoscopic examination.
Cirrhosis with ascites	Procedures that are high risk for infection or bacteremia [¶]	Studies supporting using prophylactic antibiotics in patients with cirrhosis and ascites are lacking. We believe it is prudent to provide prophylaxis in this group of patients, given the risk of bacterial translocation.
Severe neutropenia (ANC <500 cells/mm ³) Advanced hematologic malignancy	Procedures that are high risk for infection or bacteremia [¶]	Studies supporting using prophylactic antibiotics in patients at increased risk for infection are lacking. We believe it is prudent to provide prophylaxis in this group of patients, given their increased risk for infection. Prophylaxis is not recommended for patients who are immunocompromised for other reasons.
Synthetic vascular grafts within six months of graft placement	Procedures that are high risk for infection or bacteremia [¶]	When possible, elective procedures should be performed before a synthetic graft is placed or delayed for six months following graft placement. If a procedure is necessary within six months of graft placement, we generally

		will give antibiotic prophylaxis for high-risk procedures.
Procedure	Patients/conditions that require prophylaxis	Comments*
For patients NOT falling into one of the above mentioned groups		
Upper endoscopy		
<ul style="list-style-type: none"> With or without biopsy, polypectomy, esophageal stricture dilation, endoscopic sclerotherapy, or band ligation of varices 	None	
<ul style="list-style-type: none"> With PEG/PEJ tube insertion 	All patients	The ASGE guidelines recommend pre-procedural screening for MRSA in areas where MRSA is endemic and attempting decontamination before placing the feeding tube.
Colonoscopy or flexible sigmoidoscopy, with or without biopsy or polypectomy	None	Patients undergoing peritoneal dialysis should have the procedure done with the peritoneum empty. However, this recommendation differs from that of the ASGE, which recommends antibiotic prophylaxis for patients undergoing peritoneal dialysis prior to lower GI endoscopy, and the ISPD, which recommends antibiotic prophylaxis for patients undergoing colonoscopy with polypectomy.
ERCP	<p>Cholangitis</p> <p>Biliary obstruction without cholangitis if complete drainage is unlikely (eg, in patients with malignant hilar carcinoma or primary sclerosing cholangitis)</p> <p>Biliary complications following liver transplantation if drainage</p>	<p>Patients with cholangitis should receive antibiotics as part of their routine treatment. Additional prophylaxis is not required.</p> <p>If drainage is not successful, antibiotics should be started. Once drainage has been established, antibiotics can be</p>

	is unlikely	discontinued if there is no cholangitis.
EUS-FNA of cystic lesions	Mediastinal cysts	The ASGE recommends antibiotic prophylaxis for all patients undergoing EUS-FNA of cystic lesions. However, we reserve it for patients with mediastinal cysts since they appear to be at increased risk of infection. We do not provide antibiotic prophylaxis for EUS-FNA of pancreatic cysts because there are insufficient data to support their use in this setting. Antibiotics are typically continued for three to five days after the procedure.
EUS-FNA of solid lesions along the GI tract	None	
Interventional EUS procedures ^Δ , natural orifice transluminal endoscopic surgery (NOTES)	All patients	

NOTE: Refer to other table on antibiotic prophylaxis for endoscopic procedures for specific regimens.

GI: gastrointestinal; ANC: absolute neutrophil count; AHA: American Heart Association; ASGE: American Society for Gastrointestinal Endoscopy; PEG: percutaneous endoscopic gastrostomy; PEJ: percutaneous endoscopic jejunostomy; MRSA: methicillin-resistant *Staphylococcus aureus*; ISPD: the International Society for Peritoneal Dialysis; ERCP: endoscopic retrograde cholangiopancreatography; EUS: endoscopic ultrasound; FNA: fine-needle aspiration.

* The recommendations in this table are generally consistent with guidelines from the ASGE and AHA except as noted here.

¶ Procedures that are high risk for bacteremia or infection include dilation of esophageal strictures, endoscopic sclerotherapy, ERCP, EUS-FNA, and PEG/PEJ tube placement.

Δ Interventional EUS procedures include drainage of walled-off pancreatic necrosis, biliary drainage, and fine-needle injection of cysts/tumors.

Recommendations summarized from:

1. ASGE Standards of Practice Committee, Khashab MA, Chithadi KV, et al. Antibiotic prophylaxis for GI endoscopy. *Gastrointest Endosc* 2015; 81:81.
2. Otto CM, Nishimura RA, Bonow RO, et al. 2020 ACC/AHA Guideline for the Management of Patients With Valvular Heart Disease: A Report of the American College of Cardiology/American Heart Association Joint Committee on Clinical

Practice Guidelines. Circulation 2021; 143:e72.

- 3. Nishimura RA, Carabello BA, Faxon DP, et al. ACC/AHA 2008 guideline update on valvular heart disease: focused update on infective endocarditis: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines: endorsed by the Society of Cardiovascular Anesthesiologists, Society for Cardiovascular Angiography and Interventions, and Society of Thoracic Surgeons. Circulation 2008; 118:887.*
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Graphic 99536 Version 5.0

Antibiotic regimens: Prophylaxis for endoscopic procedures

Procedure	Condition(s)	Antibiotic and dose*	Interval for intraoperative re-dose for prolonged procedure (timed from initiation of preoperative dose)
High-risk endoscopic procedures needing antibiotic prophylaxis[¶] ^Δ			
PEG/PEJ placement	MRSA risk absent	Cefazolin 2 g for patients weighing <120 kg, 3 g for patients weighing ≥120 kg (pediatric dose 30 mg/kg) IV within 60 minutes before procedure. If penicillin or cephalosporin hypersensitivity: Clindamycin 900 mg (pediatric dose 10 mg/kg) IV within 60 minutes before procedure.	Cefazolin: four hours Clindamycin: six hours
	MRSA risk present Pre-procedural screening for MRSA and attempted decontamination before feeding tube placement is recommended if practical	Vancomycin 15 mg/kg (maximum 2 g) IV infused over 60 to 90 minutes and beginning within 120 minutes before surgical incision.	Vancomycin: re-dosing is generally not required
ERCP [◇]	- Biliary obstruction AND cholangitis - Biliary obstruction unlikely to be successfully drained at ERCP (including malignant hilar)	Ciprofloxacin 500 mg (pediatric dose 15 mg/kg [§]) orally given within 60 to 90 minutes prior to procedure or 400 mg (pediatric dose 10 mg/kg [§]) IV over 60	Ciprofloxacin: re-dosing is generally not required

obstruction and primary sclerosing cholangitis)

- Inadequate biliary drainage following ERCP
- Biliary complications following liver transplantation if drainage is unlikely

minutes beginning within 120 minutes prior to procedure

AND/OR

Amoxicillin-clavulanate 1750 mg (pediatric dose 45 mg/kg) orally within 60 minutes prior to procedure or ampicillin-sulbactam 3 grams (pediatric dose 50 mg/kg ampicillin component) IV within 60 minutes prior to procedure

OR

Ampicillin 2 grams (pediatric dose 50 mg/kg) IV **plus** gentamicin[‡] 5 mg/kg (pediatric 2.5 mg/kg) IV within 60 minutes before procedure. **If penicillin hypersensitivity:** Substitute vancomycin 15 mg/kg (maximum 2 g) IV infused over 60 to 90 minutes beginning within 120 minutes before procedure plus gentamicin[‡] 5 mg/kg IV (pediatric 2.5 mg/kg) within 60 minutes before procedure.

Amoxicillin-clavulanate: two hours

Ampicillin: two hours
Vancomycin: re-dosing is generally not required
Gentamicin: single dose only

ALL above regimens are discontinued post-procedure when drainage is established absent evidence of cholangitis. For antibiotic dosing post-procedure with incomplete drainage,

		refer to the individual Lexicomp drug information monograph.	
EUS-FNA of cystic lesion(s) [‡]	- Mediastinal cysts	Ciprofloxacin 500 mg orally (pediatric dose 15 mg/kg [§]) 60 to 90 minutes prior to procedure or 400 mg IV (pediatric dose 10 mg/kg [§]) IV given over 60 minutes beginning within 120 minutes prior to procedure. Continue 3 days post-procedure.	Ciprofloxacin: re-dosing is generally not required
Interventional EUS procedures including transmural or transluminal drainage of pancreatic fluid collections	- Mediastinal cysts - Pancreatic cysts - Cysts outside pancreas (excluding solid lesions) - Walled-off pancreatic necrosis	Ciprofloxacin 500 mg orally (pediatric dose 15 mg/kg [§]) 60 to 90 minutes prior to procedure or 400 mg IV (pediatric dose 10 mg/kg [§]) IV given over 60 minutes beginning within 120 minutes prior to procedure. Continue 3 days post-procedure.	Ciprofloxacin: re-dosing is generally not required
Natural orifice transluminal endoscopic surgery (NOTES)	Insufficient data to make recommendation. Antibiotic prophylaxis seems reasonable.		

High-risk patients needing antibiotic prophylaxis[¶]

All endoscopic procedures with high risk of bacteremia, including procedures not listed above (eg, routine endoscopy with esophageal stricture dilation or	- Immunocompromised patients (eg, severe neutropenia [absolute neutrophil count <500 cells/mm ³], advanced hematologic malignancy) [†]	Amoxicillin 2 grams (pediatric dose 50 mg/kg) orally within 60 minutes before procedure	Amoxicillin: two hours
		OR Ampicillin 2 grams (pediatric dose 50	Ampicillin: two hours Clindamycin: six hours

endoscopic sclerotherapy); For procedures in the biliary tree (eg, ERCP with drainage or EUS-FNA of any lesion type) in a patient who is at high risk for infection, refer to antibiotic recommendations listed above	- Cirrhosis with ascites**	mg/kg) IV or IM within 60 minutes prior to procedure. If penicillin hypersensitivity: Clindamycin 600 mg (pediatric dose 20 mg/kg) orally within 60 minutes before procedure or 900 mg IV (pediatric dose 10 mg/kg IV) within 60 minutes prior to procedure.	
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The preprocedural antibiotic recommendations presented in this table are generally consistent with those of American Society for Gastrointestinal Endoscopy^[1] and the 2013 guidelines developed jointly by the American Society of Health-System Pharmacists and collaborating organizations^[2]. A 2009 guideline available from the British Society of Gastroenterology^[3] also recommends antibiotic prophylaxis in these conditions, but includes, in some cases, different choices and dosing regimens depending upon specific clinical scenarios. When available, recent culture and sensitivity results should be considered in selecting antibiotic prophylaxis.

PEG: percutaneous endoscopic gastrostomy; MRSA: methicillin-resistant *Staphylococcus aureus*; ERCP: endoscopic retrograde cholangiopancreatography; EUS-FNA: endoscopic ultrasound-guided fine-needle aspiration; GI: gastrointestinal.

* Pediatric dose should generally not exceed adult dose. Doses shown in table are for patients with normal renal function. Dose modification for renal impairment is needed for some agents.

¶ Antibiotic prophylaxis solely to prevent infective endocarditis is **not** recommended in patients undergoing endoscopic procedures. For patients with the highest-risk cardiac conditions (eg, prosthetic heart valve, prior endocarditis) who have ongoing GI or genitourinary tract infection or who are undergoing a procedure for which antibiotic therapy to prevent wound infection or sepsis is indicated, the American Society for Gastrointestinal Endoscopy (ASGE) and American Heart Association (AHA) suggest an antibiotic regimen that includes an agent active against enterococci (eg, ampicillin, piperacillin-tazobactam, or vancomycin). Refer to topic review of antimicrobial prophylaxis for bacterial endocarditis section on gastrointestinal tract.

Δ A separate table that summarizes the types of procedures and patients needing antibiotic prophylaxis is available in UpToDate. Low-risk endoscopic procedures that do not need routine antibiotic prophylaxis in most patients (eg, routine upper endoscopy, colonoscopy, flexible sigmoidoscopy, others) are listed in that table.

◇ Patients with cholangitis require antibiotic therapy and additional prophylaxis is not required.

§ While fluoroquinolones have been associated with an increased risk of tendinitis/tendon rupture in all ages, use of these agents for single-dose prophylaxis is generally safe.

¥ Gentamicin use for surgical antibiotic prophylaxis should be limited to a single dose given preoperatively. Dosing is based on the patient's actual body weight. For overweight and obese patients (ie, actual weight is greater than 120% of ideal body weight), a dosing weight should be used. A calculator to determine ideal body weight and dosing weight is available in UpToDate.

‡ While antibiotic prophylaxis is recommended by the ASGE for all patients undergoing EUS-FNA of cystic lesions, we generally reserve antibiotic prophylaxis for patients undergoing EUS-FNA of mediastinal lesions and in those who are at high risk for infection. Antibiotic prophylaxis is not required for patients undergoing EUS-FNA of solid lesions.

† Patients at high risk for postprocedural infections may also include those with decreased gastric acidity and motility resulting from malignancy or acid suppression.

** In patients with cirrhosis and upper gastrointestinal bleeding, antibiotics are indicated even if endoscopy is not planned.

References:

1. ASGE Standards of Practice Committee, Khashab MA, Chithadi KV, et al. Antibiotic prophylaxis for GI endoscopy. *Gastrointest Endosc* 2015; 81:81.
2. Bratzler DW, Dellinger EP, Olsen KM, et al. Clinical Practice Guidelines for Antimicrobial Prophylaxis in Surgery. *Am J Health Syst Pharm* 2013; 70:195.
3. Allison MC, Sandoe JA, Tighe R, et al. Antibiotic prophylaxis in gastrointestinal endoscopy. *Gut* 2009; 58:868.

Additional data from:

1. Red Book: 2012 Report of the Committee on Infectious Diseases, 29th ed, Pickering LK, ed, Elk Grove Village, IL: American Academy of Pediatrics, 2012, p.808.

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Contributor Disclosures

George W Meyer, MD, MACP, MACG Equity Ownership/Stock Options: AbbVie [Pharmaceuticals]; Johnson & Johnson [Pharmaceuticals]; Lilly [Pharmaceuticals]; Procter & Gamble [Pharmaceuticals]. All of the relevant financial relationships listed have been mitigated. **John R Saltzman, MD, FACP, FACG, FASGE, AGAF** No relevant financial relationship(s) with ineligible companies to disclose. **Kristen M Robson, MD, MBA, FACG** No relevant financial relationship(s) with ineligible companies to disclose.

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