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PRACTICAL DERMATOLOGY

Pseudofolliculitis Barbae

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Benzoyl peroxide;
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Abstract

Pseudofolliculitis barbae is a chronic, irritating, and potentially disfiguring condition that develops as a result of attempts to eliminate hair from the beard area, usually by shaving. It is difficult to determine the incidence of the disorder, but some studies report that it affects up to 1 of every 5 caucasian individuals and that it is much more common in black persons. Clinically it is characterized by the appearance of inflammatory papules and pustules. Once pseudofolliculitis has become established, treatment consists of avoiding shaving and the use of medical treatment similar to that used in acne. However, the long-term result is much more dependent on prevention through a correct shaving technique. In severe cases or when a definitive solution is sought, the treatment of choice is photodepilation.

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PALABRAS CLAVE

Pseudofolliculitis;
Fotodepilación;
Eflornitina;
Peróxido de benzoílo;
Tratamiento acné

Pseudofolliculitis de la barba

Resumen

La pseudofolliculitis de la barba es un proceso crónico, molesto y potencialmente desfigurante que aparece como consecuencia de los procedimientos destinados a la eliminación del pelo de la zona, fundamentalmente el afeitado. Es difícil establecer la incidencia de este trastorno, pero algunos estudios apuntan a que afecta a casi uno de cada cinco individuos de raza blanca siendo mucho más frecuente en la raza negra. Desde el punto de vista clínico se caracteriza por la aparición de pápulas inflamatorias y pústulas. Cuando la pseudofolliculitis ya se ha instaurado el tratamiento consiste en la abstención del afeitado y tratamiento médico similar al que se utiliza para el acné. Sin embargo, para obtener resultados duraderos es mucho más importante la prevención mediante una técnica de afeitado correcta. A pesar de todo ello, en los casos graves o cuando se desea una solución definitiva, la fotodepilación constituye el tratamiento de elección.

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Introduction

Until recently, dermatologists have paid little attention to shaving-related skin problems. However, this type of consultation is becoming ever more common, with the result that we must bring our knowledge in this area up to date.¹

In men, the beard, formed of about 20 000 hairs, develops during puberty as one of the male sex-linked characteristics. Starting to appear as a boy enters adolescence, between 12 and 18 years of age, the beard continues growing and increasing in thickness and density throughout youth, although there is considerable variation from one man to another.

The skin of the beard area can present the same diseases that affect the skin in other areas, but a number of particular characteristics make it susceptible to certain disorders that are practically specific to that area. Though the same layers of the skin as in the rest of the body are present, both the thickness of the layers and the density and development of the adnexa are greater in the beard area.

The common dermatological problems of the beard area are mostly related to shaving and include wounds, irritant and allergic contact dermatitis, and pseudofolliculitis. This last disorder is more common in black men,² and the high level of immigration to Spain in recent years has led to an increase in consultations for this condition.

Pseudofolliculitis Barbae

Pseudofolliculitis barbae has been referred to by various names: sycosis barbae, sycosis vulgaris, ingrown hair, traumatic folliculitis of the beard, and razor or shaving bumps.

This troublesome, chronic, and potentially disfiguring condition occurs in men who shave and is characterized by the presence of an acneiform rash of papules and pustules in the beard area caused by ingrown hairs. Pseudofolliculitis mainly affects the beard area, but it can occur in any area of hair-bearing skin when traumatic methods (shaving, plucking) are used to remove the hair.^{3,4}

The disorder varies intensity from a simple cosmetic problem to a medical condition for which the dermatologist must be prepared.

Epidemiology

Pseudofolliculitis is an inflammatory disorder that occurs most frequently in men with a dense and curly beard. It can also occur in individuals who shave against the grain in an attempt to achieve a very close shave.⁵

The exact incidence of pseudofolliculitis is unknown and although it can occur in any race, it is more common in black persons.⁶ Army physicians in the United States have reported finding this condition in 45% of black soldiers; pseudofolliculitis was less common and less intense in white soldiers.⁷⁻¹⁰

Others have estimated an incidence of 94% in blacks and of 16% in whites, without specifying the degree of severity that was used in order for the condition to be considered pseudofolliculitis.¹¹ In the United States it is calculated that

around 5 million black men have severe pseudofolliculitis barbae.²

This disorder can be a serious problem for those persons who are required to shave—a beard is still not permitted in some professions, such as sales, firefighting, the police and the military, and even for certain jobs within some large companies.⁷

Pathogenesis

Pseudofolliculitis barbae occurs when emerged terminal hairs, particularly the thick, curly hairs of the beard, grow back toward the surface.^{12,13} The sharp ends of the hairs left by the oblique cut of the razor make contact with the epidermis at an angle of 90° and penetrate it; the resulting invagination of the epidermis is similar in appearance to a hair follicle and is referred to as a pseudofollicle (Figure 1A). The epidermis eventually ruptures and inflammation develops, mainly due to a foreign body reaction (secondary folliculitis). A very close shave may also cause the hair to pierce the epidermis before reaching the surface (Figure 1B).

Pseudofolliculitis is favored not only by the characteristics of the hair, but also by shaving against the grain while tensing the skin; on releasing the tension, the hair is drawn back below the skin surface and will pierce the epidermis before reaching the surface.

This phenomenon is less likely to occur with finer, less curved hairs or when the angle at which the hair is cut during shaving is perpendicular to the skin. Even so, the same problem can still arise if the hairs are cut too short; pseudofolliculitis barbae can therefore occur with greater or lesser intensity in any person who shaves.

Depilation with tweezers, wax, or machines can produce the same effect when a hair grows, although it is less common because the tip of the hair is less sharp.

If a person with pseudofolliculitis stops shaving, hair growth to a length of 10 mm usually pulls the hair out of the inflammatory papule, and the process tends to resolve spontaneously (Figure 2).¹⁴

A recent study found a mutation in the gene that codes for keratin K6hf that gives rise to a 6-fold increase in the risk of suffering pseudofolliculitis barbae.¹⁵ In that study it was shown that 76% of individuals with pseudofolliculitis had the A12T polymorphism of the gene coding for that keratin, which is found in a thin layer of cells between the inner and outer sheaths of the root of the hair follicle. Abnormalities in this keratin constitute a risk factor for pseudofolliculitis and when thick wavy or curly hair is involved, hair ingrowth after shaving is more likely.^{15,16}

Another study has demonstrated that curly hair and the presence of whorls increase the risk of developing pseudofolliculitis barbae by more than 50%.¹⁷

Clinical Presentation

Clinical presentation of this condition is characterized by the formation of erythematous papules and pustules of 2 to 5 mm in diameter in the shaved parts of the beard area (Figures 3 to 6). The submandibular area is most frequently affected due to the higher hair density and the oblique direction of hair growth in this area.

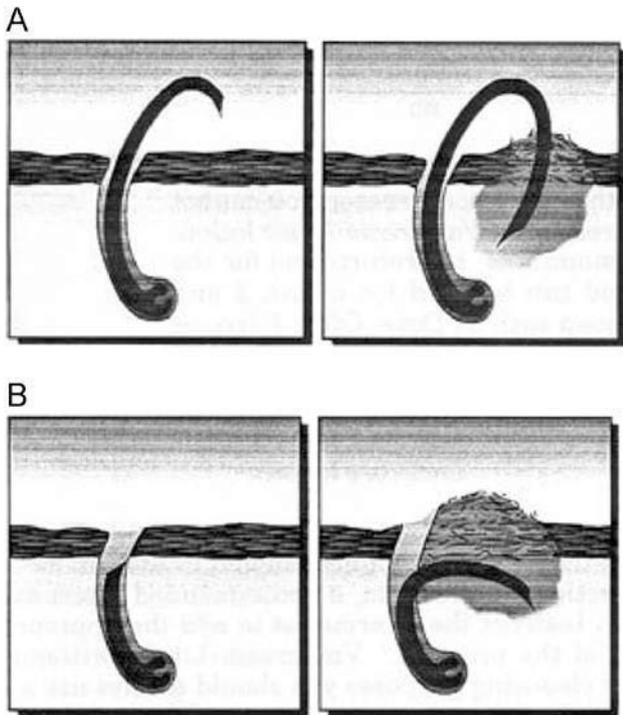


Figure 1 Diagram of the mechanism involved in pseudofolliculitis barbae. A, Extrafollicular penetration of a hair. B, Transfollicular penetration of a hair.

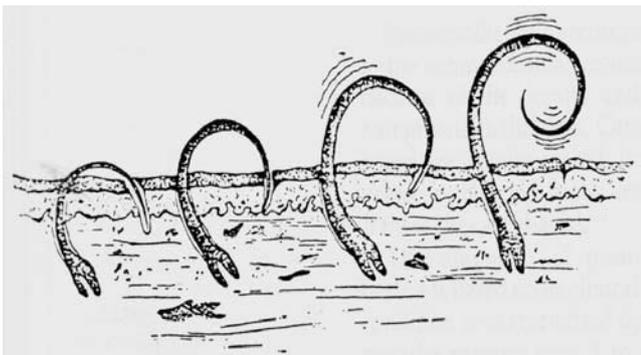


Figure 2 An ingrown hair is released as it approaches a length of 10 mm.

Pseudofolliculitis does not occur only on the face. It can develop wherever shaving or depilation is performed for cosmetic reasons and has been seen in the pubic region or the axillas, where it is common to find curly hair that emerges at an acute angle.¹⁸⁻²² In individuals with very curly body hair, pseudofolliculitis can also occur after depilation of other areas such as the chest, back, or legs.²³ Another region that is often affected is the scalp.²¹ In addition, pseudofolliculitis has been reported in the nose, caused by plucking the stiff nasal hairs or cutting them with scissors very close to the surface of the skin.²² The condition may also occur after preoperative shaving.²⁴

Pseudofolliculitis can also be related to certain occupations in which the subject has to maintain a device or hard

surface against the cheek for long periods of time. A classic case is “fiddler’s neck”, a form of pseudofolliculitis barbae caused by the pressure of the violin under the mandible.^{25,26} Other causes of occupational pseudofolliculitis include the use of constricting objects, devices, or clothing that rub on hair-bearing areas and produce depilation by friction.

There have also been reports of cases related to the administration of medicines that can favor acne, such as corticosteroids and ciclosporin.^{27,28}

Symptoms vary from minimal discomfort to pain and intense pruritus, and even ulcers and bleeding may develop due to erosion of the papules on repeated shaving. Evaluation of the intensity of pseudofolliculitis can be made using the classification in Table 1, based on a count of the number of lesions and their characteristics.

The diagnosis of pseudofolliculitis barbae is based on clinical characteristics. When it affects the face, the main differential diagnosis is shaving-related traumatic folliculitis, which is characterized by pink follicular papules



Figure 3 Mild pseudofolliculitis barbae in a white patient.



Figure 4 Mild to moderate pseudofolliculitis barbae in a white patient.



Figure 5 Moderate pseudofolliculitis barbae in a black patient.



Figure 6 Moderate pseudofolliculitis barbae with hyperpigmented lesions in a black patient.

and excoriations and shows no evidence of ingrowing hairs or transfollicular penetration. It resolves in 1 to 2 days if shaving is stopped, whereas pseudofolliculitis will persist for more than a week. Pseudofolliculitis barbae must also be differentiated from acne, staphylococcal folliculitis, herpetic folliculitis, trichophytic sycosis barbae, and other less common infectious forms.^{29,30} In a recently published case report, the initial diagnosis of pseudofolliculitis turned out to be cryptococcosis in a patient with AIDS.³¹

Prognosis

Pseudofolliculitis can become a chronic problem in patients who continue shaving or do not adopt the treatment and preventive measures discussed below.

The most common complication is hyperpigmentation, which develops in around 35% of affected black persons,

Table 1 Classification of the Severity of Pseudofolliculitis Barbae⁴

Number of lesions	
0	No lesions
1	<10 lesions on each side
2	10 to 20 lesions on each side
3	20 to 30 lesions on each side
4	>30 lesions on each side
Severity of the lesions	
0	No lesions
1	Micropapules
2	Micropapules with occasional small pustules
3	Micropapules with large pustules and moderate inflammation
4	Micropapules with widespread pustules and intense inflammation

although some authors have reported figures of 90.1% (Figure 6).³ Keloid formation has been reported less frequently, and impetigo only occasionally.⁷

Treatment

The aim of treatment is to reduce extrafollicular and transfollicular hair penetration and to reduce chronic inflammation.

When inflammation is present, it is advisable to stop shaving for around 4 weeks, until the inflammation resolves.¹³ The first days that the hair is allowed to grow, the condition may worsen if the tip of the hair penetrates the skin; however, if the hair is allowed to continue growing, the part of the hair above the skin acts as a lever and pulls out the ingrown part, leading to an improvement in the condition. Another possibility is to attempt to remove the ingrown hairs by freeing them with a sterile needle. When these methods are insufficient or the inflammation becomes severe, medical treatment is required.³²⁻³⁴

The patient must understand that the objective is not to achieve perfect skin, but rather a marked improvement and a reduction in the daily discomfort caused by shaving.

Treatment of the Acute Phase of Pseudofolliculitis

During the acute phase, compresses moistened with warm water or Burow's solution should be applied like a poultice for 10 to 20 minutes 3 times a day, followed by the application of 1% hydrocortisone cream. Twice-daily applications of a lotion containing an antibiotic, such as 2% clindamycin or 2% erythromycin, as used in acne, are also recommended. Some authors even advocate oral antibiotics such as doxycycline or minocycline at a dose of 100 mg every 12 hours for 7 days. Others, instead of antibiotics, prefer to use 2.5% or 5% benzoyl peroxide after shaving, in association with 1% or 2% hydrocortisone cream or lotion at night.

The only published randomized clinical trial included 88 men who were treated with a gel containing 5% benzoyl peroxide plus 1% clindamycin or a placebo gel for 10 weeks.³⁵

The group treated with the combination experienced a significant 38.2% reduction in pseudofolliculitis lesions in the second week and a 63.9% reduction at the end of the study.

Other authors have recommended the use of topical glycolic acid³⁶ or a topical retinoid such as 0.025% tretinoin or 0.1% adapalene. Other treatment options include a combination of benzoyl peroxide plus adapalene or 0.05% tazarotene once a day.³⁷ Finally, treatment with isotretinoin has been proposed,³⁸ though there are no subsequent articles that support its use.

Treatment of Scars and Keloids

If keloids have already developed, the treatment of choice is intralesional infiltration with triamcinolone diluted in an equal volume of normal saline or sterile bidistilled water (triamcinolone concentration after dilution, 40 mg/mL) every 2 months until the lesions resolve, though taking care not to provoke corticosteroid-induced atrophy. The topical application of a potent corticosteroid (clobetasol) can also be prescribed.

Other therapeutic approaches that can be beneficial are dermabrasion, semi-ablative lasers, and surgery, using a technique similar to that employed in the treatment of scars and keloids induced by acne.

Treatment of Hyperpigmentation

The postinflammatory hyperpigmentation that sometimes develops in pseudofolliculitis can be treated with 4% hydroquinone cream, chemical peelings, or microdermabrasion. To prevent hyperpigmentation, individuals with pseudofolliculitis should avoid using shaving products that contain alcohol and should apply a sunscreen routinely each morning after shaving. Creams containing azelaic acid, kojic acid, or retinoic acid can be useful if the changes are mild.

Hyperpigmentation also usually resolves after laser hair removal.

Prevention

As commented above, the definitive solution for pseudofolliculitis barbae is to stop shaving and let the beard grow. For persons who are not allowed or do not want to have a beard, other hair removal methods that cause fewer problems than shaving need to be found. Instead of shaving, topical depilatories or mechanical depilation can be used, although the definitive methods are electrical depilation and, in particular, photodepilation.

Blade Razors

Some blade razors are designed to reduce the frequency of pseudofolliculitis and to avoid cutting the raised papules and pustules that develop. In general, the ones that work best are single-blade razors that do not shave too closely and razors fitted with steel-wire guards that protect the blades and reduce contact with the skin. The results of studies using these methods indicate that 72% of individuals with pseudofolliculitis show an improvement of greater than 25% after a few weeks using special razors.³⁹ Razors with 2 or more blades predispose to transfollicular

penetration as the first blade pulls the hair outwards and the second cuts it, thus leading to retraction of the hair into the follicle.

Electric Razors

Electric beard trimmers rather than razors are the safest. They do not injure the pseudofolliculitis papules as they cut the hair just above the skin surface. Other types of shavers usually leave a very sharp end on the hairs, favoring ingrowth. When these machines are used, the shave height selector should be set to cut less close.

Chemical Depilatories

Depilatory powders and creams are not widely used due to their smell and the possibility of irritant dermatitis if the instructions are not followed closely. The main ingredient of these products is 2% barium sulfide or calcium thioglycolate. They work by breaking the disulfide bonds of the keratin of the hair, causing the hair to break just at the orifice of the follicle. The resulting blunt end does not cause retraction, thus reducing the possibility of ingrown hairs. These products can irritate the skin; the majority of patients do not tolerate their daily use and will typically use them every 2 or 3 days. Nevertheless, when used correctly (Table 2), they can be a good option for hair removal. The most widely accepted ones contain calcium thioglycolate. After applying chemical depilatories, it is very important to wash the face well.

Laser Depilation

The problems of shaving and the irritation caused by hair rubbing against clothes are the main reasons why men opt for definitive depilation of the lower beard area. Some choose to remove all the hairs of the beard, while others prefer to have only a few sessions to thin the beard sufficiently to make shaving easier.

Laser or intense pulsed-light depilation has provided a new and convenient method to treat pseudofolliculitis barbae,⁴⁰ achieving resolution of the papules and pustules, improving skin texture and postinflammatory hyperpigmentation, and leaving a more acceptable cosmetic outcome.⁴¹

There is now a wide range of technological methods for effective hair removal, made possible by greater understanding of laser physics, the use of appropriate wavelengths and pulse duration, and advances in skin cooling techniques. As the majority of these systems target melanin as the chromophore (absorption spectrum, 250-1200 nm),⁴² hair removal was initially reserved for light skin phototypes (Fitzpatrick skin types I through III) with black hair. The instruments used included the ruby laser,⁴³ the long-pulsed alexandrite laser,⁴⁴ and a wide variety of sources of intense pulsed light.⁴⁵

In 1999, Chui et al⁴⁶ used a long-pulsed ruby laser (694 nm) in various patients with refractory scarring follicular disorders, including pseudofolliculitis barbae. Patients tolerated the treatment well, with no significant adverse effects; a significant clinical improvement was achieved, associated with a decrease in hair growth in the treated areas. Similar results were reported with the use of the long-pulsed alexandrite laser⁴⁴ and with intense pulsed light.⁴⁵ However, as pseudofolliculitis barbae is

Table 2 Guidelines for the Correct Use of Chemical Depilatories

- Wash the beard area with warm water and mild soap
- Rinse the area thoroughly
- Apply the depilatory cream to the beard area of 1 side of the face, allow it to act for 2 to 3 minutes if using barium sulfide or 10 minutes if using calcium thioglycolate (follow the manufacturer's instructions)
- Remove the depilatory product using a wooden spatula moistened in water, moving in the direction of hair growth
- Wash the face immediately 2 or 3 times with a mild soap and rinse thoroughly to avoid leaving any residues of the product, which could cause irritation
- Apply a moist towel and leave in place for 3 to 5 minutes to reduce the irritation
- Apply a balm, lotion, or emollient cream after washing. Those recommended for use after shaving can be employed
- Apply a mild topical corticosteroid if itching develops
- Repeat the procedure every 3 to 5 days. It is not advisable to use this method of depilation at shorter intervals

more common in patients with dark phototypes,⁴⁰ it was necessary to develop other systems to minimize the thermal damage to the epidermis.

The long-pulsed diode laser (810 nm) and the neodymium:yttrium aluminium garnet (Nd:YAG) laser (1064 nm) are the most suitable for patients with a dark phototype. Both lasers are excellent choices for these patients, as they penetrate to the root of the follicle, with minimal effects on epidermal melanin. The procedure can be rather uncomfortable in some areas, such as the neck, and may require topical anesthesia. In biopsies, the hair bulb is seen to be the structure that suffers greatest damage, not surprising as it contains the highest concentration of melanin in the body. The long pulse and wavelength of these lasers, together with the epidermal cooling system, results in good efficacy and safety in patients with dark skin.⁴⁷⁻⁵⁰ The diode laser is more effective in these patients but the Nd:YAG laser is safer.⁴¹

The clinical efficacy of most devices is similar, and the optimal number of sessions varies between 3 and 7.⁵¹ In general, adverse effects have been mild and transitory and include erythema, mild or moderate pain, scab formation, a burning sensation, occasional vesicles, and paradoxical effects. Permanent scarring is rare but can occur.⁴⁶ Tolerance is increased by using a lower energy.

Before starting the laser therapy session, the area to be treated must be carefully cleaned and shaved. If topical anesthesia is used, the preparation must be removed by rubbing with alcohol to prevent it interfering with the light beam. Gauze soaked in water must then be used to remove any residual alcohol. All staff in the room and the patient must use protective eyewear appropriate for the type of device to be used. The energy and pulse duration must be selected before starting treatment. Pulse overlap must not exceed 30%. Until the hair density has been reduced, lower energy levels are recommended for the beard, face, and neck; this aims to minimize any risk of epidermal injury. Immediate cooling after treatment reduces erythema, edema, and epidermal adverse effects. To prevent these effects it is advisable to apply a moderate topical corticosteroid twice a day for 48 hours after treatment. The sessions can be repeated every 4 to

8 weeks. If there are no adverse effects and no epidermal damage, the same parameters will be used or the energy can even be increased slightly. If adverse effects develop, the energy should be decreased or a longer pulse duration used.⁴¹

Devices suitable for home use by the general public will become available in the near future.⁵²

Other methods of definitive hair removal, such as mechanical, electrical, and surgical procedures, have fallen into disuse since the introduction of photodepilation, which is more effective, less uncomfortable, and has fewer adverse effects.⁵³

In women with hirsutism, shaving or depilation by hair traction can also cause pseudofolliculitis. In these cases, in addition to the treatments discussed above, there is also the possibility of systemic hormone treatment and the use of topical 13.9% eflornithine.^{54,55}

Correct Shaving Technique

The most important aspect after resolving an episode of pseudofolliculitis is prevention. It is therefore necessary to inform the patient of the cause of the lesions and of the need for care when shaving. The patient must understand the need to modify the shaving technique and always use the recommended skincare products before and after shaving. Prevention is based on good shaving, that is, a good technique, a good razor, and the right products (Table 3).

Before Shaving

Moisturizing prior to shaving softens the hair. Soft hairs are easily cut and are not left with a sharp tip, making ingrowth less likely.

The skin can be prepared by application of a cream or balm the night before, which will both soften the hair and protect the skin.

It is advisable to wait at least 5 minutes after getting up before shaving. First wash the face with warm water to remove the physiologic skin desquamation and to moisten the skin and hair. A towel moistened with water and applied like a poultice is ideal for this. In this way,

Table 3 Recommended Shaving Technique for Patients With Pseudofolliculitis

- Use a hydrating lotion or cream the night before shaving
- Choose the type of razor according to skin type. Compare tolerance to an electric razor and a blade razor
- The blades of a blade razor must be new, clean, and sharp in order to reduce the possibility of lesions
- When using an electric razor, use the medium (not the close) shave position
- When using a blade razor, use one with a single blade or, at most, 2 blades. Still better, use one with steel-wire guards
- Wet the face with warm water and cover the beard area generously with shaving foam, cream, soap, or gel
- Leave the chosen shaving product on for at least 2 to 3 minutes. The harder the beard, the longer it takes to soften the hairs well
- Shave in the direction of hair growth, with short strokes and without using the other hand to tense the skin
- Do not try to achieve a very close shave if this means a more aggressive shave. When a closer shave is desired, it is better to shave more often but less intensely
- After shaving, rinse the beard area well and dry with a clean towel, slowly and gently massaging the beard area in a circular manner using a rough towel
- Ease out ingrown hairs using a sterile needle
- Apply a therapeutic aftershave lotion or use medication as aftershave lotion (topical antibiotics, benzoyl peroxide)
- If the skin is dry, use a moisturizing facial cream as well

the hair shaft is moistened, making it softer and easier to shave.

Preferably use a brush to apply the shaving cream, rather than applying it directly; this achieves greater lubrication of the area and will facilitate the movement of the razor blade. Apply a sufficient amount of shaving foam or gel that provides good lubrication.

Shaving

Shaving can be performed with an electric or a blade razor.

If a blade razor is used, the blade must be sharp and the same one should not be used for more than 5 days. Razors with a single blade, or a maximum of 2 blades, or ones with wire-protected blades that prevent shaving too close should be preferred. In addition, shaving should be done in the direction of hair growth, rather than against it to avoid increasing erythema, causing a burning sensation and promoting pseudofolliculitis. If shaving is performed against the direction of growth, do not tense the skin or put pressure on the razor. Shaving in the direction of hair growth may sometimes be a problem, as it can be difficult to see the direction of growth in whorls of hair. The direction is easier to see if the patient allows the beard to grow, shaving on alternate days. The patient can also be encouraged to shave only when it is truly necessary, if possible, to allow more time for the skin and beard to recover between shaves.

During a shave, the blades should be rinsed with hot water after each stroke, and the stroke should be slow, so that each area is given due attention and the direction of hair growth is taken into account.

After Shaving

On completion of shaving, wash the face with water cold and apply a balm or lotion to soothe and protect the skin.

For individuals with severe pseudofolliculitis the beard area should have been rubbed with a sponge or brush

before the shave and the area should be massaged 4 or 5 times a day to free the ends of the hairs and help them to reach the surface.

The razor must be washed with a brush and warm water and then left in a place where it can drain and dry well. The presence of hairs and humidity can promote bacterial colonization of this debris and favor folliculitis and pseudofolliculitis.

Conclusions

Pseudofolliculitis is a problem that mainly affects individuals with thick and very curly beard hair with whorls.

There is still no treatment that has been shown to be universally effective, though the condition will improve in the majority of patients if a careful shaving technique is used or the beard is allowed to grow. The therapeutic approach must be determined individually, and it is often necessary to try different products until the most suitable one is found. In general, medical treatment includes the topical and oral medications that are used for acne. Advice about prevention is essential, especially to shave in the direction of hair growth; not to attempt to achieve a very close shave, particularly on the neck; to use products that moisten and soften the hair before shaving; and to choose the shaving system that, in the patient's experience, is best tolerated. The success of treatment in pseudofolliculitis barbae depends fundamentally on the patient's motivation to adopt the preventive measures discussed. However, in most cases, the definitive solution is photodepilation.

Conflict of Interest

The authors declare that they have no conflict of interest.

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