Penicillin Allergy Testing

Why It Matters for Your Cardiac Patients

Boulder Medical Center

The Problem

- Approximately 10% of patients report penicillin allergies, but **less than 5% are truly allergic**[1]
- **Over 95% of patients labeled as "penicillin allergic" can safely tolerate penicillin** antibiotics[2]
- Penicillin allergies fade over time—**80% of patients lose sensitivity after 10 years**[3]
- These labels persist for decades, creating **significant consequences for cardiac care**[3]

Impact on Cardiac Surgery

Penicillin allergy labels directly compromise surgical outcomes for your patients.

Surgical Prophylaxis

- **Cefazolin is the recommended first-line prophylactic antibiotic** for cardiac surgery per Society of Thoracic Surgeons guidelines[4,5]
- Patients with penicillin allergy labels have **50% increased odds of surgical site infections** due to receipt of alternative antibiotics[3,6]
- Vancomycin, the alternative for "penicillin-allergic" patients, has **inferior tissue and bone penetration, narrower spectrum, and slower bactericidal effects** compared to cephalosporins[4]
- Vancomycin is **not recommended as the sole prophylactic antibiotic** for cardiac surgery (Class III recommendation) [4]
- Sternal wound infections remain a devastating complication—cefazolin provides superior protection[4.7]

Why Cefazolin is Superior for Cardiac Surgery

- More than 90% of bacteria on sternal skin are sensitive to cefazolin[7]
- Cefazolin maintains adequate tissue levels throughout cardiopulmonary bypass[7]
- Vancomycin requires 1-2 hour infusion, creating logistical challenges for timely administration before incision[1]
- Alternative regimens (vancomycin + aminoglycoside) carry nephrotoxicity and ototoxicity risks, especially after cardiopulmonary bypass[4]

Impact on Infective Endocarditis Treatment

Beta-lactam antibiotics are the cornerstone of endocarditis therapy.

- **Beta-lactams are recommended over vancomycin or daptomycin** for methicillin-susceptible S. aureus endocarditis[8]
- Nafcillin/oxacillin or cefazolin are **drugs of choice** for MSSA native-valve endocarditis[8]
- For viridans streptococci and S. gallolyticus endocarditis, **penicillin G or ceftriaxone are first-line therapy**[8.9]
- For enterococcal endocarditis, **ampicillin plus ceftriaxone** is preferred, especially in elderly patients or those with renal disease[8]

- Vancomycin-based regimens are considered **"regimens of last resort"** due to toxicity[8]

Impact on Endocarditis Prophylaxis

- **Amoxicillin is the recommended prophylactic agent** for dental procedures in high-risk cardiac patients[1]
- Penicillin allergy labels force use of alternatives with less evidence of efficacy[1]

Consequences of Using Alternative Antibiotics

When cardiac patients with unverified penicillin allergies receive alternative antibiotics, they face: [1, 2,3,6]

- **50% increased odds of surgical site infections** after cardiac surgery
- **23-26% increased risk of C. difficile infection**
- **Increased antimicrobial resistance** (MRSA, VRE)
- **Higher mortality rates** from suboptimal endocarditis treatment
- **Nephrotoxicity and ototoxicity** from vancomycin/aminoglycoside combinations
- **Longer hospital stays and higher healthcare costs**

Benefits of Penicillin Allergy Testing

- Enables use of **first-line cefazolin prophylaxis** for cardiac surgery
- Reduces surgical site infections and sternal wound complications
- Allows **optimal beta-lactam therapy** for infective endocarditis
- Enables appropriate endocarditis prophylaxis for dental procedures
- Decreases C. difficile infections and antimicrobial resistance
- Reduces nephrotoxicity from alternative antibiotic regimens
- **Over 95% of tested patients can be safely "de-labeled"**[2,6]

References

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PENICILLIN ALLERGY CLINIC

Help us give your cardiac patients access to optimal GBS prophylaxis and first-line antibiotic therapy.

WHO TO REFER

Pre-Surgical Patients who

- Are scheduled for CABG, valve surgery, or other cardiac procedures
- Have penicillin allergy labels who would benefit from cefazolin prophylaxis
- Are undergoing device implantation (pacemakers, ICDs, LVADs)

Endocarditis Risk Patients with

- Prosthetic valves, prior endocarditis, or congenital heart disease
- Frequent dental procedures who need optimal prophylaxis
- Active or suspected infective endocarditis requiring beta-lactam therapy

General Cardiac Patients

- Patients with penicillin allergy labels acquired in childhood or more than 10 years ago
- Patients with remote reactions or unknown reaction details
- Any patient where first-line beta-lactam therapy would be beneficial

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Safe, Evidence-Based Testing

We use validated, internationally recognized protocols:

- Direct oral amoxicillin challenge for low-risk patients (most patients)
- Risk stratification using validated clinical decision rules (PEN-FAST)
- Skin testing available for higher-risk histories when indicated
- Severe reactions are exceedingly rare
- For patients with non-IgE mediated reactions (simple rash) or unclear history, cephalosporins can often be administered safely

Ideal Timing for Referral

Delabeling before cardiac surgery can prevent surgical site infections and improve outcomes.

Clinic capacity can expand based on demand.

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