Canadian Association of Gastroenterology Practice Guidelines: Antibiotic prophylaxis for gastrointestinal endoscopy

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A number of international guidelines published recently on antibiotic prophylaxis that were relevant to Canadian practice were considered during the preparation of this document. These recommendations have been approved by the Practice Affairs Committee of the Canadian Association of Gastroenterology (CAG) based on the 1995 American Society of Gastrointestinal Endoscopy (1) and the 1996 British Society of Gastroenterology (2) guidelines updated with the new 1997 American Heart Association publication (3). The recent European Society of Gastrointestinal Endoscopy (4) guidelines were also reviewed. Williams (5) commented on the controversies of the subject and reviewed the literature in this journal.

The use of endoscopy has exploded in the past two decades, especially from a therapeutic viewpoint. Bacteremia has been documented during many diagnostic procedures (6) (2% to 5%) including endoscopic retrograde cholangiopancreatography but can follow such trivial daily events as tooth brushing and defecation. There is always a concern about seeding and consequent endocarditis on both native and prosthetic cardiac elements; however, there are few reports of endocarditis attributable to endoscopy.

It is likely that most bacteremic events are inconsequential in an immunocompetent host, particularly with the low pathogenicity of some organisms. *Streptococcus viridans* are the most common cause of endocarditis from oral and upper procedures, and *Enterococcus fecalis* from the lower gastrointestinal tract. Gram-negative bacilli are rarely responsible.

Unfortunately there are not a lot of firm data from which to draw conclusions about antibiotic prophylaxis. Prospective studies would be considered unethical, especially in high risk individuals with such a devastating infection. Animal studies have provided some data, but much of these recommendations are based on empirical observation and risk assessment.

These guidelines are meant to aid practitioners but are not intended to be a substitute for sound clinical judgment. We aim to encourage responsible antibiotic use in this era of cost containment and antibiotic resistance.

SPONSORS AND VALIDATION

This practice guideline was developed by Dr Timothy Devlin MD FRCPC and was reviewed by

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TABLE 1
Approximate incidence of bacteremia in immunocompetent patients

Procedure	Incidence of bacteremia (%)
Tooth brushing	25
Dental extraction	30–60
Gastroscopy	4
Endoscopic variceal sclerotherapy	10–50
Endoscopic variceal band ligation	6
Esophageal dilation/prosthesis	34–5
Esophageal laser	35
Digital rectal examination	4
Proctoscopy	5
Sigmoidoscopy	6–9
Colonoscopy	2–4
Barium enema	11

Data from reference 2

TABLE 2
Cardiac conditions associated with endocarditis

High/moderate risk – prophylaxis recommended
Prosthetic valves
Previous endocarditis
Most congenital heart disease
Surgically created shunts and conduits
Rheumatic valve disease
Hypertrophic cardiomyopathy
Mitral valve prolapse with regurgitation and/or thickened leaflets
Low risk – prophylaxis not recommended
Mitral valve prolapse without regurgitation
Innocent and functional murmurs
Pacemakers and implanted defibrillators
Previous aortocoronary bypass graft surgery
Previous rheumatic fever without valve dysfunction
Previous Kawasaki disease without valve dysfunction
Previous atrial septal defect, ventricular septal defect or patent ductus arteriosus repair
Isolated secundum atrial septal defect

Data from reference 3

RISK OF BACTEREMIA

Table 1 lists the approximate incidence of bacteremia with various gastrointestinal procedures. More traumatic procedures such as esophageal dilation may cause bacteremia in 34% to 54% of cases and variceal sclerotherapy in approximately 10% to 50%; however, variceal band ligation is safer. Laser esophageal ablation is also high risk. Biliary obstruction with possible sepsis is another high risk situation, especially with instrumentation, and even average risk patients deserve prophylaxis. Surprisingly, colonoscopic polypectomy and deep biopsy do not seem to cause extraordinary bacteremia.

TABLE 3
Prophylactic regimens for adults – Standard regimens for upper gastrointestinal procedures

Standard oral regimen
Amoxicillin 2 g orally 1 h preprocedure
Standard parenteral regimen
Ampicillin 2 g intravenously or intramuscularly within 30 mins
Penicillin allergic
Clindamycin 600 mg orally or intravenously, or clarithromycin 500 mg orally, or azithromycin 500 mg orally, or cephalexin 2 g orally* or cefazolin 1 g intravenously*

**Cephalosporins should not be used with urticaria, angioedema or anaphylaxis to penicillins. Data from reference 3*

Conditions of risk – *Cardiac conditions:* Table 2 lists the cardiac conditions that are high/moderate and low risk in terms of infective endocarditis, and indicates whether antibiotic prophylaxis is recommended. Please note that patients with previous aortocoronary bypass and pacemakers are in the negligible risk category and that antibiotic prophylaxis is not recommended for these individuals.

Readers will notice a refinement of the mitral valve prolapse guidelines, which removes many patients without clinical or echo evidence of regurgitation from the prophylaxis list. A cost-benefit analysis suggested that these patients are at low risk (7). Further data and advice on other subtypes of the wide spectrum of mitral valve prolapse may be forthcoming in the cardiology literature. The ultimate decision will rest with the clinician. In an urgent setting without echocardiographic knowledge of the valve status, antibiotics should be given.

Vascular grafts: Vascular grafts less than one year after insertion (not fully endothelialized) are recommended to receive antibiotic prophylaxis per the above guidelines.

Orthopedic prostheses: There has been no change in the recommendation against antibiotic prophylaxis for prosthetic orthopedic material, but a recent survey (8) suggested that approximately 50% of infectious disease program directors recommend standard antibiotics, especially for recently implanted joints to avoid osteomyelitis or joint sepsis.

ANTIBIOTIC REGIMENS

Table 3 lists the antibiotic prophylaxis regimens for esophageal procedures in high and moderate risk procedures.

Table 4 lists the antibiotic prophylaxis regimens for non-esophageal (colonic and biliary) procedures.

Further discussion of the antibiotic classes and the rationale can be found in the American (3) and European (7) documents.

Failures of antibiotic prophylaxis (with documented approved regimens) have been reported. An American Heart Association registry of antibiotic prophylaxis failures was established in the 1980s, with reports of 52 failures (9). Only six (12%) had received the recommended prophylaxis, and most of the failures occurred with regimens that do not conform to those of modern guidelines.

SPECIFIC CIRCUMSTANCES

Some patients are already on antibiotics, and it is wise to use a drug from a different class because the patient may be colonized with resistant strains. Patients who are anticoagulated should not receive antibiotics intramuscularly. Physicians may wish to administer antibiotics to patients for procedures in which antibiotic prophylaxis is not routinely recommended when there may be extraordinary risk and there is a desire to err on the side of caution.

Antibiotic use in neutropenic (less than 100×10^9/L) patients is recommended with high risk procedures, with special attention to Gram-negative coverage. Organ transplant recipients or human immunodeficiency virus-infected individuals who are not neutropenic do not generally require antibiotic prophylaxis. Marrow transplant recipients are at higher risk, especially with graft-versus-host and steroid issues reducing immunity, and prophylaxis is recommended for these individuals (10).

CONCLUSIONS

It must be recognized that the above guidelines are subject to revision in time and that they are not meant to be fully inclusive. Newer antibiotic resistance patterns and novel antimicrobials will be introduced, and these will need to be incorporated into these guidelines.

Many individual situations arise in clinical practice that may not fit the standards. Clinical judgment with cardiology and infectious disease consultations may be needed. Patients with trivial nonregurgitant mitral valve prolapse may be reassured that they do not need antibiotic prophylaxis for most procedures.

We encourage dissemination of these guidelines to all endoscopy areas so that physicians and nurses are fully informed.

TABLE 4
Prophylactic regimens for adults – Standard regimens for lower gastrointestinal and biliary procedures

Ampicillin 2 g plus gentamicin 1.5 mg/kg (not to exceed 120 mg) intravenously within 30 mins of starting
6 h later ampicillin 1 g intravenously or intramuscularly or amoxicillin 1 g orally
Penicillin allergic: substitute vancomycin 1 g intravenously over 1 to 2 h before the procedure with gentamicin as above with no dosing at 6 h

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Canadian Association of Gastroenterology Practice Guideline Disclaimer

This clinical practice guideline has been developed by the author on behalf of the Canadian Association of Gastroenterology (CAG) in order to outline the clinical approach to management problems or training issues. After preparation by the author, based on a review of the literature, each guideline is extensively reviewed by the CAG Practice Affairs Committee, composed of practitioners from across Canada. Changes are made, and once the guideline is felt to be appropriate, it is then circulated for further review by recognized Canadian experts and then amended further. Finally, the guideline is presented to the CAG Governing Board for further review and final approval.

Practice guidelines are intended to give an understanding of a clinical problem and outline one or more preferred approaches to investigation and management of the problem. While practice guidelines are intended to be useful to all physicians, it is recognized that specialists may rely less on practice guidelines than those in more general practice. These guidelines are intended to give a practical approach to a problem based on the current literature, but are not intended to be state-of-the-art reviews with extensive references.

Practice guidelines are developed to be of assistance to practising clinicians and are not intended to be the only approach to the management of clinical problems, nor are they intended to be considered as a 'standard of care'. The CAG Practice Affairs Committee recognizes that clinical circumstances may at times justify an approach different from that outlined in a practice guideline. It is also recognized that new developments in medical research and clinical practice may require subsequent changes to the practice guideline.