

**LEVEL I CLINICAL INQUIRIES****When should patients with mitral valve prolapse get endocarditis prophylaxis?****■ EVIDENCE-BASED ANSWER**

Patients with suspected mitral valve prolapse (MVP) (**Figure 1**) should undergo echocardiography before any procedure that may place them at risk for bacteremia. Patients with MVP and documented absence of mitral regurgitation or valvular thickening likely do not need antibiotic prophylaxis against subacute bacterial endocarditis (SBE). Patients with MVP with documented mitral regurgitation, valvular thickening, or an unknown degree of valvular dysfunction may benefit from antibiotics during procedures that often lead to bacteremia (strength of recommendation: **C**).<sup>1</sup>

**■ EVIDENCE SUMMARY**

Only disease-oriented evidence and expert opinion address prevention for endocarditis. A randomized trial would require an estimated 6000 patients to demonstrate benefit.<sup>2</sup>

Endocarditis occurs in MVP at a rate of 0.1 cases/100 patient-years.<sup>3</sup> However, MVP is the most common predisposing/precipitating cause of native valve endocarditis.<sup>4,5</sup> In animal models, antibiotics prevent endocarditis following experimental bacteremia. The antibiotic can be administered either just before or up to 2 hours after the bacteremic event.<sup>2</sup> It is worth noting that most bacteremia is not associated with medical procedures. Since endocarditis is often fatal, recommendations have been developed based on these animal models. Estimates of

effectiveness of prophylaxis from case-control studies in humans (not limited to patients with MVP) estimate effectiveness from 49% to 91%.<sup>2</sup>

For patients with MVP who do not have evidence of mitral regurgitation on physical examination or echocardiography, the risk of

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**What are Clinical Inquiries?**

**Clinical Inquiries answer real questions** that family physicians submit to the Family Practice Inquiries Network (FPIN), a national, not-for-profit consortium of family practice departments, residency programs, academic health sciences libraries, primary care practice-based research networks, and other specialists.

**Questions chosen** for Clinical Inquiries are those that family physicians vote as most important through a web-based voting system.

**Answers are developed by a specific method:**

**Type I answers**

- FPIN medical librarians conduct systematic and standardized literature searches in collaboration with an FPIN clinician or clinicians.
- FPIN clinician authors select the research articles to include, critically appraise the research evidence, review the authoritative sources, and write the answers.
- Each Clinical Inquiry is reviewed by 4 or more peers and editors before publication in *JFP*.
- FPIN medical librarians coauthor Type I Clinical Inquiries that have required a systematic search.
- Finally, a practicing family physician writes an accompanying commentary.

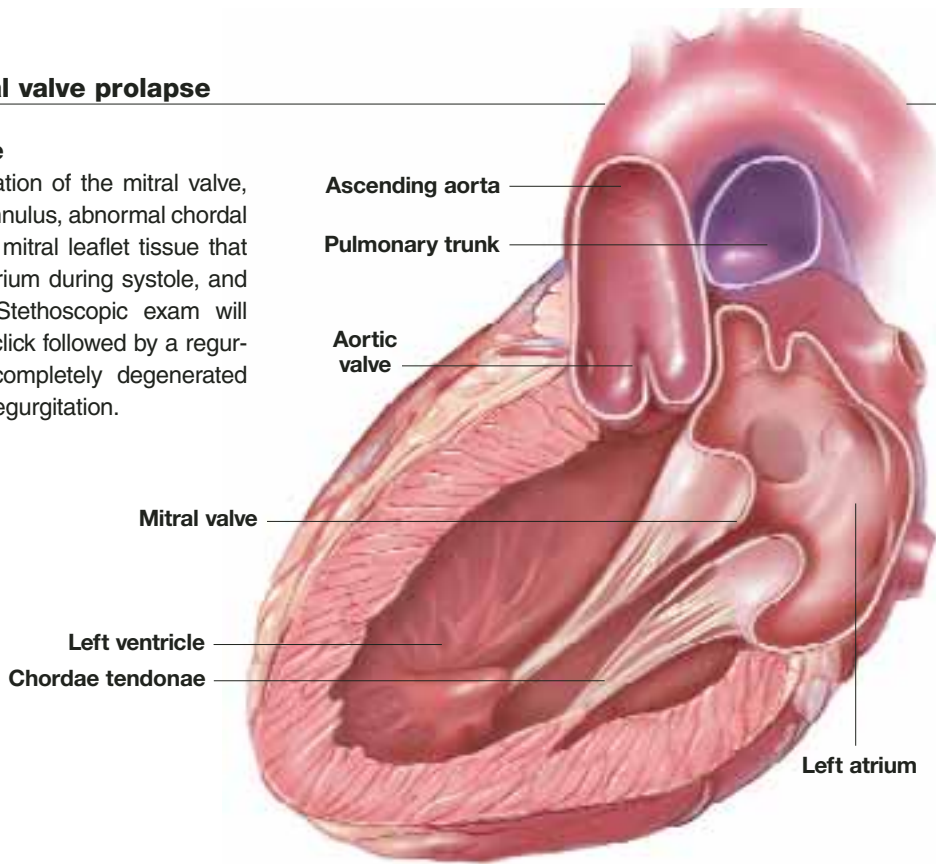
**Type II answers**

- FPIN librarians and editors review questions chosen by practicing physicians and identify those that have been recently answered in the highest-quality sources, such as Cochrane Reviews, Clinical Evidence, or the US Preventive Services Task Force report. These sources report evidence that has been gathered through a systematic literature review, critically appraised, and summarized.
- FPIN clinician authors integrate the available evidence, conduct background searches as needed, conduct a structured search dating from the original search to the present, and prepares the evidence-based answer.
- The Type II Clinical Inquiry is reviewed by two or more peers and editors.
- The author(s) of the Clinical Inquiry answer also prepare the clinical commentary.

**FIGURE 1 Mitral valve prolapse**

**Mitral valve prolapse**

involves the degeneration of the mitral valve, dilation of the mitral annulus, abnormal chordal insertions, redundant mitral leaflet tissue that bulges into the left atrium during systole, and elongated chordae. Stethoscopic exam will reveal a mid-systolic click followed by a regurgitation murmur. A completely degenerated valve leads to mitral regurgitation.



ILLUSTRATIONS BY JENNIFER E. FAIRMAN

**TABLE 1**

**Recommended prophylactic regimens for mitral valve prolapse**

Situation	Medication	Dosage	
<b>Dental, oral, respiratory, esophageal procedures</b>			
		1 hour before procedure	
Standard prophylaxis	Amoxicillin	<b>Adult:</b> 2 g	<b>Child:</b> 50 mg/kg
Allergy to penicillin	Clindamycin	<b>Adult:</b> 600 mg	<b>Child:</b> 20 mg/kg
	Cephalexin	<b>Adult:</b> 2 g	<b>Child:</b> 50 mg/kg
	Azithromycin	<b>Adult:</b> 500 mg	<b>Child:</b> 15 mg/kg
<b>Genitourinary or non-esophageal gastrointestinal procedures</b>			
Moderate-risk patients	Amoxicillin	<b>Adult:</b> 2 g	<b>Child:</b> 50 mg/kg
		1 hour before procedure	
Moderate-risk patients allergic to penicillin	Vancomycin	<b>Adult:</b> 1 g IV	<b>Child:</b> 20 mg/kg IV
		Administer over 1-2 hrs; complete 30 minutes before procedure	
High-risk patients	Add gentamicin to amoxicillin or vancomycin	1.5 mg/kg (up to 120 mg) IV to be completed 30 minutes before procedure. If not allergic to penicillin, give penicillin give penicillin, give amoxicillin 1 g 6 hours after	

Modified from Dajani 1997.<sup>1</sup>

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morbidity may be greater from antibiotic therapy than the risk of endocarditis. Prophylaxis for these patients is not recommended. Patients with MVP associated with regurgitation are at moderate risk and may benefit from antibiotic prophylaxis.

**RECOMMENDATIONS FROM OTHERS**

The American Heart Association has published recommendations in 1985,<sup>6</sup> 1990,<sup>7</sup> and 1997.<sup>1</sup> The 1997 recommendations are summarized in **Figure 2**. The Swiss Working Group for Endocarditis Prophylaxis published similar recommendations in 2000.<sup>8</sup> Recommended prophylactic regimens appear in **Table 1**. **Table 2** shows a modified list of procedures for which prophylaxis is recommended.

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**REFERENCES**

1. Dajani AS, Taubert KA, Wilson W, et al. Prevention of bacterial endocarditis. Recommendations by the American Heart Association. *JAMA* 1997; 277:1794-1801.
2. Durack DT. Prevention of infective endocarditis. *N Engl J Med* 1995; 332:38-44.
3. Zuppiroli A, Rinaldi M, Kramer-Fox R, Favilli S, Roman MJ, Devereux RB. Natural history of mitral valve prolapse. *Am J Cardiol* 1995; 75:1028-1032.
4. Awadallah SM, Kavey RE, Byrum CJ, Smith FC, Kveselis DA, Blackman MS. The changing pattern of infective endocarditis in childhood. *Am J Cardiol* 1991; 68:90-94.
5. McKinsey DS, Ratts TE, Bisno AL. Underlying cardiac lesions in adults with infective endocarditis. The changing spectrum. *Am J Med* 1987; 82:681-688.
6. Shulman ST, Amren DP, Bisno AL, et al. Prevention of bacterial endocarditis: A statement for health professionals by the Committee on Rheumatic Fever and Bacterial Endocarditis of the Council on Cardiovascular Diseases in the Young of the American Heart Association. *Am J Dis Child* 1985; 139:232-235.
7. Dajani AS, Bisno AL, Chung KJ, et al. Prevention of bacterial endocarditis. Recommendations by the American Heart Association. *JAMA* 1990; 264:2919-2922.
8. Moreillon P. Endocarditis prophylaxis revisited: experimental evidence of efficacy and new Swiss recommendations. Swiss Working Group for Endocarditis Prophylaxis. *Schweiz Med Wochenschr* 2000; 130:1013-1026.
9. Chaitlin MD, Armstrong WF, Aurigemma GP, et al. ACC/AHA/ASE 2003 guideline update for the clinical application of echocardiography: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines. *Am Coll Cardiol* 2003; 42:954-970.

**TABLE 2**

**Procedures for which endocarditis prophylaxis is, or is not, recommended**

**Endocarditis prophylaxis recommended**

**Respiratory tract**

Tonsillectomy or adenoidectomy  
Surgical operations that involve respiratory mucosa  
Bronchoscopy with a rigid bronchoscope

**Gastrointestinal tract**

Sclerotherapy for esophageal varices  
Esophageal stricture dilation  
Endoscopic retrograde cholangiography with biliary obstruction  
Biliary tract surgery  
Surgical operations that involve intestinal mucosa

**Genitourinary tract**

Prostatic surgery  
Cystoscopy  
Urethral dilation

**Endocarditis prophylaxis not recommended**

**Respiratory tract**

Endotracheal intubation  
Flexible bronchoscopy, with or without biopsy  
Tympanostomy tube insertion

**Gastrointestinal tract**

Endoscopy with or without gastrointestinal biopsy

**Genitourinary tract**

Circumcision  
Vaginal hysterectomy  
Vaginal delivery  
Cesarean section

**In uninfected tissue**

Incision or biopsy of surgically scrubbed skin  
Urethral catheterization  
Uterine dilatation and curettage  
Therapeutic abortion  
Sterilization procedures  
Insertion or removal of intrauterine devices

**Cardiac**

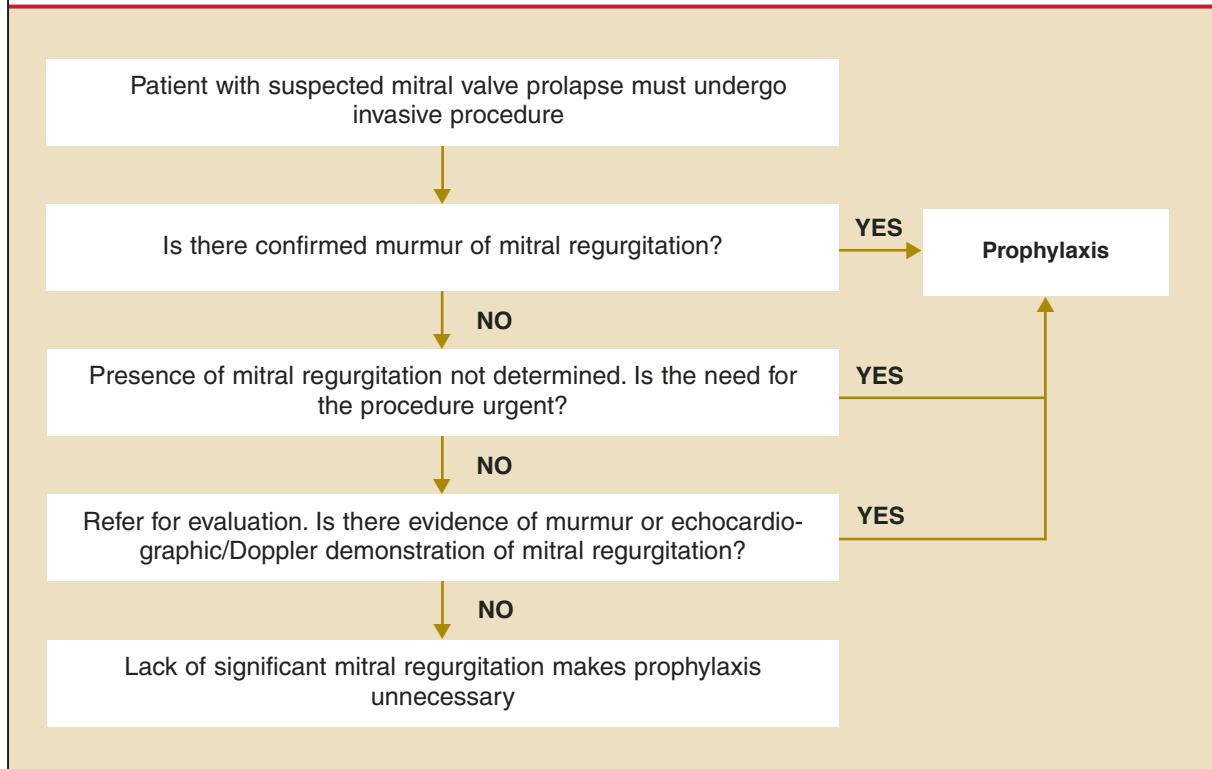
Transesophageal echocardiography  
Cardiac catheterization, including balloon angioplasty and coronary stents  
Implanted cardiac pacemakers, implanted defibrillators

Modified from Dajani et al, 1997.<sup>1</sup>

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FIGURE 2

### Determining the need for antibiotic prophylaxis for patients with mitral valve prolapse



#### CLINICAL COMMENTARY

##### Guidelines assist decision-making regarding who needs SBE prophylaxis

It is unfortunate, but not surprising, that the evidence for SBE prophylaxis for patients with MVP is disease-oriented evidence and expert opinion. Too often, the easy thing to do in a busy practice is not necessarily in the best interest of either the patient or the public. However—despite the low incidence of SBE—the high mortality of the disease and community standard of care often drive clinicians to write that prescription for antibiotics.

With the improved resolution and sensitivity of newer generations of echocardiograms, clinicians often face the dilemma of the patient with MVP and “trivial” or “minimal” mitral regurgitation. Unfortunately, no guidelines assist us in our decision-making regarding these patients.

Another consideration for the clinician is the American Heart Association’s recommendation for SBE prophylaxis for patients with MVP and thickened leaflets, regardless of whether there is associated mitral valve regurgitation.

One significant change that should lessen the frequency of unnecessary antibiotic prescribing was published recently. The echocardiographic criteria for diagnosing MVP were changed in the 2003 updated guidelines from the American College of Cardiology, American Heart Association, and American Society of Echocardiography. Valve prolapse of 2 mm or more above the mitral annulus is required for diagnosis.<sup>10</sup> This change has effectively lowered the prevalence of MVP from 4% to 8% of the general population down to 2% to 3%.

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