American Academy of Allergy Asthma & Immunology

Penicillin Allergy Testing Should Be Performed Routinely in Patients with Self-Reported Penicillin Allergy

Penicillin Allergy in Antibiotic Resistance Workgroup

Adverse reactions to medications are frequently observed. Among the drugs associated with IgE-mediated allergic reactions, penicillins are most commonly implicated.[1] Penicillin allergy is estimated to affect 7% to 10% of community populations and up to 20% of hospitalized patients.[1,2] However, when penicillin allergy testing is performed in individuals who report a history of penicillin allergy, the overwhelming majority do not exhibit positive reactions. The rate of positive skin test results to penicillin in recent studies is only 1% to 8%.[3-5] The reasons for the low rate of confirmed penicillin allergy include mislabeling of a side effect (eg, gastrointestinal upset) or a coincidental event (eg, headache or cutaneous eruption due to underlying infection) as an allergic reaction, reduced rates of exposure to parenteral penicillins, and loss of IgE-mediated allergy with avoidance of penicillins over time.[2]

Skin testing was introduced as a diagnostic intervention for the evaluation and management of patients with a history of penicillin allergy in the late 1950s and early 1960s, independently by Charles Parker and Bernard Levine.[6] This procedure is commonly performed, and with minimal risk. Penicillin skin testing can be done safely in properly selected patients with suspected penicillin allergy, even in pregnant women with group B Streptococcal infections[7] and in patients who require organ transplantation.[8]

Systemic reactions have been reported, although rarely; for this reason, penicillin allergy testing should be performed in a health care setting only by clinicians with the knowledge, training, and experience to select appropriate patients for this procedure, interpret test results, and manage a systemic allergic reaction should it occur.[1,2] Patients with negative skin testing to penicillin reagents, followed by an oral challenge that is well tolerated, are able to receive penicillins without increased risk of IgE-mediated allergic reaction. The negative predictive value of penicillin allergy testing exceeds 99%.[9]

Reporting a history of penicillin allergy is associated with a morbidity that has not been widely appreciated until recently. Unverified penicillin allergy in hospitalized patients is associated with longer hospital stays and increased rates of serious drug-resistant infections.[10] For this reason, the Choosing Wisely program of the American Board of Internal Medicine Foundation recommended in 2014 that clinicians not overuse non–beta-lactam antibiotics in patients with a history of penicillin allergy, without an appropriate evaluation.[11] The National Quality Partners' Antibiotic Stewardship Action Team recommends penicillin allergy skin testing as a component of a comprehensive antibiotic stewardship program.[12]

In the absence of appropriate evaluation for penicillin allergy, patients providing a history of penicillin allergy must continue to avoid penicillins. For example, when such patients undergo a surgical procedure, preoperative antibiotics are commonly administered prophylactically to safeguard against postoperative infection. Hospitalized patients frequently report allergy to penicillin. Providing this history leads to receiving an alternative antibiotic (eg, vancomycin, a quinolone, or a carbapenem). These alternative therapies can be associated with higher cost and/or greater risk for untoward effects. More frequent use of alternative non–beta-lactam antibiotics also may lead to greater

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nosocomial rates of resistant gram-positive (eg, enterococci and staphylococcus) and gram-negative (eg, klebsiella) strains, which are associated with increased costs, poorer patient outcomes, and other burdens.

In 2015, President Obama released an Executive Order for a National Action Plan for combating antibiotic-resistant bacteria.[13] This plan focuses on reducing the emergence and spread of resistant bacteria and infections, and promotes antibiotic stewardship in hospital and ambulatory settings. The National Quality Forum (NQF) has committed its support and resources to this initiative. Antibiotic stewardship was selected by attendees at the March 2015 annual NQF meeting as 1 of its 2 priority issues for this year. The AAAAI, which has been a member of the NQF since 2011, has joined as an active participant in this praiseworthy effort.

Penicillin allergy testing is associated with an unrealized potential: this procedure can accurately identify the approximately 9 of 10 patients who despite reporting a history of penicillin allergy can receive penicillins safely, that is, without elevated risk for an IgE-mediated allergic reaction compared with the general population. In the context of the recently launched national antibiotic stewardship initiative, the AAAAI encourages more widespread and routine performance of penicillin skin testing for patients with a history of allergy to penicillin or another beta lactam (eg, ampicillin or amoxicillin). More frequent performance of penicillin allergy testing can be expected to lead to a greater proportion of patients safely receiving penicillins, including patients undergoing surgical procedures, hospitalized patients with serious infections, and patients who require antibiotics in the ambulatory setting. On the basis of current evidence, we are confident that more frequent and routine performance of penicillin allergy testing will be associated with reduced costs of care, enhanced patient safety, and improved outcomes of care.

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