ALLERGEN Focus

Focus on T.R.U.E. Test Allergen #5:

Caine Anesthetics

BY SHARON E. JACOB, M.D., AND ASHA R. PATEL, B.S.

This expert provides an enlightening, practical look at common allergens so that you can better educate your patients about the basis for their allergy and what products they need to avoid.

Sharon E. Jacob, M.D

The thin-layer rapid use epicutaneous (T.R.U.E) Test of 23 common allergens is a valuable, first-line screening tool used by many dermatologists. Although the test focuses on common allergens, frequent questions have arisen from colleagues and patients as to where a specific allergen is derived or what products should be avoided by patients. With this in mind, this column was developed to provide educational information about the T.R.U.E. Test allergens. A rich, interesting history accompanies each of the 23 allergens, and understanding these historic perspectives can help you to better educate patients. Each column will also highlight appropriate products patients should avoid when they're allergic to a specific allergen.

CONTACT DERMATIDES

Allergic contact dermatitis is an important disease with high impact both in terms of patient morbidity and economics. The contact dermatides include allergic contact dermatitis, irritant contact dermatitis and contact urticaria.

Irritant contact dermatitis, the most common form, accounts for approximately 80% of environmental-occupational based dermatoses.

Contact urticaria (wheal and flare reaction) represents an IgE and mast cell-mediated immediate-type hypersensitivity reaction that can lead to anaphylaxis, the foremost example of this would be latex hypersensitivity. Although this is beyond the scope of this section, we acknowledge this form of hypersensitivity due to the severity of the potential reactions and direct the reader to key sources.[1,2]

The primary focus of this section is to highlight the educational component of allergic contact dermatitis.

CLINICAL ILLUSTRATION

A patient presented to the University of Miami Contact Dermatitis Clinic with a history of facial erythema and swelling 1 week after dental surgery. (See photo on next page.) She related that she'd had a similar reaction 15 years prior and had been T.R.U.E. tested at that time. The results had shown that she was allergic to paraphenylenediamine dye (which she avoided) and the caine mix. She presented to determine which anesthetic would be safe for her use in the future.

THE HISTORY OF LOCAL ANESTHETICS

The history of local anesthetics dates back to the time when the New World and all its mysteries were being discovered. Around 1530, after the occupation of Peru by Spanish conquistador Francisco Pizarro, Europeans began to discover the medicinal powers of the potent coca plant that native Peruvians considered healthful.

Approximately three centuries later, in 1850, Austrian Carl von Scherzer brought coca leaves *en masse* to Europe for further analytical study. Carl von Scherzer bequeathed his find to two German scientists, Albert Niemann and Wilhelm Lossen, who then discovered the main alkaloid of the coca plant and appropriately named it cocaine.

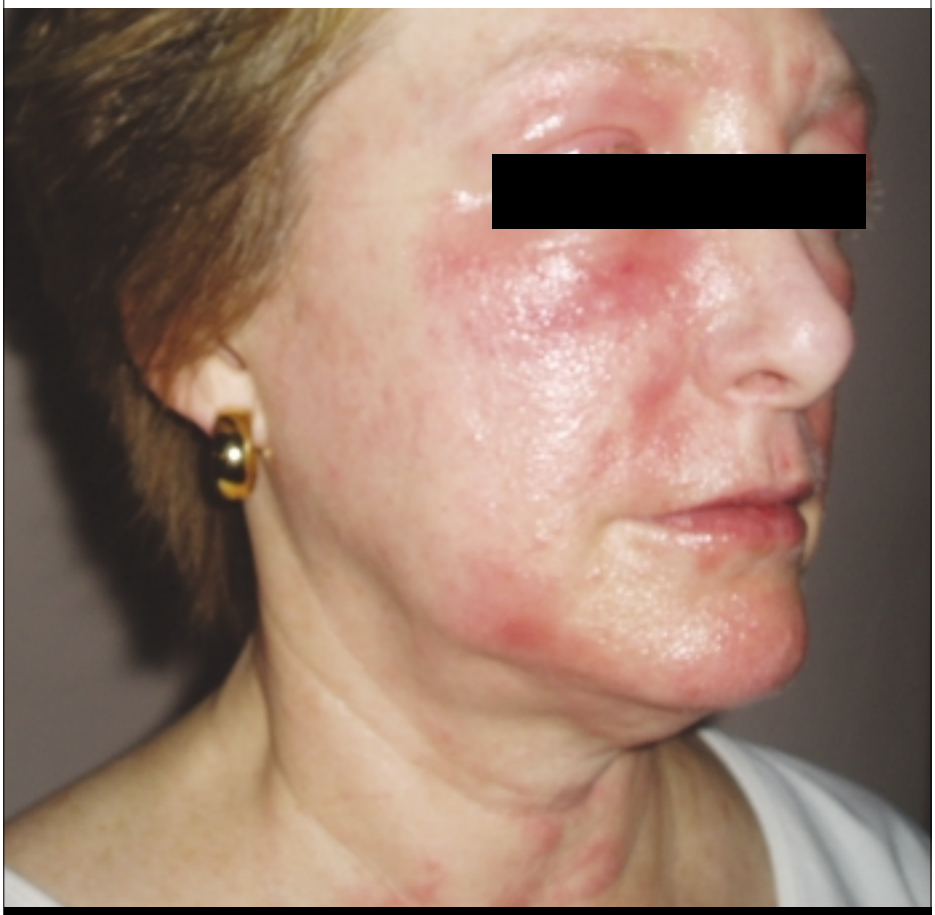
In 1884, Sigmund Freud prompted Austrian colleague Carl Koller to use cocaine as a local ester anesthetic in a clinical setting. Koller successfully performed the first clinical operation under local anesthesia, via administration of cocaine on the eye. With the advent of modern organic chemistry and the scare of cocaine and its dangerous toxicities, new amino ester local anesthetics were produced from 1891 to 1930, namely benzocaine, tetracaine and tropocaine. Since 1898, amide local anesthetics were developed, for example prilocaine, lidocaine and cinchocaine.[3]

The anesthetic category is assigned by the nature of the chemical linkage between the aromatic portion and the intermediate chain of the local anesthetic.[4] These biochemical differences in structure give rise to the compound's allergenicity. Members of the ester group of anesthetics are relatively frequent causes of contact sensitization while the amide group is less common. Also, cross-reactivity between esters is quite common, while cross-reactivity between the ester and amide groups and cross-reactivity within the amide group, on the other hand, are uncommon.[5]

TABLE I

COMMON PRODUCTS CONTAINING CAINES[5,7]

Anti-hemorrhoidal ointment
Antitussives
Arthritis/muscle ache topical creams/gels
Astringents
Burn cream
Cold sore treatment
Denture irritation cream
Insect bite lotion
Herpes zoster ointment
Lip balm
Oral antibacterial ointments
Pruritus cream
Sunburn relief
Teething pain relief lotion
Throat lozenges
Toothache ointment



This patient suffered from an acute reaction to benzocaine gel after her dentist applied it to her gum prior to an injection of novocaine.

Local anesthetics are among the most commonly used medications in clinical practice and personal hygiene products today. *(See Table I: "Common Products Containing Caines.")* However, toxicity and adverse events are common. The first case of contact dermatitis to a topical local ester anesthetic was reported in 1920 to Apothesin, a procaine compound, but contact dermatitis to a wide variety of local anesthetics is well documented, (e.g.: benzocaine, lidocaine).[6] Contact dermatitis to local anesthetics can be due to the anesthetic agent or the vehicle used to deliver the medication.[5] The esters anesthetics are para-aminobenzoic acid (PABA) derivatives, and thus cross-react with other PABA-like derivatives. These derivatives include the following:

- paraphenylenediamine (PPD)
- PABA sunscreens
- sulfonamides
- aniline dyes
- aminobenzoic acids
- hydrochlorothiazide.[5,7]

TESTING FOR "CAINE" SENSITIVITY

Patch testing for "caine mix" allergy can be accomplished with the T.R.U.E. test (site #5). The caine mix on the T.R.U.E. test is a mixture of two esters and one amide: benzocaine, tetracaine and dibucaine.

In patients who have purported reactions to an anesthetic, patch tests should be performed. If the allergen is an ester local anesthetic, an amide should be considered for alternative therapy.[5] If the patient had a reaction to an amide local anesthetic, another amide may be considered, because the cross-reactivity among the amides

Contact Dermatitis Specialists: Few and Far Between

We are faced with important workforce economics, there are approximately 14,500 members of the American Academy of Dermatology and many of these dermatologists serve remote locations. In contrast there are approximately 450 members of the American Contact Dermatitis Society (www.contactderm.org). Providing that everybody practiced, roughly one ACDS member for every 33 dermatologists would be available to patch test, and that would be if the distribution of ACDS members were evenly cast, which is not the case. Therefore, the T.R.U.E test is a basic and necessary screening tool that should be used and its limitations understood.

Comprehensive patch testing and patch test support should be available to the general dermatologist and mechanisms are in place (such as the ACDS mentorship programs). Additionally, patient education materials are available through the American Contact Dermatitis Society's newly developed Contact Allergen Replacement Database (C.A.R.D).

group is minimal. Alternately, the delivery vehicle may need to be changed. Ultimately, for "caine" allergy comprehensive patch testing can more specifically delineate the contact allergen and allow for safe alternatives.

THE VALUE OF THIS PATIENT CASE

Our patient tested positive to tetracaine. The identification of her ester anesthetic allergen proved important because she could now avoid further complications and was armed with the knowledge of a safe local anesthetic alternative.

The importance of appropriate patch testing and subsequent patient education can not be overstated, since ACD is a preventable disease once the allergen is identified and avoided. ■

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