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Christine M. Palmer, BS, and Valerie B. Lyon, MD

Introduction

Atopic dermatitis, a type of eczema, is the most common skin disease in children, with an estimated prevalence of up to 20% of children.[1] It is a chronic inflammatory disease, for which there is no known cure, and is associated with significant psychosocial morbidity and a decrease in health-related quality of life.[2] Although mild disease can be relatively easily controlled with occasional therapy, many patients have frequent exacerbations requiring ongoing therapy.

Atopic dermatitis can be a difficult condition to treat, both from the family's perspective and from the view of the practitioners. Parental concerns stem from a lack of clearance of lesions despite therapy, a lack of consensus regarding recommendations by practitioners, and a lack of understanding of disease and therapy. Parents often express a sense of frustration with treatment and frequently abandon medical therapy in search of unproven remedies. In addition to frustrations resulting from family perceptions, physicians often struggle with choosing effective therapy. Factors that contribute to ineffective therapeutic recommendations by the general physician include fear of side effects from medication, lack of awareness of or inadequate assessment of variations present in skin lesions, and suboptimal instruction for medication application.

Optimal use of topically applied corticosteroids is important for preventing unwanted side effects; and choosing medication that is effective as well as safe is central to excellent patient care. Proper assessment of skin lesions and an appropriate knowledge base of medications are required. Lesions must be assessed for duration of presence and response to medication. In addition to selecting medications for duration and response to treatment, selection should be tailored according to body sites of application. Patients will benefit from efficacious therapy that is customized to meet their individual needs and will thereby experience better disease control, improved satisfaction, and quality of life.

Children with atopic dermatitis often present to primary care clinics before dermatology offices. The principles and pathway presented here will aid the general practitioner in treating mild to moderately severe atopic dermatitis in children. In the pathway, response of the dermatitis to the chosen therapy is used to guide subsequent care in a stepwise fashion for long-term disease management.

Establish Diagnosis

Atopic dermatitis is a clinical diagnosis. Requisite signs and symptoms include the following: (1) pruritus, (2) characteristic morphology and distribution of lesions (Table 1 and Figures 1 and 2), and (3) recurrence of skin lesions. The presence of all 3 signs in a patient is sufficient for diagnosis.[3] Other important features seen in most cases, adding support to the diagnosis, include dry skin, early age at onset, and atopy.[3] Atopy is a genetically predisposed tendency to exaggerated skin and mucosal reactivity (eg, inflammation, pruritus, bronchoconstriction, rhinorrhea, IgE production) in response to a variety of environmental stimuli (eg, irritants, infectious agents, and allergens). The best-known atopic conditions form what is called the "atopic triad" of

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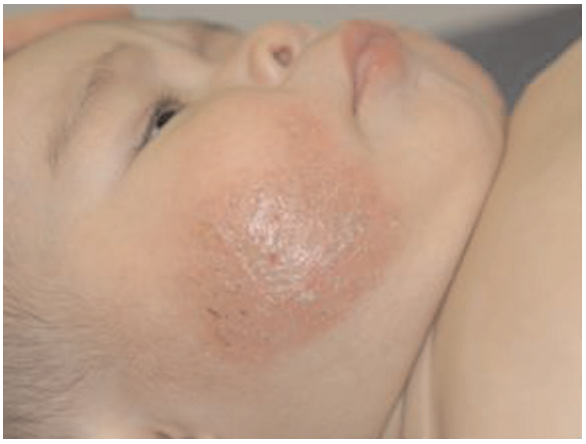


Figure 1. Erythematous plaques on cheeks of an infant with atopic dermatitis.

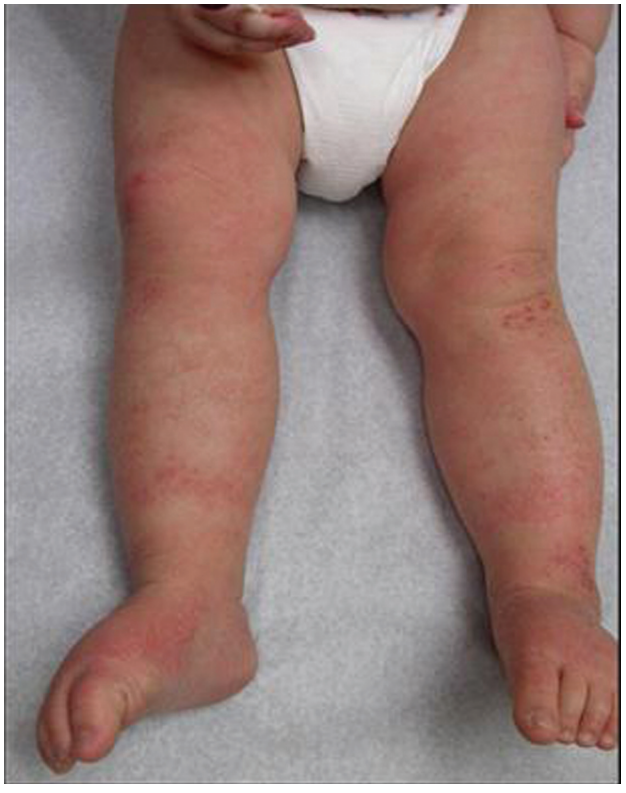


Figure 2. Erythematous plaques and papules on extensor surfaces of leg of infant.

asthma, allergic rhinoconjunctivitis (hay fever), and atopic dermatitis.

The differential diagnosis of atopic dermatitis is broad (Table 2) and a firm diagnosis depends on excluding these conditions. Although biopsy may aid in diagnosis, because atopic dermatitis has a characteristic microscopic pattern, in most cases the clinical impression is sufficient, especially considering that irritant contact dermatitis, allergic contact dermatitis, and other acute inflammatory skin lesions can have identical histological features.

Table 1. Characteristic Morphology and Distribution of Atopic Dermatitis Lesions

Morphology of lesions
Infants: erythematous plaques and papules, may develop oozing and/or crusting vesicles
Children and adults: erythematous plaques with lichenification and scaling are typical with chronic lesions
Distribution of lesions
Infants: face, trunk, and extensor surfaces
Children: antecubital and popliteal fossae
Adults: dorsal surface of hands, neck, upper chest, and groin

Table 2. Differential Diagnosis of Atopic Dermatitis

Scabies
Psoriasis
Viral exanthema
Photosensitivity rash
Contact dermatitis
Seborrheic dermatitis
Nummular eczema
Perioral dermatitis
Lichen simplex chronicus
Ichthyosis vulgaris
Neurodermatitis
Dermatitis herpetiformis
Dermatophyte infection
Systemic disease resulting in pruritus
Acrodermatitis enteropathica
Hyperimmunoglobulinemia E syndrome
Langerhans cell histiocytosis (histiocytosis X)
Wiskott–Aldrich syndrome
Ataxia–telangiectasia syndrome

Treat Acute Flare and Provide Follow-up Care

Untreated patients with atopic dermatitis most often present to the practitioner with an acute flare. Frequently, use of emollients and/or a 1% or 2.5%

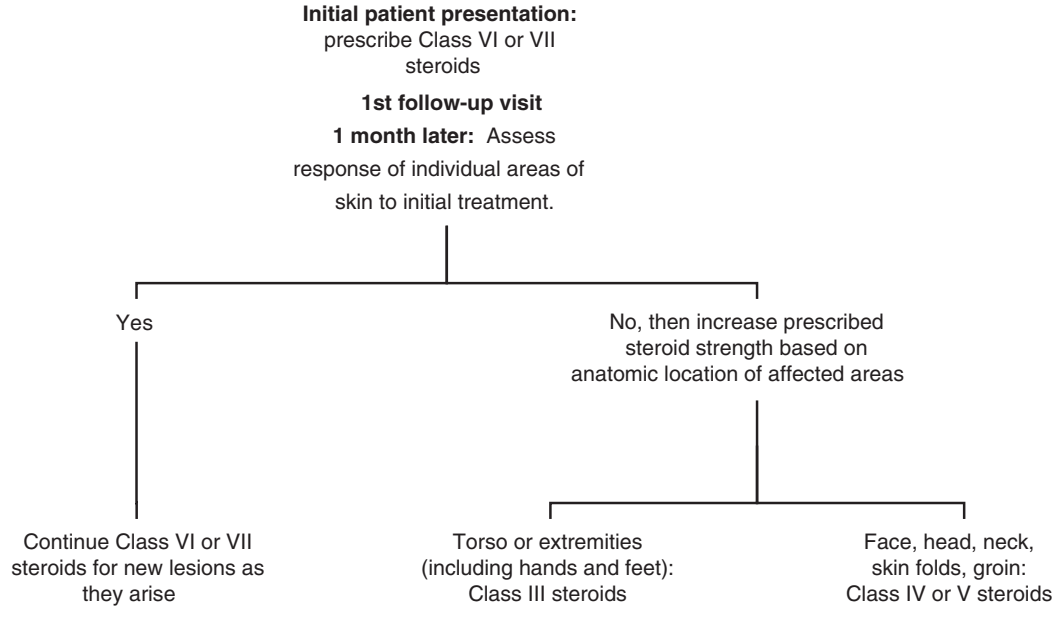
hydrocortisone topical preparation (class VII steroid) will relieve the mildest of symptoms. Many patients, however, go on to have lesions that are recalcitrant to emollients or low-strength hydrocortisone preparations, and these patients require a more intensive approach to care. We have found that prescribing therapy according to body site of involvement and monitoring therapy for improvement can predictably produce relief for patients. Choices for medications and care plan for successive patient encounters are outlined in Figure 3.

Essential to the success of the treatment algorithm are adherence to the following principles: (1) correct diagnosis; (2) application of medication to the affected areas (red or rough) only and discontinuation after the lesions resolve; (3) quantities of medication prescribed are limited when prescribing more potent steroids and more liberal for low-potency and lowest-potency (class VI or VII) topical steroids for which larger quantities of medication can be prescribed; (4) at each patient encounter the entire skin is examined, the diagnosis confirmed, and the response of individual lesions is assessed; (5) the patient is assessed for signs of infection at each encounter; and (6) referral for subspecialty care is made when skin does not respond appropriately or therapeutic suggestions have been exhausted.

Choosing Appropriate Topical Therapy

Choosing medication based on anatomic site of disease. Topical corticosteroids are the most commonly used and appropriate first-line topical therapy to treat atopic dermatitis. Selection as to which steroid strength to prescribe depends on the anatomic site of disease. The skin is a very large, heterogeneous organ. Within the skin, variations in thickness differ depending on the body site. Eyelid and genital skin is the thinnest, whereas palmar and plantar skin is the thickest. The thickness of the skin (dermis) is important to predict the relative response to topically applied medications. In fact, different classes of topical steroids are chosen according to the affected body site, with lower-strength topical steroids applied on facial, flexural, or genital areas and higher-strength medications elsewhere. The strongest topical steroids are frequently used for disease affecting palmar and plantar surfaces. A schematic diagram depicting appropriate topical steroid strength is shown in Figure 4. Class I and II steroids should generally only be used for very short-term therapy (2 to 3 weeks).

Choosing medication based on duration of lesion. Once the affected body site is known and the options for topical therapy have been limited to



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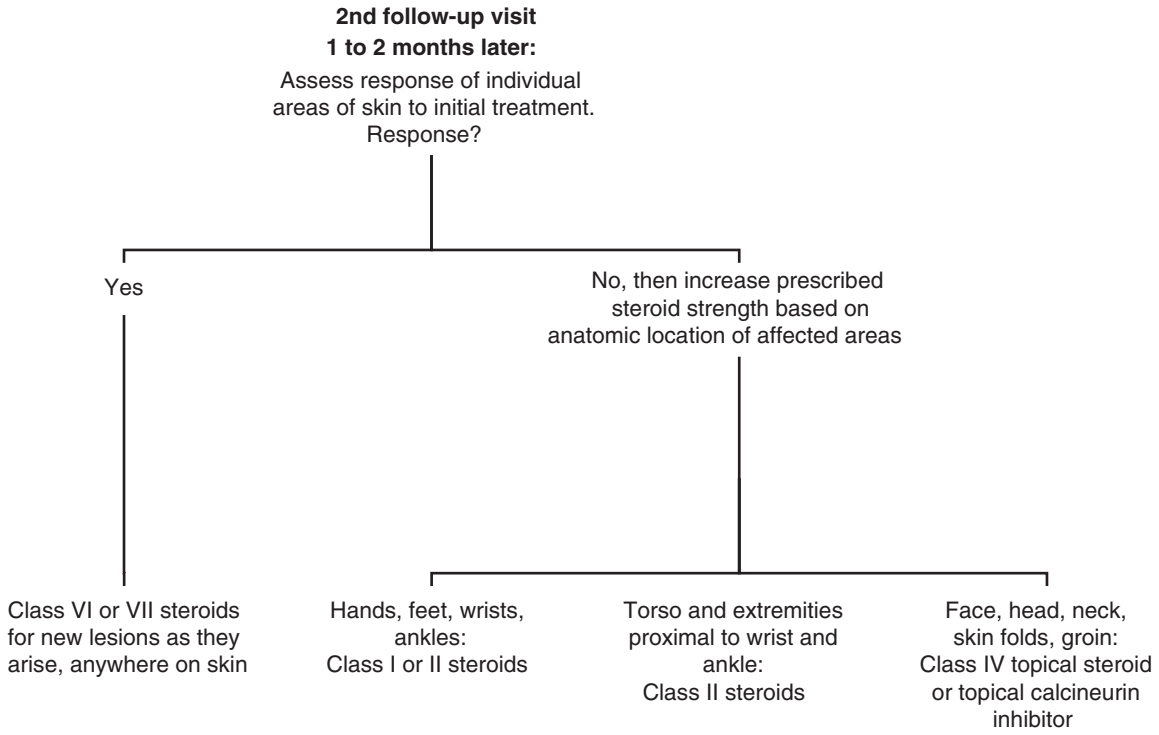

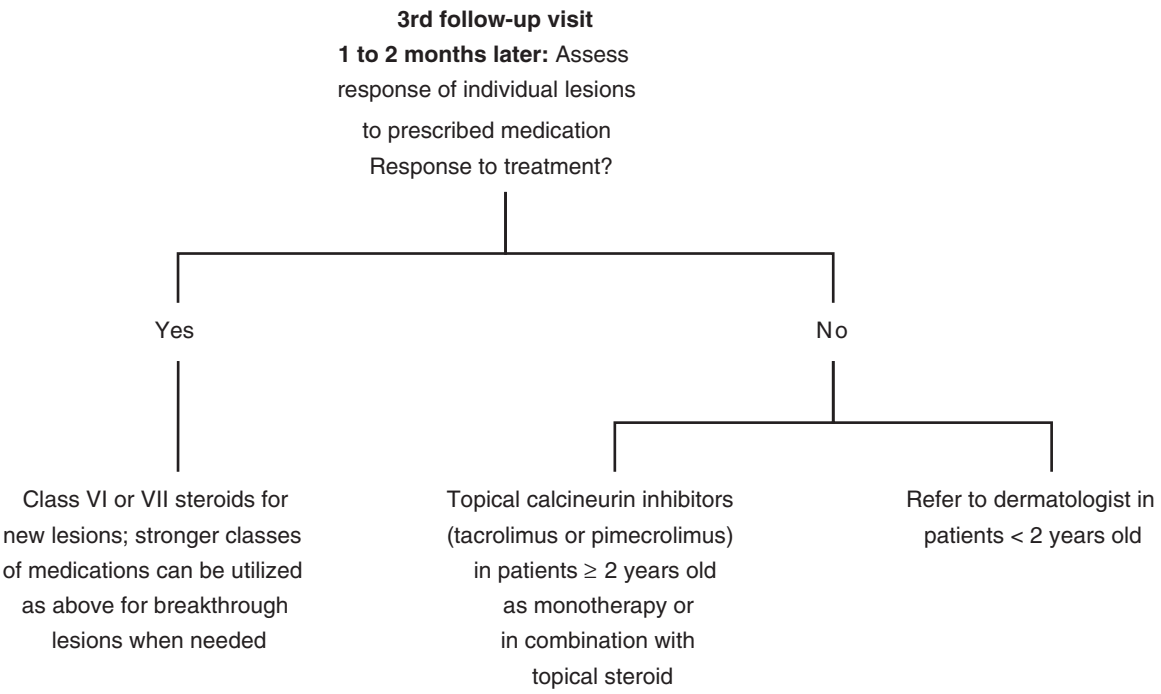

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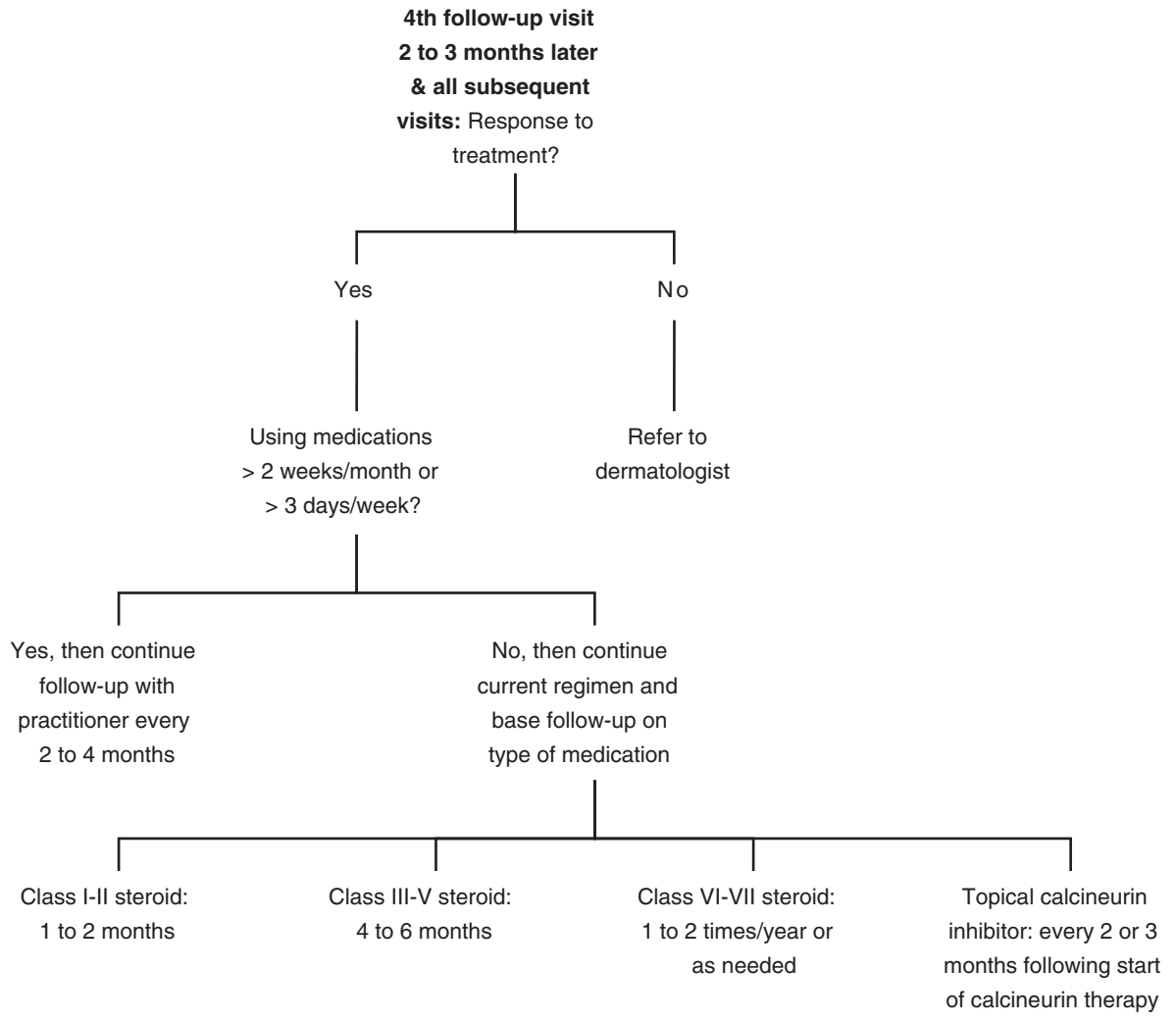

Figure 3. Medications and care plan for successive patient visits.

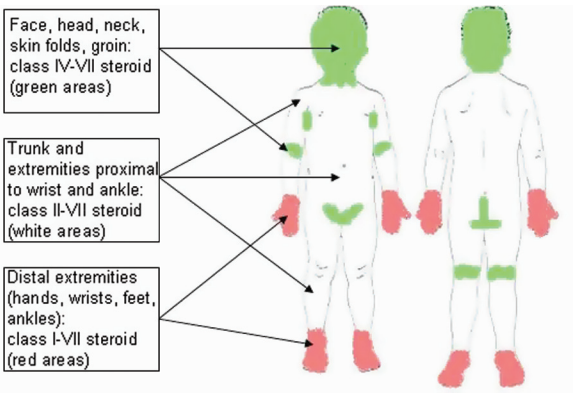

Figure 4. Guide to selecting topical steroid strength based on anatomic site of disease.

appropriate relative strengths, the duration of the lesions should be determined. Earlier lesions respond more readily to therapy than lesions of longer duration. Therefore, on newer body sites of involvement lower-potency steroids can be used, whereas higher-potency medication may be required for long-standing lesions. For example, application of a class VI-VII topical steroid to an early lesion of atopic dermatitis will be effective. In contrast, lesions that are more chronic (more than 2 to 3 weeks in duration) and have become thickened will not clear as readily with low-potency steroid application. Therefore, an effective treatment regimen will adjust medication in a stepwise fashion with increasing steroid potency for increasing thickness of lesions. In this

way, both the duration of lesions and the affected body areas of involvement are considered in managing skin lesions. If done properly, the patient will receive medications that are the most efficacious and also safe to use.

Initial Patient Presentation

Choosing appropriate therapy—topical corticosteroids are first line of treatment. Although there are many options for treating atopic dermatitis, in our experience, first-line treatment with topical steroids results in rapid improvement in lesions. Within the spectrum of topical steroids available, 2 factors guide selection: steroid potency and medication vehicle. The first principle of prescribing a topical steroid is familiarity with the spectrum of relative topical steroid potency, with the class I group referring to those topical steroids that are most potent and class VII as the least potent (Table 3).

The second principle for prescribing topical steroids is awareness of the relative benefits of the different vehicles. In general, ointment-based preparations provide better delivery of the drug and decrease evaporative losses, but they are greasier than other preparations. Creams and lotions are easier to apply, but are not as occlusive as ointments; therefore, they can be less effective in treating atopic dermatitis. In warmer climates, however, ointments can be too occlusive and creams may be preferred. Solutions or newer foams are useful on the scalp or other hair bearing areas or in patients who dislike heavy ointments.

On initial presentation, a low-potency class VI or VII topical steroid is generally adequate as newer lesions are more easily responsive to lower-strength medication. Alternatively, if the duration of the lesions is unknown or the affected areas of involvement are on areas of skin where the dermis is thicker, it may be more efficacious to instead start with somewhat high potency of topical steroids. A higher relative strength steroid within the given range of strengths appropriate for the affected body area should be chosen.

First Follow-up Visit at 1 Month

Assessing response to therapy. The first follow-up visit should be approximately 1 month following the initial visit to assess the response to therapy. When assessing the response to therapy, it is important to identify not only the parent's impression as to how frequently the eczema flares are occurring but also if the individual lesions are clearing, at least temporarily. This is an important distinction because often a patient's/parent's perception is that "medication doesn't work" when in actuality it has cleared the original lesions, but new lesions continue to arise. In fact, if this is the scenario, the medication is working perfectly well. To determine current response to therapy, it is important to confirm with the parent which medications are being applied currently and to which areas of the body. This information will help in deciding whether the medication is working as it should. The same medication should be continued in follow-up if for a given body area the lesions are deemed to be of similar thickness (duration of lesion similar to previous) and if clearance of individual lesions is achieved, even if for a brief period.

It is worth mentioning that for the parent who is not convinced of the effectiveness of the medication, it is important to take the opportunity to remind the family that there is no cure for atopic dermatitis. Reassurance can be provided, however, that there are attainable goals: keeping the patient more comfortable, reducing the body area involved, reducing the frequency of flares, and decreasing the intensity of flares. In most cases, the condition improves with age.

During follow-up visits with the patient, new lesions will often not attain the same thickness that untreated lesions did. For this reason, a lower-potency steroid is frequently adequate. The lowest-potency topical steroid that will be effective should be prescribed. In many cases, a class VI or VII steroid applied twice daily anywhere new lesions arise at the first signs (roughness) will control the inflammation. The steroid potency can be increased stepwise at anytime as necessary according to body area of involvement for any lesions not responsive to lower-strength medication.

On the other hand, if the patient does not respond to the steroids initially prescribed, the steroid strength should be adjusted upward. For lesions on the torso or extremities, steroid strength can be safely increased to upper mid-potency class III steroids until significant improvement has

Table 3. Potency Ranking of Selected Topical Corticosteroid Preparations[a]

Class I (very high potency)	Betamethasone dipropionate oint/crm, 0.05% (Diprolene, Diprosone)
	Clobetasol propionate oint/crm/lot/fm/sp, 0.05% (Temovate, Dermoxin)
	Diflorasone diacetate oint, 0.05% (Fluorone, Psorcon)
	Halobetasol propionate oint/crm, 0.05% (Ultravate)
Class II (high potency)	Amcinonide oint, 0.1% (Cyclocort)
	Desoximetasone oint/crm, 0.25%; gel, 0.05% (Topicort, Ibaril)
	Diflorasone diacetate oint, 0.05% (Florone, Maxiflor)
	Fluocinonide oint/crm/gel, 0.05% (Lidex)
	Halcinonide crm, 0.1% (Halog)
	Mometasone furoate oint, 0.1% (Elocon, Ecural)
	Triamcinolone acetonide oint, 0.5% (Kenalog)
Class III (upper mid-potency)	Amcinonide crm/lot, 0.1% (Cyclocort)
	Betamethasone valerate oint, 0.01% (Valisone)
	Diflorasone diacetate crm, 0.05% (Florone, Maxiflor)
	Fluticasone propionate oint, 0.005% (Cutivate)
	Fluocortolone crm, 0.25% (Ultralan)
	Fluocinonide crm, 0.05% (Lidex E cream, Topsyn)
	Halcinonide oint, 0.1% (Halog)
	Triamcinolone acetonide oint, 0.1% (Aristocort A)
	Triamcinolone acetonide crm, 0.5% (Aristocort-HP)
Class IV (mid-potency)	Betamethasone valerate lotion, 0.01% (Valisone, Luxiq)
	Desoximetasone crm, 0.05% (Topicort-LP)
	Fluocinolone acetonide crm, 0.2% (Synalar-HP)
	Fluocinolone acetonide oint, 0.025% (Synalar)
	Flurandrenolide oint, 0.05% (Cordran)
	Halcinonide crm, 0.025% (Halog)
	Hydrocortisone valerate oint, 0.2% (Westcort)
	Mometasone furoate crm, 0.1% (Elocon, Ecural)
	Triamcinolone acetonide oint, 0.1% (Kenalog)
Class V (lower mid-potency)	Betamethasone dipropionate lotion, 0.05% (Diprosone)
	Betamethasone valerate crm, 0.01% (Valisone)
	Fluocinolone acetonide crm, 0.025% (Dermasmoothe/FS)
	Fluocinolone acetonide oil, 0.01% (Dermasmoothe/FS)
	Flurandrenolide crm, 0.05% (Cordran)
	Fluticasone propionate crm, 0.1% (Cutivate)
	Hydrocortisone butyrate oint/crm, 0.1% (Locoid)
	Hydrocortisone valerate oint/crm, 0.2% (Westcort)
	Triamcinolone acetonide lotion, 0.1% (Kenalog)
Class VI (low potency)	Aclomethasone dipropionate oint/crm, 0.05% (Aclovate)
	Betamethasone valerate lotion, 0.05% (Valisone)
	Desonide crm, 0.05% (Desowen, Tridesilon)
	Flucinolone acetonide crm/sol, 0.01% (Synalar)
	Prednicarbate crm, 0.1% (Dermatop)
	Triamcinolone acetonide crm, 0.1% (Aristocort)
Class VII (lowest potency)	Dexamethasone crm, 0.1% (Decadron phosphate)
	Hydrocortisone oint/crm/lot, 0.5%, 1%, 2.5% (Hytone, others)

a. Adapted from Hengge et al.[4]
Note: Crm = cream; fm = foam; lot = lotion; oint = ointment; sol = solution; sp = spray.

occurred (lesions are significantly thinner and less erythematous). This may take up to 6 weeks or more on the extremities. For affected areas on the face, head, neck, skin folds (ie, antecubital and popliteal fossae), and groin, steroid strength can be safely increased to mid-potency or lower-mid-potency class IV or V steroids if necessary. For patients in whom regular use of medication is required for disease control, a follow-up visit should be scheduled at regular intervals.

Second Follow-up Visit 1 to 2 Months Later

At the second follow-up visit, lesions are again assessed according to their individual response to therapy. For lesions that did not respond to class III steroid application and are located on the hands, feet, wrists, or ankles, the steroid strength can be safely increased to class I or II steroids until the lesions have resolved (typically 2 to 3 weeks but may take up to 6 weeks). Of note, however, class I steroids should not generally be used in patients less than 1 year of age (nor are they necessary because the dermis is still relatively thin in this age group). For lesions on the torso and extremities proximal to the wrists and ankles that did not respond to class III steroid application, the steroid can be increased to class II steroids temporarily (2 to 3 weeks).

For lesions on the face, head, neck, skin folds, and groin that are unresponsive to the previous steroid strength, which is common in children, there are 2 options that are safe, simple, and can be effective. Either topical steroid strength is increased (up to class IV) or a topical calcineurin inhibitor can be substituted. The topical calcineurin inhibitors (tacrolimus ointment 0.03% or pimecrolimus cream 1%) are applied twice daily to affected areas and can be prescribed for patients 2 years of age and older for short-term and noncontinuous chronic treatment.[5,6] (Higher-strength tacrolimus ointment 0.1% is approved only in patients 16 years of age and older.) When prescribing topical calcineurin inhibitors, either agent can be used. The differences between the 2 options is that tacrolimus is currently offered in an ointment vehicle and pimecrolimus in a cream. Also, tacrolimus may be slightly stronger than pimecrolimus. In the case of pimecrolimus, data have shown that it is especially effective on the head and the neck.

Again, once the inflammatory lesions have responded to therapy, the lowest effective strength topical steroid (class VI or VII) should continue to be used on affected areas as needed. If calcineurin inhibitors are being used, these should continue to be applied to affected areas. New areas of skin involvement can be identified by the caregiver as redness or rough areas of skin that are not responsive to topical emollient. The stronger steroids should be reserved for lesions that do not respond.

Third Follow-up Visit 1 to 2 Months Later

The patient is reexamined at a third follow-up visit 1 to 2 months later. If the patient is using stronger than class VI or VII topical steroids and responded to the increase in steroid potency prescribed at the previous follow-up visit, that is, the lesions are resolved or improved, it is now appropriate to step down in steroid strength to class VI or VII for twice daily application to anywhere new lesions arise at the first signs of new lesions. The potency of topical steroid preparations should be increased for individual lesions that do not respond within 2 to 4 weeks to the lower-strength therapy as long as the anatomic location of application is appropriate.

If the lesions do not respond to the increase in steroid potency prescribed at the previous follow-up visit, there are 2 safe and effective options. In patients 2 years of age and older, a topical calcineurin inhibitor can be prescribed as monotherapy applied twice daily for 3 months or in combination therapy along with a topical steroid for 3 months (the approximate duration to meet intermittent use guidelines by the FDA[7,8]). One such combination treatment regimen consists of application of appropriate topical steroid in the evening and a topical calcineurin inhibitor in the morning. Patients less than 2 years of age who are not responding to therapy at this point should be referred to a dermatologist. Just as previously, patients should be monitored in follow-up visits for response to therapy and potential side effects of ongoing medication use.

Fourth Follow-up Visit 2 to 3 Months Later and All Subsequent Visits

The fourth follow-up visit follows 2 to 3 months after the third visit. Once again, the patient is evaluated for response to continued treatment, and if it is determined that the lesions are responding, a step-down to a class VI or VII topical steroid should occur, reserving stronger topical steroid therapy for intermittent use for recalcitrant individual lesions based on anatomic location. On the other hand, if the patient still fails to respond to treatment at this point, the patient needs to be referred for specialized dermatological care.

Subsequent follow-up visits can be scheduled based on the frequency of ongoing medication use. If the patient is using medication more often than 2 weeks per month or 3 days per week, then follow-up is recommended every 2 to 4 months. If the patient is using medication less frequently, then the frequency of follow-up depends on which medications the patient uses. The use of class I-II steroids requires close follow-up (every 1 to 2 months). Class III-V steroids requires regular follow-up as well, and this can be limited to every 4 to 6 months. Class VI-VII steroid use requires follow-up on a semiannual or annual basis as the practitioner feels appropriate. If the patient is using a topical calcineurin inhibitor, follow-up is required every 2 to 3 months and intermittent discontinuation of medication to prevent long-term use is advised in most cases. In this manner, side effects can be reliably prevented.

Adjunctive or Concomitant Therapy

Moisturizers and bathing. The initial visit should also include patient education regarding appropriate bathing, cleansing, and moisturizing. Use of moisturizers in conjunction with skin hydration is best achieved by a short daily warm soaking bath (limited to approximately 10 minutes) followed immediately by application of emollient.[1] Mild soaps (such as Dove or Basis) or soapless cleansers (such as Cetaphil or Aquanil) are preferred. Soaps remove oil and can be irritating. Therefore, the most important message to convey is that cleansers should only be used sparingly to areas that are dirty or in skin folds and should be rinsed thoroughly after washing. Skin should also be patted dry instead of rubbed to avoid further inflammatory reaction. The best method to maintain hydration after bathing is immediate application of a thick emollient preferably when the skin is still damp, before evaporative loss occurs. Emollients have been shown to improve clinical outcomes and to be steroid sparing for atopic dermatitis in children.[9,10]

A fragrance-free moisturizing ointment or cream (instead of lotions with alcohol and high water content) should be applied liberally. However, immediate coapplication of emollient and medication in the same area may decrease their effectiveness. Therefore, medications (often in moisturizing bases) are applied to affected areas and emollients to the remaining unaffected areas. Emollients may be applied to any area, once time has been given to allow for at least partial absorption of medication, approximately 20 minutes. In general, the thicker and greasier the emollient, the more effective it is. Ointments are best (such as petroleum jelly or Aquaphor) in general and have the fewest added preservatives and allergen-provoking fragrances. During periods of excessive heat or humidity, creams or lotions may be preferred. A ceramide-dominant moisturizing cream (TriCeram) has been found to be more effective than traditional moisturizers.[11] CeraVe cream is a newer over-the-counter cream that also contains lipids that mimic normal epidermal lipids and can be found in many local pharmacies.

Table 4. Signs of Skin Infection in Atopic Dermatitis

Pustules
Erosions
Numerous excoriations
Honey-colored crust
Lesion not responding to appropriate therapy

Infectious complications. It is important to evaluate the patient at every visit for signs of infection, which can prevent improvement in the skin. Secondary infection is the most common complication seen in atopic dermatitis, especially because of *Staphylococcus aureus,* as the prevalence of cutaneous colonization with *S aureus* in atopic dermatitis patients is estimated at more than 80%.[1] If an infection is suspected (Table 4), prescribe an appropriate oral antibiotic targeted for *S aureus*.

If bacterial infection is suspected, a penicillinase-resistant penicillin or cephalosporin such as dicloxacillin or cephalexin can be used. Although many Staphylococci are resistant to erythromycin, this can be beneficial as second-line therapy in penicillin-allergic individuals with mild skin infections. Often, a 5-day course is all that is necessary, but treatment can be for as long as 10 days or more based on predicted response to therapy. Topical antibiotic therapy, such as topical mupirocin, can be effective if applied at a separate time during the day from the topical anti-inflammatory therapy. However, concomitant application of topical antibiotic and topical anti-inflammatory steroid medication

reduces the efficacy of anti-inflammatory therapy, often preventing improvement. Also, there is often superinfection throughout the eczema skin and, thus, treating just the areas that appear infected can be inadequate. The administration of oral antibiotic therapy avoids this problem and treats the whole skin simultaneously. If abscesses are present, incision and drainage with appropriate cultures, systemic antibiotics, and close follow-up are recommended to ensure adequate improvement. Nonpharmacologic methods to avoid frequent infection include daily cleansing, dispensing medication without contamination by skin microbes, controlling pruritus, and maintaining an adequate skin barrier with frequent hydration. These methods should be included in routine skin care.

Pruritus—use of antihistamines. Decreasing pruritus associated with atopic dermatitis is at least partly achieved by application of topical anti-inflammatory medications.[1] However, antihistamines are indicated for the treatment of atopic dermatitis and associated pruritus in patients who have comorbid allergic conditions and sleep disturbances.[12] In general, literature has shown little direct effect on pruritus, but in clinical practice, relief is often not possible without the use of oral antihistamines during flares. Oral antihistamines that are sedating (diphenhydramine or hydroxyzine) are used in the evening, the most common time for increased pruritus. Nonsedating antihistamines (cetirizine or loratadine) are frequently not as effective, but can be helpful in patients where daytime antihistamines dosing is preferred or in whom drowsiness from nighttime sedating antihistamines lingers into the following day. The hangover effect from sedating antihistamines can be alleviated by prescribing lower doses of the medication. Hydroxyzine can be used in doses up to 2 mg/kg/day, but a daily dose in the evening equivalent to one-quarter of the maximum dose is frequently all that is needed. A second dose can be added each morning or up to every 6 hours as needed; however, as the majority of children with atopic dermatitis have the most pruritus in the evening hours, this is usually not necessary.

Maintain Remission

Once the practitioner is familiar with examining the skin to identify the areas of involvement for chronicity and thickness of lesions, choosing steroid medication based on relative steroid potency and medication vehicle, treating any confounding factors present, and controlling the acute disease flare accordingly, maintaining remission is relatively simple in many cases. This does not mean that intermittent flares will not occur, but the frequency and duration of flares can be limited. In addition to appropriate treatment of inflammatory skin lesions, it is important to avoid many of the known common triggers of inflammation including soaps, rubbing, fragrance, extreme temperature changes, and tobacco smoke. Additionally, frequent and liberal application of skin moisturizers is required to maintain remission.

Combination therapy with topical calcineurin inhibitor therapy and topical steroid therapy can potentially be more effective than monotherapy with a single agent because of synergistic effects of distinctive mechanisms of action. A unique aspect of topical steroid medication is the potential for development of tachyphylaxis, the hardening of the response to a given steroid medication. Switching to an alternative steroid, even within the same steroid class, can help maintain response to therapy by avoiding tachyphylaxis.[13-15] However, for the patient whose lesions respond to therapy but in whom frequent relapse is prominent, therapy can also rotate between mechanistic actions, that is, between topical steroid and topical calcineurin inhibitor medications, with enhanced efficacy of disease control.[16]

In rotational therapy for patients with frequent flares, topical steroids should be used first on areas that flare and topical calcineurin inhibitors can be used once the flare is resolving until clearance. In practical language, this translates to using topical steroids for approximately 2 weeks followed by topical calcineurin inhibitors for 2 weeks, according to the recommendations in the product information.[7,8] As previously mentioned, an alternative method for combination therapy that takes advantage of synergistic mechanisms of the 2 different medications involves application of a topical calcineurin inhibitor in the morning and a topical steroid in the evening.

Limiting Potential Local Side Effects

Limit potential side effects by prescribing small amounts of more potent topical steroids. Potential local side effects of topical steroid misuse include atrophy, acne, striae, and telangiectasia. In general,

methods to avoid local side effects include application of medication to affected areas only, discontinuation of medication when lesion is resolved, and application of class III and more potent steroids on nonfacial, nonflexural, or nongenital sites only.

The quantity of medication prescribed should also be appropriate and follow-up visits should be maintained. A 1-month supply of these highest-strength class I or class II steroids is prescribed without refills, anticipating a limit of use of 2 to 3 weeks in duration to avoid side effects from overuse or misuse. These stronger topical steroid medications can be prescribed for longer periods (up to 6 weeks) on affected areas of the extensor surfaces of the extremities in most patients without clinical signs of atrophy if needed, but patients need to be evaluated at more frequent intervals when using these stronger medications. Larger amounts of lower-strength (class IV-VII) steroid preparations can be prescribed at a time with more refills provided, within reason, when emphasis is placed on treating affected areas only and discontinuing medication once the inflammation has resolved.

Topical calcineurin inhibitors. Follow-up visits for patients on topical calcineurin inhibitor therapy should be no longer than 3 months after prescribed because these medications are only approved by the FDA for intermittent use. Topical calcineurin inhibitors do not show the atrophogenic potential of steroids and can be safely used on the face, neck, and intertriginous areas. They are also safe to apply to periorbital areas. It is important to realize that topical tacrolimus is thought to be stronger than pimecrolimus. Randomized, controlled clinical trials have shown that tacrolimus is more effective than pimecrolimus in treating atopic dermatitis, with a similar safety profile.[17]

Topical calcineurin inhibitor prescribing information includes a black box warning about the theoretical risk of developing lymphoma and cutaneous malignancies.[7,8] Systemic absorption of topical calcineurin inhibitors, in combination with a link between systemic use of the drugs and malignancies in animal studies, creates a biologically plausible cancer risk. However, there has been no causal relationship shown to date.

Just as with topical steroid application, to lessen the risk of side effects from prescribed medication, the patient/family is instructed to apply the medication to affected areas until they are resolved and discontinue use thereafter. Current recommendations are that topical calcineurin inhibitors be used intermittently; therefore, it is advisable that this therapy be discontinued or interrupted after 12 weeks by switching to the lowest topical steroid that will clear the lesions. Topical calcineurin inhibitors have been shown to be safe when used intermittently for up to 1 year.[18,19] For example, cycle their use every 3 months—3 months with topical calcineurin inhibitor treatment, then 3 months off using solely topical steroids for treatment, then resume topical calcineurin inhibitor use for 3 months, and so on.

Topical calcineurin inhibitors are currently second-line treatments for atopic dermatitis and should be used with patients who fail to respond to steroids, have suspected side effects from topical steroid use, or in whom the use of topical steroids are not advisable.[7,8] They are to be avoided in immunosuppressed, pregnant, or breastfeeding individuals and patients with skin conditions leading to enhanced absorption such as those with Netherton syndrome. In general, although they can be used safely in younger patients, in children less than 2 years of age they are mainly reserved for those whose lesions are recalcitrant to appropriate topical corticosteroids.[20,21] Their off-label use in these patients should be monitored by a dermatologist.

Conclusion

In summary, there are many factors that contribute to physician and patient dissatisfaction in treatment of atopic dermatitis. A uniform approach to therapy based on anatomic location, duration of lesion, and the response to previous therapy can be very effective. Not only is the approach effective but the methodical attitude to therapy results in more predictable recommendations by physicians and may allow families to better understand disease control, avoiding some of the confusion and potential dissatisfaction. In fact, this stepwise approach principle to anti-inflammatory therapy in dermatology can be extended beyond atopic dermatitis to related inflammatory skin conditions such as seborrheic dermatitis and many other chronic, intermittent inflammatory skin conditions.

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