

# Penicillin Allergy Tied to Responses to Other Drugs

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SAN DIEGO — People who report allergies to other drugs were more than 27 times as likely to report a penicillin allergy as people who reported no other drug allergies, Dr. Andrea J. Apter reported in a poster presentation at the annual meeting of the American Academy of Allergy, Asthma, and Immunology.

Other statistically significant predictors of

penicillin allergy were a family history of penicillin allergy and a personal history of asthma, allergic rhinitis, or atopic dermatitis, wrote Dr. Apter of the University of Pennsylvania, Philadelphia, and associates.

The study involved 24 adults with penicillin allergies and 39 age-matched controls with no allergies to penicillin. All were recruited from the offices of allergists.

Patients were judged to have a penicillin allergy if they responded positively to the questions, "Are you allergic to penicillin or

its derivatives (for example, penicillin, amoxicillin, Augmentin, ampicillin, dicloxacillin, piperacillin, ticarcillin)? By allergic reaction, did you have hives, angioedema, wheeze, hypotension, or anaphylaxis after a dose of this antibiotic?"

The patients completed a questionnaire inquiring about several health-related matters, such as whether they had asthma, allergic rhinitis, or eczema; were currently taking more than two medications; or had more than two current medical diagnoses.

After controlling for age and a personal history of atopy, the researchers found statistically significant associations between penicillin allergy and allergies to other drugs (odds ratio 27.4) and between a personal history of penicillin allergy and a family history of penicillin allergy (OR 8.8). After controlling for age, they found a statistically significant association between a personal history of penicillin allergy and a personal history of atopy (OR 3.5). No other associations were statistically significant. ■

**References:** 1. Weyer C, Heise T, Heinemann L. Insulin aspart in a 30/70 premixed formulation: pharmacodynamic properties of a rapid-acting insulin analog in stable mixture. *Diabetes Care*. 1997;20:1612-1614. 2. Raskin P, Allen E, Hollander P, et al, for the INITIATE Study Group. Initiating insulin therapy in type 2 diabetes: a comparison of biphasic and basal insulin analogs. *Diabetes Care*. 2005;28:260-265. 3. Garber AJ, Wahlen J, Wahl T, et al. Attainment of glycaemic goals in type 2 diabetes with once-, twice-, or thrice-daily dosing with biphasic insulin aspart 70/30 (the 1-2-3 study). *Diabetes Obes Metab*. 2006;8:58-66. 4. Data on file. Novo Nordisk Inc, Princeton, NJ. 5. IMS Health Inc. Q3 2005 IMS formulary focus data, interstudy lives. Valid as of December 2006.

**NovoLog® Mix 70/30**  
70% insulin aspart protamine suspension and  
30% insulin aspart injection, (rDNA origin)

**BRIEF SUMMARY. PLEASE CONSULT PACKAGE INSERT FOR FULL PRESCRIBING INFORMATION.**

#### INDICATIONS AND USAGE

NovoLog Mix 70/30 is indicated for the treatment of patients with diabetes mellitus for the control of hyperglycemia.

#### CONTRAINDICATIONS

NovoLog Mix 70/30 is contraindicated during episodes of hypoglycemia and in patients hypersensitive to NovoLog Mix 70/30 or one of its excipients.

#### WARNINGS

Because NovoLog Mix 70/30 has peak pharmacodynamic activity one hour after injection, it should be administered with meals.

NovoLog Mix 70/30 should not be administered intravenously.

NovoLog Mix 70/30 is not to be used in insulin infusion pumps.

NovoLog Mix 70/30 should not be mixed with any other insulin product.

Hypoglycemia is the most common adverse effect of insulin therapy, including NovoLog Mix 70/30. As with all insulins, the timing of hypoglycemia may differ among various insulin formulations.

Glucose monitoring is recommended for all patients with diabetes.

Any change of insulin dose should be made cautiously and only under medical supervision. Changes in insulin strength, manufacturer, type (e.g., regular, NPH, analog), species (animal, human), or method of manufacture (rDNA versus animal-source insulin) may result in the need for a change in dosage.

#### PRECAUTIONS

##### General

Hypoglycemia and hypokalemia are among the potential clinical adverse effects associated with the use of all insulins. Because of differences in the action of NovoLog Mix 70/30 and other insulins, care should be taken in patients in whom such potential side effects might be clinically relevant (e.g., patients who are fasting, have autonomic neuropathy, or are using potassium-lowering drugs or patients taking drugs sensitive to serum potassium level).

Fixed ratio insulins are typically dosed on a twice daily basis, i.e., before breakfast and supper, with each dose intended to cover two meals or a meal and snack. The dose of insulin required to provide adequate glycemic control for one of the meals may result in hyper- or hypoglycemia for the other meal. The pharmacodynamic profile may also be inadequate for patients (e.g., pregnant women) who require more frequent meals.

Adjustments in insulin dose or insulin type may be needed during illness, emotional stress, and other physiologic stress in addition to changes in meals and exercise.

The pharmacokinetic and pharmacodynamic profiles of all insulins may be altered by the site used for injection and the degree of vascularization of the site. Smoking, temperature, and exercise contribute to variations in blood flow and insulin absorption. These and other factors contribute to inter- and intra-patient variability.

Lipodystrophy and hypersensitivity are among other potential clinical adverse effects associated with the use of all insulins.

**Hypoglycemia** - As with all insulin preparations, hypoglycemic reactions may be associated with the administration of NovoLog Mix 70/30. Rapid changes in serum glucose concentrations may induce symptoms of hypoglycemia in persons with diabetes, regardless of the glucose value. Early warning symptoms of hypoglycemia may be different or less pronounced under certain conditions, such as long duration of diabetes, diabetic nerve disease, use of medications such as beta-blockers, or intensified diabetes control.

**Renal Impairment** - Clinical or pharmacology studies with NovoLog Mix 70/30 in diabetic patients with various degrees of renal impairment have not been conducted. As with other insulins, the requirements for NovoLog Mix 70/30 may be reduced in patients with renal impairment.

**Hepatic Impairment** - Clinical or pharmacology studies with NovoLog Mix 70/30 in diabetic patients with various degrees of hepatic impairment have not been conducted. As with other insulins, the requirements for NovoLog Mix 70/30 may be reduced in patients with hepatic impairment.

**Allergy - Local Reactions** - Erythema, swelling, and pruritus at the injection site have been observed with NovoLog Mix 70/30 as with other insulin therapy. Reactions may be related to the insulin molecule, other components in the insulin preparation including protamine and cresol, components in skin cleansing agents, or injection techniques.

**Systemic Reactions** - Less common, but potentially more serious, is generalized allergy to insulin, which may cause

rash (including pruritus) over the whole body, shortness of breath, wheezing, reduction in blood pressure, rapid pulse, or sweating. Severe cases of generalized allergy, including anaphylactic reaction, may be life threatening. Localized reactions and generalized myalgias have been reported with the use of cresol as an injectable excipient.

**Antibody production** - Specific anti-insulin antibodies as well as cross-reacting anti-insulin antibodies were monitored in the 3-month, open-label comparator trial as well as in a long-term extension trial. Changes in cross-reactive antibodies were more common after NovoLog Mix 70/30 than with Novolin® 70/30 but these changes did not correlate with change in HbA1c or increase in insulin dose. The clinical significance of these antibodies has not been established. Antibodies did not increase further after long-term exposure (>6 months) to NovoLog Mix 70/30.

**Information for patients** - Patients should be informed about potential risks and advantages of NovoLog Mix 70/30 therapy including the possible side effects. Patients should also be offered continued education and advice on insulin therapies, injection technique, life-style management, regular glucose monitoring, periodic glycosylated hemoglobin testing, recognition and management of hypo- and hyperglycemia, adherence to meal planning, complications of insulin therapy, timing of dose, instruction for use of injection devices, and proper storage of insulin.

Female patients should be advised to discuss with their physician if they intend to, or if they become, pregnant because information is not available on the use of NovoLog Mix 70/30 during pregnancy or lactation (see PRECAUTIONS, Pregnancy).

**Laboratory Tests** - The therapeutic response to NovoLog Mix 70/30 should be assessed by measurement of serum or blood glucose and glycosylated hemoglobin.

**Drug Interactions** - A number of substances affect glucose metabolism and may require insulin dose adjustment and particularly close monitoring. The following are examples of substances that may increase the blood-glucose-lowering effect and susceptibility to hypoglycemia: oral antidiabetic products, ACE inhibitors, disopyramide, fibrates, fluoxetine, monoamine oxidase (MAO) inhibitors, propoxyphene, salicylates, somatostatin analog (e.g., octreotide), sulfonamide antibiotics.

The following are examples of substances that may reduce the blood-glucose-lowering effect: corticosteroids, niacin, danazol, diuretics, sympathomimetic agents (e.g., epinephrine, salbutamol, terbutaline), isoniazid, phenothiazine derivatives, somatropin, thyroid hormones, estrogens, progestogens (e.g., in oral contraceptives).

Beta-blockers, clonidine, lithium salts, and alcohol may either potentiate or weaken the blood-glucose-lowering effect of insulin.

Pentamidine may cause hypoglycemia, which may sometimes be followed by hyperglycemia.

In addition, under the influence of sympatholytic medical products such as beta-blockers, clonidine, guanethidine, and reserpine, the signs of hypoglycemia may be reduced or absent.

##### Mixing of Insulins

NovoLog Mix 70/30 should not be mixed with any other insulin product.

##### Carcinogenicity, Mutagenicity, Impairment of Fertility

Standard 2-year carcinogenicity studies in animals have not been performed to evaluate the carcinogenic potential of NovoLog Mix 70/30. In 52-week studies, Sprague-Dawley rats were dosed subcutaneously with NovoLog®, the rapid-acting component of NovoLog Mix 70/30, at 10, 50, and 200 U/kg/day (approximately 2, 8, and 32 times the human subcutaneous dose of 1.0 U/kg/day, based on U/body surface area, respectively). At a dose of 200 U/kg/day, NovoLog increased the incidence of mammary gland tumors in females when compared to untreated controls. The incidence of mammary tumors for NovoLog was not significantly different than for regular human insulin. The relevance of these findings to humans is not known. NovoLog was not genotoxic in the following tests: Ames test, mouse lymphoma cell forward gene mutation test, human peripheral blood lymphocyte chromosome aberration test, in vivo micronucleus test in mice, and in ex vivo UDS test in rat liver hepatocytes. In fertility studies in male and female rats, NovoLog at subcutaneous doses up to 200 U/kg/day (approximately 32 times the human subcutaneous dose, based on U/body surface area) had no direct adverse effects on male and female fertility, or on general reproductive performance of animals.

##### Pregnancy-Teratogenic Effects—Pregnancy Category C

Animal reproduction studies have not been conducted with NovoLog Mix 70/30. However, reproductive toxicology and teratology studies have been performed with NovoLog (the rapid-acting component of NovoLog Mix 70/30) and regular human insulin in rats and rabbits. In these studies, NovoLog was given to female rats before mating, during mating, and throughout pregnancy, and to rabbits during organogenesis. The effects of NovoLog did not differ from those observed with subcutaneous regular human insulin. NovoLog, like human insulin, caused pre- and post-implantation losses and

visceral/skeletal abnormalities in rats at a dose of 200 U/kg/day (approximately 32-times the human subcutaneous dose of 1.0 U/kg/day, based on U/body surface area), and in rabbits at a dose of 10 U/kg/day (approximately three times the human subcutaneous dose of 1.0 U/kg/day, based on U/body surface area). The effects are probably secondary to maternal hypoglycemia at high doses. No significant effects were observed in rats at a dose of 50 U/kg/day and rabbits at a dose of 3 U/kg/day. These doses are approximately 8 times the human subcutaneous dose of 1.0 U/kg/day for rats and equal to the human subcutaneous dose of 1.0 U/kg/day for rabbits based on U/body surface area.

It is not known whether NovoLog Mix 70/30 can cause fetal harm when administered to a pregnant woman or can affect reproductive capacity. There are no adequate and well-controlled studies of the use of NovoLog Mix 70/30 or NovoLog in pregnant women. NovoLog Mix 70/30 should be used during pregnancy only if the potential benefit justifies the potential risk to the fetus.

**Nursing Mothers** - It is unknown whether NovoLog Mix 70/30 is excreted in human milk as is human insulin. There are no adequate and well-controlled studies of the use of NovoLog Mix 70/30 or NovoLog in lactating women.

**Pediatric Use** - Safety and effectiveness of NovoLog Mix 70/30 in children have not been established.

**Geriatric Use** - Clinical studies of NovoLog Mix 70/30 did not include sufficient numbers of patients aged 65 and over to determine whether they respond differently than younger patients. In general, dose selection for an elderly patient should be cautious, usually starting at the low end of the dosing range reflecting the greater frequency of decreased hepatic, renal, or cardiac function, and of concomitant disease or other drug therapy in this population.

##### ADVERSE REACTIONS

Clinical trials comparing NovoLog Mix 70/30 with Novolin 70/30 did not demonstrate a difference in frequency of adverse events between the two treatments.

Adverse events commonly associated with human insulin therapy include the following:

**Body as whole:** Allergic reactions (see PRECAUTIONS, Allergy).

**Skin and Appendages:** Local injection site reactions or rash or pruritus, as with other insulin therapies, occurred in 7% of all patients on NovoLog Mix 70/30 and 5% on Novolin 70/30. Rash led to withdrawal of therapy in <1% of patients on either drug (see PRECAUTIONS, Allergy).

**Hypoglycemia:** see WARNINGS and PRECAUTIONS.

**Other:** Small elevations in alkaline phosphatase were observed in patients treated in NovoLog controlled clinical trials. There have been no clinical consequences of these laboratory findings.

##### OVERDOSAGE

Hypoglycemia may occur as a result of an excess of insulin relative to food intake, energy expenditure, or both. Mild episodes of hypoglycemia usually can be treated with oral glucose. Adjustments in drug dosage, meal patterns, or exercise, may be needed. More severe episodes with coma, seizure, or neurologic impairment may be treated with intramuscular/subcutaneous glucagon or concentrated intravenous glucose. Sustained carbohydrate intake and observation may be necessary because hypoglycemia may recur after apparent clinical recovery.

##### More detailed information is available on request.

Rx only

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## WBC Might Not Be Best Bacterial Infection Marker

An abnormal white blood cell count is not a useful marker for predicting concurrent serious bacterial infection in infants and young children hospitalized with respiratory syncytial virus lower respiratory tract infection, results from a large single-center study demonstrated.

The finding is important because although there is a guideline for treating infants and young children with fever without a source (Pediatrics 1993;92:1-12), there is no guideline that addresses the treatment of febrile infants and young children with clinical evidence of viral infection, Dr. Kevin Purcell and Dr. Jaime Fergie said.

The researchers studied the medical records of 1,920 infants and young children admitted to Driscoll Children's Hospital in Corpus Christi, Tex., with respiratory syncytial virus (RSV) lower respiratory tract infections between July 1, 2000, and June 30, 2005 (Pediatr. Infect. Dis. J. 2007;26:311-5).

They defined fever as having a temperature of 100.4° F or higher before admission. The WBC count was considered abnormal if it was lower than 5,000/mcL of blood or it reached or exceeded 15,000/mcL of blood. The median age of the 1,920 patients was 142 days, and 672 had a complete WBC count and bacterial culture.

Overall, only 34 of the 672 patients (5.1%) had a positive bacterial culture. The probability of a WBC less than 5,000/mcL and a level between 15,000 and 29,999/mcL being associated with a concurrent serious bacterial infection ranged from 0% to 5.7%. This was no different from the rate of a normal WBC in febrile and afebrile patients, which ranged from 3.9% to 4.7%. However, patients with a WBC of 30,000/mcL or greater were about six times more likely to have a concurrent serious bacterial infection than those who had lower levels.

"Applying the guideline for treatment of infants and young children with fever without a source to patients with RSV lower respiratory tract infection is of no use in predicting the presence of a concurrent serious bacterial infection. However, we believe [one should] obtain blood cultures in infants with RSV lower respiratory tract infection that have a WBC count of 30,000 per mcL or greater or are toxic-appearing," they wrote.

—Doug Brunk