Choosing Topical Corticosteroids

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Topical corticosteroids are one of the oldest and most useful treatments for dermatologic conditions. There are many topical steroids available, and they differ in potency and formulation. Successful treatment depends on an accurate diagnosis and consideration of the steroid's delivery vehicle, potency, frequency of application, duration of treatment, and side effects. Although use of topical steroids is common, evidence of effectiveness exists only for select conditions, such as psoriasis, vitiligo, eczema, atopic dermatitis, phimosis, acute radiation dermatitis, and lichen sclerosus. Evidence is limited for use in melasma, chronic idiopathic urticaria, and alopecia areata. (*Am Fam Physician.* 2009;79(2):135-140. Copyright © 2009 American Academy of Family Physicians.)

Topical steroids are available in a variety of potencies and preparations. Physicians should become familiar with one or two agents in each category of potency to safely and effectively treat steroid-responsive skin conditions. When prescribing topical steroids, it is important to consider the diagnosis as well as steroid potency, delivery vehicle, frequency of administration, duration of treatment, and side effects. The usefulness and side effects of topical steroids are a direct result of their anti-inflammatory properties, although no single agent has been proven to have the best benefit-to-risk ratio.

Table 1. Conditions Treatable with Topical Steroids

High-potency steroids (groups I to III)	Atopic dermatitis
Alopecia areata	Lichen sclerosus (vulva)
Atopic dermatitis (resistant)	Nummular eczema
Discoid lupus	Scabies (after scabicide)
Hyperkeratotic eczema	Seborrheic dermatitis
Lichen planus	Severe dermatitis
Lichen sclerosus (skin)	Severe intertrigo (short-term)
Lichen simplex chronicus	Stasis dermatitis
Nummular eczema	**Low-potency steroids (groups VI and VII)**
Poison ivy (severe)	Dermatitis (diaper)
Psoriasis	Dermatitis (eyelids)
Severe hand eczema	Dermatitis (face)
Medium-potency steroids (groups IV and V)	Intertrigo
Anal inflammation (severe)	Perianal inflammation
Asteatotic eczema	

Indications

An accurate diagnosis is essential when selecting a steroid. A skin scraping and potassium hydroxide test can clarify whether a steroid or an antifungal is an appropriate choice, because steroids can exacerbate a fungal infection. Topical corticosteroids are effective for conditions that are characterized by hyperproliferation, inflammation, and immunologic involvement. They can also provide symptomatic relief for burning and pruritic lesions.

Many skin conditions are treated with topical steroids *(Table 1)*, but evidence of effectiveness has been established only for a small number of conditions. For example, high- or ultra-high-potency topical steroids, alone or in combination with other topical treatments, are the mainstay of therapy for psoriasis.[1] They are also effective for treating vitiligo involving a limited area of a patient's skin,[2,3] lichen sclerosus,[4] bullous pemphigoid, and pemphigus foliaceus.[5,6] Alopecia areata, which is usually self-limited, may respond to ultra-high-potency topical corticosteroids, but randomized controlled trials have yielded conflicting results.[7,8]

Medium- to high-potency topical corticosteroids are effective for atopic dermatitis and eczema in adults and children,[9,10] as well as for phimosis[11,12] (i.e., foreskin that cannot be retracted) and acute radiation dermatitis.[13,14]

Topical corticosteroids may be effective for other conditions, but the data to support their use are from small, low-level, or uncorroborated studies. Melasma,[15] chronic idiopathic

SORT: KEY RECOMMENDATIONS FOR PRACTICE

Clinical recommendation	*Evidence rating*	*References*
Topical steroids can be used to treat psoriasis, vitiligo, lichen sclerosus, atopic dermatitis, eczema, and acute radiation dermatitis.	C	1, 2, 4, 9-13
Ultra-high-potency topical steroids should not be used continuously for longer than three weeks.	C	21
Low- to high-potency topical steroids should not be used continuously for longer than three months to avoid side effects.	C	21
Combinations of topical steroids and antifungal agents generally should be avoided to reduce the risk of tinea infections.	C	31

A = consistent, good-quality patient-oriented evidence; B = inconsistent or limited-quality patient-oriented evidence; C = consensus, disease-oriented evidence, usual practice, expert opinion, or case series. For information about the SORT evidence rating system, go to http://www.aafp.org/afpsort.xml.

urticaria,[16] infantile acropustulosis,[17] prepubertal labial adhesions,[18] and transdermal testosterone-patch–induced skin irritation[19] fall into this category.

Steroid Vehicles

Steroids may differ in potency based on the vehicle in which they are formulated. Some vehicles should be used only on certain parts of the body. Ointments provide more lubrication and occlusion than other preparations, and are the most useful for treating dry or thick, hyperkeratotic lesions. Their occlusive nature also improves steroid absorption. Ointments should not be used on hairy areas, and may cause maceration and folliculitis if used on intertriginous areas (e.g., groin, gluteal cleft, axilla). Their greasy nature may result in poor patient satisfaction and compliance.

Creams are mixes of water suspended in oil. They have good lubricating qualities, and their ability to vanish into the skin makes them cosmetically appealing. Creams are generally less potent than ointments of the same medication, and they often contain preservatives, which can cause irritation, stinging, and allergic reaction. Acute exudative inflammation responds well to creams because of their drying effects. Creams are also useful in intertriginous areas where ointments may not be used. However, creams do not provide the occlusive effects that ointments provide.

Lotions and gels are the least greasy and occlusive of all topical steroid vehicles. Lotions contain alcohol, which has a drying effect on an oozing lesion. Lotions are useful for hairy areas because they penetrate easily and leave little residue. Gels have a jelly-like consistency and are beneficial for exudative inflammation, such as poison ivy. Gels dry quickly and can be applied on the scalp or other hairy areas and do not cause matting.

Foams, mousses, and shampoos are also effective vehicles for delivering steroids to the scalp. They are easily applied and spread readily, particularly in hairy areas. Foams are usually more expensive.

Because hydration generally promotes steroid penetration, applying a topical steroid after a shower or bath improves effectiveness.[20] Occlusion increases steroid penetration and can be used in combination with all vehicles. Simple plastic dressings (e.g., plastic wrap) result in a several-fold increase in steroid penetration compared with dry skin.[21] Occlusive dressings are often used overnight and should not be applied to the face or intertriginous areas. Irritation, folliculitis, and infection can develop rapidly from occlusive dressings, and patients should be counseled to monitor the treatment site closely. Flurandrenolide (Cordran) 4 mcg per m^2 impregnated dressing is formulated to provide occlusion. It is beneficial for treating limited areas of inflammation in otherwise difficult-to-treat locations, such as fingertips.

Potency

The preferred way to determine topical steroid potency is the vasoconstrictor assay, which classifies steroids based on the extent to which the agent causes cutaneous vasoconstriction ("blanching effect") in normal, healthy persons. This is a useful but imperfect method for predicting the clinical effectiveness of steroids.[21] The anti-inflammatory potency of some steroids may vary among patients, depending on the frequency of administration, the duration of treatment, and where on the body they are used.[22,23] A ranking system that compares clinical outcomes or an effectiveness-to-safety ratio may be of greater benefit, but does not currently exist.

There are seven groups of topical steroid potency, ranging from ultra high potency (group I) to low potency (group VII). *Table 2* provides a list of topical steroids and available preparations listed by group, formulation, and generic availability.[24] Brand name agents may be more expensive, which may reduce patient compliance. This should be considered when choosing steroid agents. Physicians should also be aware that some generic formulations have been shown to be less or more potent than their brand-name equivalent.[25]

Table 2. Potency Ratings of Topical Corticosteroids

	Medication			
Potency (group)	*Generic*	*Brand*	*Dosage vehicle*	*Available sizes*
Ultra high (I)	Augmented betamethasone dipropionate 0.05%	Diprolene*	G,† O	15, 45, 50 g
	Clobetasol propionate 0.05%	Clobex	L, Sh	59, 118 mL (L); 118 mL (Sh)
		Olux*	F	50, 100 g
		Temovate*	C, G, O	15, 30, 45 g (C, O); 15, 30, 60 g (G)
		Temovate E*	C	15, 30, 60 g
	Diflorasone diacetate 0.05%	Apexicon*	O	15, 30, 60 g
	Fluocinonide 0.1%	Vanos	C	30, 60 g
	Flurandrenolide 4 mcg per m^2	Cordran	T	24″ × 3″ and 80″ × 3″ rolls
	Halobetasol propionate 0.05%	Ultravate*	C, O	15, 50 g
High (II)	Amcinonide 0.1%	—	O	15, 30, 60 g
	Augmented betamethasone dipropionate 0.05%	Diprolene*	L	30, 60 mL
		Diprolene AF*	C	15, 50 g
	Betamethasone dipropionate 0.05%	Diprosone*‡	O	15, 45 g
	Desoximetasone	Topicort 0.25%*	C, O	15, 60 g
		Topicort 0.05%*	G	15, 60 g
	Diflorasone diacetate 0.05%	Apexicon E*	C	15, 30, 60 g
	Fluocinonide 0.05%	Lidex*	C,† G,† O	15, 30, 60 g
	Halcinonide 0.1%	Halog	C, O, So	15, 30, 60, 240 g (C, O); 30, 60 mL (So)
Medium to high (III)	Amcinonide 0.1%	Cyclocort‡	C	4, 15, 30, 60 g
	Betamethasone dipropionate 0.05%	Betanate*	C	15, 45 g
	Fluticasone propionate 0.005%	Cutivate*	O	15, 30, 60 g
	Triamcinolone acetonide 0.5%	Cinalog*‡	C, O	15 g

(continued)

C = cream; F = foam; G = gel; L = lotion; O = ointment; Sh = shampoo; So = solution; T = tape.

**—Generic is available.*
†*—Brand not available in this formulation.*
‡*—Brand no longer available in the United States.*

Low-potency steroids are the safest agents for long-term use, on large surface areas, on the face or areas of the body with thinner skin, and on children. More potent agents are beneficial for severe diseases and for areas of the body where the skin is thicker, such as the palms and bottoms of the feet. High- and ultra-high-potency steroids should not be used on the face, groin, axilla, or under occlusion, except in rare situations and for short durations.[26]

Frequency of Administration and Duration of Treatment

Once- or twice-daily application is recommended for most preparations.[21] More frequent administration does not provide better results.[27] The optimal dosing schedule can be determined by trial and error, titrating to the minimum frequency of application that still provides relief.

Chronic application of topical steroids can induce tolerance and tachyphylaxis. Ultra-high-potency steroids should not be used for more than three weeks continuously.[21] If a longer duration is needed, the steroid should be gradually tapered to avoid rebound symptoms, and treatment should be resumed after a steroid-free period of at least one week. This intermittent schedule can be repeated chronically or until the condition resolves. Side effects are rare when low- to high-potency steroids are used for three months or less, except in intertriginous areas, on the face and neck, and under occlusion.[21]

The amount of steroid the patient should apply to a particular area can be determined by using the fingertip unit method.[28] A fingertip unit is defined as the amount that can be squeezed from the fingertip to the first crease of the finger. *Table 3* describes the number of fingertip units needed to cover specific areas of the body.[28] One hand-size area (i.e., the area of one side of the hand) of skin requires 0.5 fingertip units or 0.25 g of steroid. The amount dispensed and applied should be considered carefully because too little steroid can lead to a poor response, and too much can increase side effects.

Table 2. Potency Ratings of Topical Corticosteroids *(continued)*

	Medication			
Potency (group)	*Generic*	*Brand*	*Dosage vehicle*	*Available sizes*
Medium (IV and V)	Betamethasone valerate	Beta-Val 0.1%*	C, L	14, 45 g (C); 60 mL (L)
		Luxiq 0.12%	F	100 g
	Desoximetasone 0.05%	Topicort LP*	C	15, 60 g
	Fluocinolone acetonide 0.025%	Synalar*‡	C, O	15, 60 g
	Fluticasone propionate 0.05%	Cutivate*	C	15, 30, 60 g
	Hydrocortisone butyrate 0.1%	Locoid*	O	5, 10, 15, 30, 45 g
	Hydrocortisone probutate 0.1%	Pandel	C	15, 45, 80 g
	Hydrocortisone valerate 0.2%	Westcort*	C, O	14, 45, 60 g (C, O); 120 g (C)
	Mometasone furoate 0.1%	Elocon*	C, L, O	15, 45 g (C, O); 30, 60 mL (L)
	Triamcinolone acetonide 0.025%	Kenalog*‡	C, L, O	15, 80, 454 g (C, O); 60 mL (L)
	Triamcinolone acetonide 0.1%	Triderm*	C, L,† O†	15, 80, 454 g (C, O); 15, 60 mL (L)
Low (VI)	Alclometasone dipropionate 0.05%	Aclovate*	C, O	15, 45, 60 g
	Desonide 0.05%	Desonate	G	15, 30, 60 g
		Desowen*	C, O	15, 60 g
		Lokara	L	60, 120 mL
		Verdeso	F	100 g
	Fluocinolone 0.01%	—	C	15, 60 g
	Hydrocortisone butyrate 0.1%	Locoid*	C	5, 10, 15, 30, 45 g
Least potent (VII)	Hydrocortisone 1%, 2.5%	—	C, L, O	20, 30, 120 g (C, O); 60, 120 mL (L)

C = cream; F = foam; G = gel; L = lotion; O = ointment; Sh = shampoo; So = solution; T = tape.

**—Generic is available.*
†—Brand not available in this formulation.
‡—Brand no longer available in the United States.

Information from reference 24.

Side Effects

Prolonged use of topical corticosteroids may cause side effects *(Table 4[29])*. To reduce the risk, the least potent steroid should be used for the shortest time, while still maintaining effectiveness.

The most common side effect of topical corticosteroid use is skin atrophy. All topical steroids can induce atrophy, but higher potency steroids, occlusion, thinner skin, and older patient age increase the risk. The face, the backs of the hands, and intertriginous areas are particularly susceptible. Resolution often occurs after discontinuing use of these agents, but it may take months. Concurrent use of topical tretinoin (Retin-A) 0.1% may reduce the incidence of atrophy from chronic steroid applications.[30] Other side effects from topical steroids include permanent dermal atrophy, telangiectasia, and striae.

Topical steroids can also induce rosacea, which may include the eruption of erythema, papules, and pustules. Steroid-induced rosacea occurs when a facial rash is treated with low-potency topical steroids that produce resolution of the lesions. If the symptoms recur and steroid potency is gradually increased, the rosacea may become refractory to further treatment, making it necessary to discontinue the steroid. This may then induce a severe rebound erythema and pustule outbreak, which may be treated with a 10-day course of tetracycline (250 mg four times daily) or erythromycin (250 mg four times daily). For severe rebound symptoms, the slow tapering of low-potency topical steroids and use of cool, wet compresses on the affected area may also help.

The normal presentation of superficial infections can be altered when topical corticosteroids are inappropriately used to treat bacterial or fungal infections. Steroids interfere with the natural course of inflammation, potentially allowing infections to spread more rapidly. The application of high-potency steroids can induce a deep-tissue tinea infection known as a Majocchi granuloma.

Table 3. Quantity of Ointment Based on Fingertip Units*

Area of the body	*Fingertip unit required for one application*	*Weight of ointment required for one application (g)*	*Weight of ointment required for an adult male to treat twice daily for one week (g)*
Face and neck	2.5	1.25	17.5
Trunk (front or back)	7	3.5	49
One arm	3	1.5	21
One hand (one side)	0.5	0.25	3.5
One leg	6	3	42
One foot	2	1	14

**—One fingertip unit = approximately 0.5 g.*

Information from reference 28.

Table 4. Potential Side Effects of Topical Corticosteroids

Cutaneous/local effects	**Cutaneous/local effects**
Atrophic changes	Miscellaneous (continued)
Easy bruising	Reactivation of Kaposi sarcoma
Increased fragility	Rebound flare
Purpura	Steroid-induced acne
Stellate pseudoscars	Steroid-induced rosacea
Steroid atrophy	Ocular changes
Striae	Cataracts
Telangiectasis	Glaucoma
Ulceration	Ocular hypertension
Infections	**Systemic effects**
Aggravation of cutaneous infection	Endocrine
Granuloma gluteale infantum	Cushing disease
Masked infection (tinea incognito)	Hypothalamic-pituitary-adrenal suppression
Secondary infections	Metabolic
Miscellaneous	Aseptic necrosis of the femoral head
Contact dermatitis	Decreased growth rate
Delayed wound healing	Hyperglycemia
Hyperpigmentation	Renal/electrolyte
Hypertrichosis (hirsutism)	Hypertension
Hypopigmentation	Hypocalcemia
Perioral dermatitis	Peripheral edema
Photosensitization	

Adapted with permission from Hengge UR, Ruzicka T, Schwartz RA, Cork MJ. Adverse effects of topical glucocorticosteroids. J Am Acad Dermatol. *2006;54(1):5.*

This tinea folliculitis requires oral antifungal therapy. Combinations of antifungal agents and corticosteroids should be avoided to reduce the risk of severe, persistent, or recurrent tinea infections.[31] Any rash treated with topical steroids that worsens or does not significantly improve should be reevaluated for the possibility of an undiagnosed infectious etiology.

Topical applications of corticosteroids can also result in hypopigmentation. This is more apparent with darker skin tones, but can happen in all skin types. Repigmentation often occurs after discontinuing steroid use.[29]

Steroids can induce a contact dermatitis in a minority of patients, but many cases result from the presence of preservatives, lanolin, or other components of the vehicle. Nonfluorinated steroids (e.g., hydrocortisone, budesonide [Rhinocort]) are more likely to cause a contact dermatitis.

Topically applied high- and ultra-high-potency corticosteroids can be absorbed well enough to cause systemic side effects. Hypothalamic-pituitary-adrenal suppression, glaucoma, septic necrosis of the femoral head, hyperglycemia, hypertension, and other systemic side effects have been reported.[29] It is difficult to quantify the incidence of side effects caused by topical corticosteroids as a whole, given their differences in potency. According to a postmarketing safety review, the most frequently reported side effects were local irritation (66 percent), skin discoloration (15 percent), and striae or skin atrophy (15 percent).[29] Side effects occur more often with higher potencies.

Topical steroids can induce birth defects in animals when used in large amounts, under occlusion, or for long duration.[21] They have not been shown to do so in humans, and are classified by the U.S. Food and Drug Administration as pregnancy category C. It is unclear whether topical steroids are excreted in breast milk; as a precaution, application of topical steroids to the breasts should be done immediately following nursing to allow as much time as possible before the next feeding.

Special Considerations

Children often require a shorter duration of treatment and a lower potency steroid. When the diagnosis is unclear, when standard treatments fail, or when allergy patch testing is unavailable in the physician's office, referral to a dermatologist is recommended.

This is one in a series of "Clinical Pharmacology" articles coordinated by Allen F. Shaughnessy, PharmD, Tufts University Family Medicine Residency at Cambridge Health Alliance, Malden, Mass.

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