

Treatment of Acne Vulgaris

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Acne vulgaris is a common skin disorder that is socially disabling to some degree in the majority of adolescents. Effective management of this disease has two major components: a strong physician-patient relationship and a sound medical regimen. The former is necessary to foster patient compliance with the long-term therapeutic regimen required, as well as to reduce the disease's potential for emotional scarring. The rational usage of the various topical and systemic medications available will serve to decrease the frequency and severity of exacerbations as well as to minimize possible scarring. Specific recommendations as to moisturizers and cosmetics are included.

Every family physician who treats adolescents should be an expert in the art of management of acne vulgaris. Acne vulgaris is probably the most common skin disorder in the United States, accounting for an estimated 25 percent of office visits in a private dermatologist's practice.¹ It may be a socially disabling disease to some degree in 50 to 60 percent of adolescents,² and may leave both physical and psychological scars that last a lifetime.

Pathogenesis

The primary lesion in acne is the microcomedo. The comedo (plural—comedones) is an impaction of the pilosebaceous canal of a sebaceous follicle. Sebaceous follicles are located predominantly on the face and upper trunk and produce sebum, a lipid containing predominantly triglycerides, but

also squalene and wax esters. Both an overproduction of cells and increased cohesiveness of the cells lining the duct occur in the dermal portion of the duct.³ This is called "retention hyperkeratosis" and results in congestion of the ductal lumen, but not total blockage. With the increase in androgen production at puberty in both sexes, these glands are stimulated to increase sebum production. Acne-prone patients are postulated to have an increased end-organ sensitivity to normal levels of androgens,⁴ resulting in overproduction of sebum with enlarged sebaceous glands. This increased sensitivity may be hereditary in nature, for an estimated 70 percent of acne patients have a positive family history of acne.⁵ Therefore, in acne there is more material traveling through a smaller passage.

Closed comedones appear as small "whiteheads" and have a layer of epidermis covering them at the surface. Open comedones are seen as "blackheads" and have a distended lumen at their surfaces. Their black color is not dirt, but rather represents melanin deposits from ductal melanocytes.⁶

A normal inhabitant of sebaceous glands is an anaerobic bacterium formerly called *Corynebacterium*.

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terium acnes and now classified as *Propionibacterium acnes*. It is found in much larger quantities at the onset of puberty in those individuals who develop acne, producing lipases which degrade the triglycerides in sebum to free fatty acids.⁷ Both the free fatty acids and the bacteria themselves may serve as irritants which provoke an inflammatory reaction via polymorphonuclear leukocyte chemotaxis.⁵

This inflammatory reaction results in the formation of superficial pustules and deeper papular or nodular lesions. Acne cysts are formed following multiple rupture and re-encapsulation of other acne lesions.⁷

Management of Acne Vulgaris

The proper management of acne involves the cultivation of a therapeutic physician-patient relationship along with a sound medical regimen.⁸ The goals of therapy are to prevent scarring and to give the patient the best appearance possible by decreasing the frequency and severity of exacerbations.

The Physician-Patient Relationship

An understanding, sympathetic physician is an integral part of successful acne management. Both the waxing and waning nature of acne and the inconveniences of its long-term management are often frustrating to the adolescent. A strong physician-patient relationship helps the patient overcome these frustrations and fosters the necessary compliance with the medical regimen. Patient compliance can be enhanced further by the physician giving a clear explanation of the pathogenesis of acne and its treatment at the initial office encounter. This will serve not only to make the patient feel that he is an active participant in his care, but also to convince him that the physician is an interested ally. Follow-up visits should enhance this bond and physicians should be receptive to any clues that the patient is beginning to put his acne problem out of perspective.

There are a number of issues which should be discussed with acne patients. These include:

1. *Picking and Popping Pimples*

Patients should avoid these practices as they may lead to increased inflammation and scarring.⁹

2. *Dirt*

Acne is not caused by dirt and it cannot be washed away. Overzealous scrubbing may actually make it worse.

3. *Cosmetics*

Some cosmetics have been implicated in comedo formation, including those containing sodium lauryl sulfate, isopropyl myristate, and lipids.¹⁰ Patients who choose to use make-up should be advised to use non-comedogenic preparations which include Clinique Pore Minimizer, Regime, Charles of the Ritz Reversence Liquid Moisturizer, Revlon Moon Drops, Touch and Glow, and Yardley Next-to-Nothing.

4. *Moisturizers*

Acne patients generally have oily skin and do not require moisturizers. However, since many acne medications are "drying," patients may request one during the course of therapy. If a moisturizer is required, non-comedogenic preparations (Purpose Dry Skin Cream, Wibi Lotion) should be advised.

5. *Diet*

Patients should be advised to eat a healthy diet. It is no longer felt that certain foods, eg, chocolate, should be prohibited.

6. *Stress*

Stressful situations, including college examinations, family fights, and competitive sports may play a role in acne exacerbations.¹¹

7. *Sex*

There is no evidence that either masturbation or

"too much" or "too little" sexual activity plays any role whatsoever in the pathogenesis of acne.

8. Expectations

Treatment controls acne; it does not cure it. Therapy should be continued, even if the patient's skin clears, in order to forestall and minimize exacerbations.

Medical Management

It is helpful to apply what is known about the pathogenesis of different types of acne lesions to the selection of acne therapy for a particular patient. Acne may be divided into the following three groups on the basis of the predominant lesional type, although there is virtually always considerable overlap: (1) obstructive acne, (2) inflammatory acne, (3) acne conglobata.

Obstructive acne consists mainly of open and closed comedones and generally responds to comedolytic and exfoliant therapy and manual removal of the lesions. Antibiotics are generally unnecessary and steroids are clearly not indicated.

Inflammatory acne is predominantly involvement with pustules, papules, and nodules. Comedolytic therapy is often helpful as an adjunct to the mainstay of therapy for this form, antibiotics. The latter are used to inhibit *Propionibacterium acnes* and thereby decrease the irritation from the products of their metabolism. Occasionally, intralesional steroids may be helpful for particularly severe lesions.

Acne conglobata is a particularly severe and scarring form characterized by cysts, large papulonodular lesions, and multiporous comedones. It is treated with all of the above modalities and even systemic steroids, and probably should be managed by a dermatologist in most cases.

1. Benzoyl Peroxide

This agent is both comedolytic and bacteriocidal¹⁰ and is therefore useful in the therapy of

both obstructive and inflammatory acne. It may be used alone in the treatment of mild cases or in combination with other agents in more severe cases. It may cause mild peeling and flaking and may be irritating to the eyes and mucous membranes. There are many preparations on the market, of which those in a gel form are probably more effective. These include: Benzagel, Benzac, Desquam-X, PanOxyl, Xerac BP. Each comes in five- and ten-percent formulations and may be used twice daily.

2. Retinoic Acid

This is the most potent comedolytic agent but it often has lower patient compliance than benzoyl peroxide. It may be utilized if comedones persist despite benzoyl peroxide therapy or as primary therapy in patients who have severe comedonal acne; it should be used with caution due to its potential irritating effects in fair skinned patients or those who have sensitive skin. Retinoic acid can cause redness and peeling, especially if the skin is hydrated since this enhances penetration; therefore, the patient should be instructed to avoid application shortly after washing. It is usually used once daily, but if irritation proves to be a problem, it may be used on alternate days. Retinoic acid initially may cause irritation but this generally resolves within a few weeks as the patient's skin develops tolerance to it. The patient should be advised to avoid excessive sun exposure and to use a protective sunscreen when needed. The patient should be aware that retinoic acid may rarely exacerbate his acne at first by acting on subclinical comedones but that perseverance will lead to improved results after two to six weeks. The most easily tolerated preparations include Retin-A 0.05% cream and 0.01% gel, which are of equivalent efficacy. If necessary, the stronger cream or gel forms or the lotion may be used later. If the comedones persist despite Retin-A use, then benzoyl peroxide also may be added to the regimen. The benzoyl peroxide is usually used in the morning and the Retin-A at night. They should not be applied at the same time since the Retin-A will be oxidized and inactivated. Retinoic acid and benzoyl peroxide are felt to be synergistic.

3. Salicylic Acid

These agents can be utilized if the benzoyl peroxide and the retinoic acid are not tolerated. Commercial preparations include three- to five-percent Saligel and two-percent Klaron Acne Lotion. Unlike retinoic acid and benzoyl peroxide, they are not comedolytic and therefore have no preventive effects although they may shorten the course of mild inflammatory lesions.

4. Liquid Nitrogen

Liquid nitrogen is utilized by some dermatologists as a light swab for its "exfoliating" or "peeling" activity. It should be used with caution in dark complexioned individuals because of the risk of hyperpigmentation.

5. Comedone Extractor

Both open and closed comedones may be removed manually by utilizing gentle pressure with an instrument called a comedo extractor. Closed comedones should first be lightly incised with a lancet.

6. Antibiotic Therapy

Antibiotic therapy is indicated for inflammatory acne and its efficacy has been attributed to its inhibition of *Propionibacterium acnes* and the resultant decrease in free fatty acid production.

The two major systemic antibiotics utilized are tetracycline and erythromycin. The patient is usually started on one gram per day (500 mg twice daily) and the dose is adjusted every two to four weeks. The average maintenance dose is about 500 mg daily. The dosage can often be reduced to 250 mg daily or every other day, in which case the patient should be instructed to increase the dose if necessary. Long-term therapy is relatively safe^{12,13} while side effects (such as gastrointestinal upset and monilial vaginitis) are infrequent and mild in non-debilitated patients. Rarely, gram-negative folliculitis due to *Klebsiella* or *Proteus* occurs with

pustules on the central portion of the face, requiring selection of an antibiotic based on culture and sensitivity. Tetracycline is contraindicated in pregnancy, in children less than nine years old, and in renal failure. It should be taken on an empty stomach since it may be inactivated by chelation with calcium or other dietary minerals.

Some dermatologists feel that minocycline may be more effective than tetracycline or erythromycin for acne, at least for patients with resistant acne. It is used in doses of 50 mg to 200 mg daily.

Topical antibiotics are useful as the dosage of systemic antibiotics is being reduced and are also effective in inflammatory acne not severe enough to warrant systemic antibiotics.^{14,15} The use of topical antibiotics also helps to increase patient compliance in those who are reluctant either to take systemic antibiotics or who are unable to tolerate them. Topical Cleocin is the most commonly prescribed agent and the patient should be instructed to apply it twice daily. It can be prescribed as "600 mg cleocin in 48 cc isopropyl alcohol, 6 cc water, and 6 cc propylene glycol" or as "four capsules of cleocin in 60 cc Vehicle-N," which gives a one percent solution. By doubling the amount of antibiotic, a two percent Cleocin solution can be used. Topical erythromycin is utilized in a similar way and can be prescribed as follows: "2 gm Ilosone in 40 cc of 70 percent isopropyl alcohol and add propylene glycol ps to 100 cc" or "3 250 mg capsules of erythromycin in E-solve." Topical tetracycline is available as a commercial preparation called Topicycline. All of the topical antibiotics are usually applied twice daily.

7. Steroids

Intralesional steroid injections are useful in nodulocystic lesions and possibly papular lesions, and may rapidly decrease inflammation and minimize scarring. With a 30-gauge needle, a solution containing Kenalog 2.5 mg/cc formed by dilution with normal saline or xylocaine may be injected into the lesion so as to blanch or slightly distend the lesion. Risks associated with this include atrophy of the skin, but this risk can be minimized by using the dilute solution and injecting only a small amount. The injections can be repeated every one to two weeks. One should avoid using more than

20 mg of Kenalog at a time. Systemic steroids are reserved for fulminant nodulocystic acne with severe scarring. Generally, prednisone 20 mg daily or 40 mg every other day is used for a month, then decreased gradually over three to four months.¹⁶

8. Other Modalities

Soaps and scrubs are sometimes employed in mild acne. Commercial preparations include Fostex, Fomac Foam, Neutrogena Acne Bar, and Desquam-X acne cleanser, and the patient should be instructed to "wash, don't scrub" twice a day. These agents should be discontinued if topical comedolytics are required, for they may limit the patient's ability to use the more effective agents due to excessive drying.

Estrogen decreases sebum production and thus can be beneficial in acne. Its well-known potential side effects generally preclude its usage except in the female with severe, recalcitrant, nodulocystic acne.⁸ Doses of approximately 100 micrograms of ethinyl estradiol are usually required. For women with acne on birth control pills, androgen dominant pills (eg, Ovral, Loestrin, Zorane) can be replaced with estrogen dominant pills (eg, Demulen, Ovulen).²

Sebum production is decreased and its composition altered by 13-cis-retinoic acid. In a recent study oral 13-cis-retinoic acid resulted in 13 of 14 patients with severe refractory acne obtaining 100 percent resolution after four months.¹⁷ Side effects involving primarily the skin and mucous membranes (cheilitis, facial dermatitis, xerosis) were extremely common and the drug is still classified as investigational.

Treatment for Scarring

Basic guidelines for the management of scarring include delaying any surgical procedures until the acne is well controlled and allowing the scars at least one year to "mature" to their final appearance.⁵

Dermabrasion is reserved for severe scarring and is relatively contraindicated in dark skinned patients because of the greater risk of hyperpigmentation. Neither should it be offered to patients

with mild scarring, for dermabrasion may actually worsen their appearance if pronounced pigmentary changes do occur. Deep "ice pick" scars can be only partially smoothed.

Liquid nitrogen swabs are sometimes useful for shallow, superficial scars.

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