

Cosmetic Warts

Pseudo-Koebnerization of Warts after Cosmetic Procedures for Hair Removal

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ABSTRACT

Objective: To sensitize patients, physicians, and aestheticians about the possibility of spread of cutaneous warts during cosmetic procedures, especially following temporary hair removal methods, such as shaving, waxing, threading, and using depilatory creams, so they practice the requisite safety measures. Cutaneous warts caused by human papilloma virus are highly contagious. They tend to spread locally with even the trivial trauma of scratching, resulting in autoinoculation or “pseudo-Koebnerization.” Other than isolated case reports, there is a paucity of literature on pseudo-Koebnerization of warts by temporary hair removal methods. **Design, setting, and participants:** The authors present their observations from five patients—two men and three women (Cases 1 to 5)—in whom, after a single or a few episodes of a specific temporary hair removal method, either pre-existent warts spread locally at a rapid pace or surfaced clinically for the first time and then started spreading locally. An attempt was made to study the temporal relationship between the cosmetic procedure and the eruption or exacerbation of warts. **Results:** All five cases showed warts in a linear or local distribution, suggesting pseudo-Koebnerization and the possible use of unclean material used for temporary hair removal methods. One male (Case 1) and two female (Cases 3 and 4) patients already had pre-existent warts, which spread locally following the temporary hair removal procedures. The clinically naive other two patients may have acquired human papilloma virus due to cross-infection from unsterilized razor blades (possibly in Case 2) or from a spouse’s infected towel pressing against freshly waxed skin (Case 5). Treatment with radiofrequency ablation or topical tretinoin was successful in all patients. **Conclusion:** Despite the widely prevalent practice of temporary hair removal cosmetic procedures around the globe, such pseudo-Koebnerization-induced “cosmetic warts” remain under-reported. Through this case series, the authors wish to inculcate the practice of more hygienic measures by patients, barbers, aestheticians, and beauticians to prevent such cosmetic mishaps.

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Cutaneous warts caused by human papilloma virus (HPV) constitute one of the most common viral infections of the skin and mucosae. There are more than 100 distinct HPV subtypes, with certain types having a predilection for specific body sites to produce characteristic proliferative lesions. For example, verruca vulgaris (common warts with verrucous surface) caused by serotypes 2 and 4; verruca plana (flat warts) caused most often by HPV type 3 and less often by types 10, 27, and 41; filiform warts (firm thread-like projections) caused by types 2 and 4; and condyloma acuminata (genital warts) commonly caused by HPV types 6 and 11 and less often by the oncogenic types 16 and 18. Once acquired, the virus remains in the skin indefinitely and may give rise to recurrent lesions, the frequency of which depends upon the HPV serotype and host immunity against the virus.¹ Warts

also tend to spread locally around the site of original lesion by autoinoculation induced by trauma-like scratching. This phenomenon is akin to the occurrence of lesions of psoriasis at sites of trauma. However, the pathogenesis of this phenomenon, called Koebner phenomenon is different in the two conditions. While the former is speculated to involve various pathogenetic factors, primarily immunologic with others being vascular, dermal, enzymatic, genetic, and hormonal, the latter is believed to be due to autoinoculation of the infective viral material (hence, called “pseudo-Koebner” rather than true Koebner phenomenon).² Lesions of molluscum contagiosum, another common cutaneous viral infection, also spread through a similar mechanism. All procedures employed for temporary hair removal (THR) result in trivial unnoticeable trauma to the skin, such as shaving, threading, waxing, or

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Figures 1A and 1B. (A) Multiple firm warty papules (verruca vulgaris) over the beard area of a 31-year-old man. The dark-brown-colored macule over the mandibular region is postinflammatory hyperpigmentation reminiscent of lime-induced irritant dermatitis. (B) Multiple, light-brown-colored, asymptomatic, discrete, flat, papular lesions (verruca plana) over the upper and lower neck of a 26-year-old man.

using depilatory creams. In a patient with pre-existent viral warts, these may seed and spread, whereas in patients not yet exposed to HPV, THR procedures breach the protection of the epidermis and allow viral inoculation from an external infected source, such as a non-sterile razor blade or an infected thread or towel, resulting in a fresh eruption.

CASE SERIES

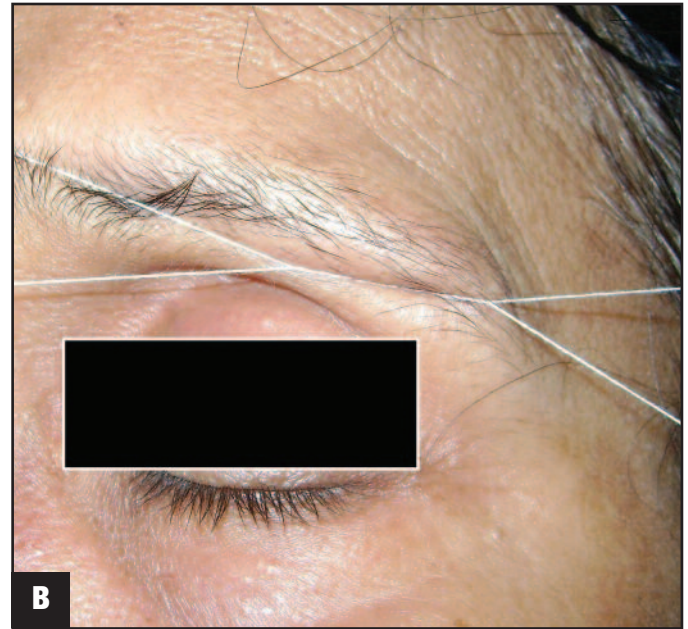
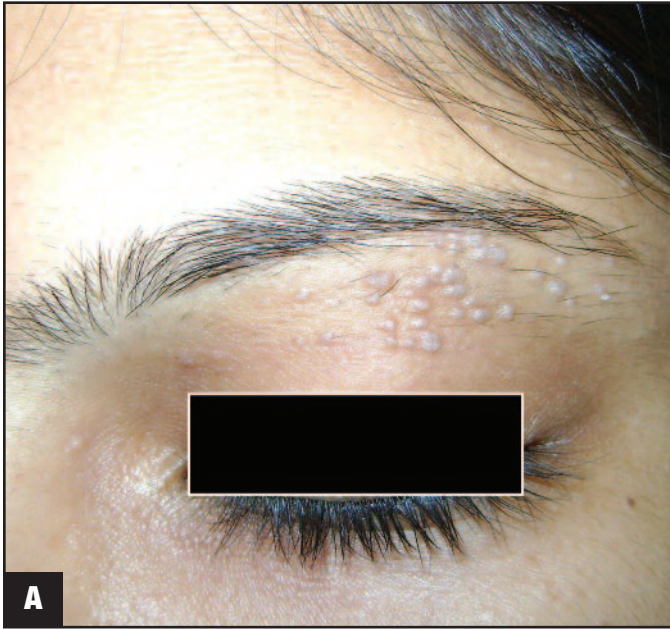
Case 1. A 31-year-old man had a history of developing multiple firm warty papules over his beard area (Figure 1A) for the past year. He also had a history of multiple warts over the palms four years ago, which were ablated by a CO₂ laser device with no recurrence for four years. He used to shave himself and emphasized upon using a fresh sterile razor blade every time. He also had a history of applying lime over one of the lesions, which led to an irritant reaction that healed with postinflammatory hyperpigmentation. A diagnosis of multiple verruca vulgaris over the beard area was made and his lesions were successfully ablated with a bipolar radiofrequency device under local infiltration anesthesia. He had recurrence in the beard area with two new lesions that appeared after four months and had them cauterized.

Case 2. A 26-year-old man presented with multiple light brown-colored asymptomatic discrete flat papular lesions over the upper and lower neck (Figure 1B), which he noticed within two weeks of getting his beard shaved from a local barber to whom he had gone for the first time. He had no history of similar lesions elsewhere in the past. He continued to shave regularly thereafter and noticed a gradual increase in number of lesions in the beard area of

the neck. A clinical diagnosis of verruca plana (with spread due to shaving-induced pseudo-Koebnerization) was made and lesions were successfully ablated with a bipolar radiofrequency device under topical anesthesia.

Case 3. A 35-year-old woman presented with multiple skin-colored to violaceous, non-itchy, 2 to 4mm sized flat-topped papules localized linearly as a cluster just below the left eyebrow for the last six months (Figure 2A). She gave a history of noticing two such lesions below the left eyebrow six months earlier, which had appeared within 15 days of getting threading done at a beauty salon. Although she started doing threading herself instead of going to the salon, the lesions increased in number following each episode of brow-threading. The lesions were clearly localized to the site of threading, with absence of similar lesions elsewhere over the face or body. There were no lesions elsewhere. Keeping a differential diagnosis of verruca plana and lichen planus, a 2mm punch biopsy was performed for histopathology, which revealed mild hyperkeratosis, acanthosis without papillomatosis, and koilocytosis, confirming the diagnosis of verruca plana. Lesions were carefully ablated under topical anesthesia with a bipolar radiofrequency device.

Case 4. A 23-year-old woman presented with a one-month history of multiple, pink-colored, flat, asymptomatic papules unilaterally over the left shin (Figure 3A). She gave a history of having only three to four such lesions over the upper left thigh region for the past few months. However, numerous new similar-looking lesions suddenly spread over the left shin and lower thigh area within three weeks of using a depilatory cream (consisting of thioglycolic acid,



Figures 2A and 2B. (A) Multiple skin-colored to violaceous, 2–4mm sized, flat-topped papules arranged linearly near the left eyebrow of a 35-year-old woman that developed following eyebrow threading. (B) The “threading procedure.” A double stranded thread has been converted to a figure 8 with two triangles, and one triangle of the thread is placed over the target eyebrow. Keeping the thread juxtaposed to the hairline, quick opposing scissors-like movements against the direction of hair growth removes the hair.

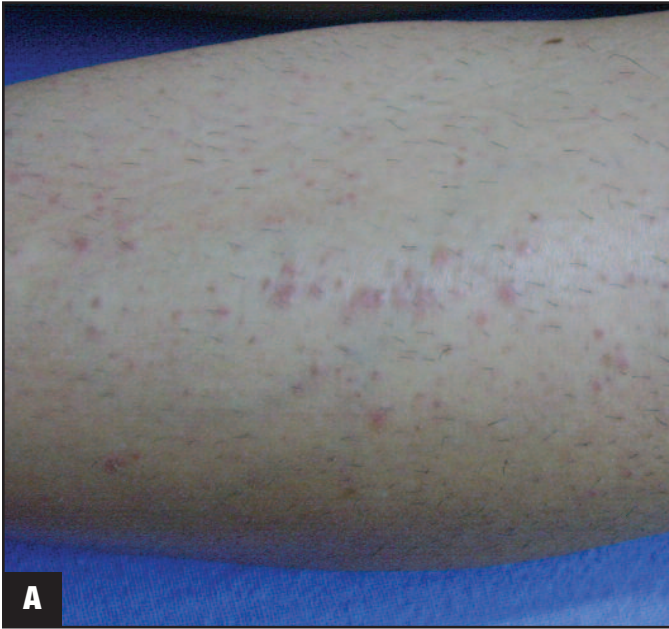
calcium hydroxide, liquid Paraffin, and aloe vera) with a spatula in that region. She had used this mode of THR for the first time. Previously, she shaved her legs. Although she denied a history of genital warts or any high-risk behavior, on examination vulvar warts were seen. Later, the patient gave a history of multiple episodes of unprotected heterosexual contact with the same partner. She was unaware if her partner had warts. On closer examination of the legs, the lesions were present discretely as well as in a linear distribution suggestive of spread due to pseudo-Koebnerization. There were no similar lesions elsewhere on the body. The patient was unwilling to undergo lesional biopsy. Serology for human immunodeficiency virus (HIV) and Venereal Disease Research Laboratory (VDRL) were negative. Treatment with tretinoin 0.1% cream recommended for 6 to 8 weeks resulted in good improvement.

Case 5. A 35-year-old woman presented with multiple, closely placed, dark-colored, asymptomatic, flat-topped papules over the upper left region of the neck (Figure 3B). She had performed waxing of the facial hair of that region for the first time in her life three days before and remembered using her husband’s hand towel for cleaning her face. The patient was not sure about presence of cutaneous warts elsewhere on her own body in the past, but gave a definite history of her husband having multiple wart-like growths over his beard region for the past one year. They had been sharing hand towels since getting married, though her lesions became clinically visible only after her first-time waxing followed by gentle rubbing with her husband’s towel, which probably resulted in direct

inoculation of HPV. The patient was otherwise in good health, with no evidence of immunosuppression. The patient refused biopsy of the lesions and responded well to topical tretinoin 0.04% gel application for six weeks.

DISCUSSION

First described by Heinrich Koebner in 1877, Koebner’s isomorphic phenomenon is the development of isomorphic pathologic lesions in the traumatized uninvolved skin of patients who have a pre-existing dermatosis.³ It may occur due to trauma induced by 1) mechanical or thermal trauma and allergic or irritant reactions (e.g., scratching, surgical incisions, needle-punctures, tattooing, shaving, insect-bites, vaccination, tuberculin testing, etc.); 2) dermatoses (e.g., dermatitis, folliculitis, zoster, etc.); or 3) therapy (e.g., radiotherapy, ultraviolet light, laser hair removal, etc.).² Boyd and Neldner have classified Koebner’s phenomenon into the following four different groups: 1) true Koebnerization, described in psoriasis, lichen such as warts and molluscum contagiosum; 3) occasional localization (e.g., in Darier’s disease, lichen sclerosus); and 4) questionable Koebnerization in disorders with anecdotal reports (e.g., lichen nitidus, vasculitis, pemphigus vulgaris, etc.).²⁻³ While immunologic factors have been implicated in true Koebnerization, pseudo-Koebnerization represents seeding of surrounding tissues by trauma-like scratching or shaving and recently, threading.² Warts are known to spread by seeding into surrounding areas in the beard area of men due to shaving or after tattooing and in women who shave their legs. Kumar et al⁴ and Verma et al⁵ have previously reported threading-induced warts.



Figures 3A and 3B. (A) Skin-colored to pinkish flat asymptomatic papules clustered unilaterally over the shin of a 23-year-old woman that spread following the use of a depilatory cream. (B) Multiple, closely placed, dark-colored, asymptomatic, flat-topped papules over the upper left region of the neck in a 35-year-old woman that developed following waxing and use of an infected towel.

Shaving has been the standard practice for men for ages to remove their beards and moustaches as well as remove hair from other parts of the body. Despite the use of best quality razors, the process of shaving entails inadvertent breach into the shaved skin allowing for HPV to inoculate from a pre-existing lesion over the face or due to exposure to an infected fomite (e.g., a hand towel). An electrical trimmer is less likely to result in seeding of virus and thus a preferred alternative to razor blade for men with multiple and/or recurrent beard warts.

Threading is an ancient epilation technique originating in South Asia as “Bande Abru” and in the Middle East as “Khite” (Khite-brow) that is used to remove unwanted hair. Globally, it is the preferred THR used by women themselves at home or more commonly done by beauticians at beauty salons for removal of unwanted hair and eyebrow shaping and enhancing the cosmetic appearance of the upper lip. In this simple procedure, a double-stranded thread is held between both hands and one hand is twisted 5 to 6 times while tightly holding the other section of the thread tightly. Then the thread is converted to a figure 8 with two triangles and one triangle of the thread being placed over the eyebrow from where hairs need to be plucked (Figure 2B). Keeping the thread juxtaposed to the hairline, quick opposing scissors-like movements against the direction of hair growth removes the hair. Since the first case of threading warts reported by Kumar and Zawar,⁴ the incidence of the so-called “threading warts,” a subset of “cosmetic warts,” is on the rise with more cases being reported.⁴⁻⁷ Threading may contribute to the spread of warts in the following two

ways: 1) cross-infection from a client who had HPV infection and her thread was re-used for another person, or 2) spread of pre-existing warts if they are located in the threading territory. The snappy scissors-like movements of threading are sufficient enough to breach the protective epidermal barrier and allow HPV inoculation and seeding. To avoid warts due to threading, ideally, ablative removal of the pre-existing warts should be done as soon as possible and threading attempted only after complete healing of lesions occurs. Additionally, a fresh thread should always be used, the area which already contains some lesions should not at all be touched and any fomite suspected to be infected should not be allowed to come in contact with the depilated skin.

Chemical depilation is used as an alternative to shaving by girls and women, particularly for large body areas, such as legs, thighs, and forearms. During this THR, the epidermal barrier is at risk to be breached. After applying and spreading the cream using the plastic spatula, it is left on for a couple of minutes so that the active ingredient thioglycolic acid breaks disulphide bonds of the hair cortex and weakens them enough to be removed with a damp cloth. If left on the body too long, the chemical can abrade the normal skin. Moreover, the gentle wiping done to remove the hairs also imparts trivial trauma to the skin. All these factors render the treated skin vulnerable to acquire a fresh HPV infection or spread of a pre-existing local wart. Despite this, many patients with warts consider chemical depilation safer than shaving in terms of the risk of pseudo-Koebnerization. However, in a retrospective study by Kaptanoglu and Duruk⁸ conducted in 50 patients with

genital warts being treated by electrocauterization, wart recurrence rates remained the same whether shaving or depilatory cream was used as a regular hair removal method before and after treatment.

Waxing is another popular THR among both the sexes as it provides longer-lasting hair removal. Warm wax is applied to the area and after some time, it is removed (stripping the wax) in the opposite direction of the hair growth, pulling hairs out at the root. Apart from the pain, this THR method also abrades the skin during the stripping of wax. The patient described in Case 5 further ended up using her spouse's towel, which had a high possibility of acting as an infected fomite for transmission of HPV from her spouse's beard warts to her neck and chin.

All of these procedures are causes for inadvertent skin trauma creating a portal for infection.⁶ Another unrelated cosmetic practice that is well-known to cause eruption of warts is cosmetic tattooing. An infected tattoo needle is the most likely to inoculate the skin directly through penetration and implant the wart. Few such cases have been reported.⁹⁻¹⁴ Thus, the authors propose the broad term "cosmetic warts" for all cases arising out of a cosmetic procedure including THR methods and tattooing.

Development of skin infections (viral as well as bacterial) after cosmetic procedures in beauty salons are commonly seen in the authors' practice, but they are not extensively reported in literature. In short, there are two ways cosmetic warts spread—pseudo-Koebnerization of pre-existing warts along a line due to cosmetic procedure-induced trauma and compromised epidermal barrier and use of unclean potentially HPV-infected material during the procedure, such as a tattoo needle, razor blade, towels, thread, cotton wools, wax, powders, and wipes. HPV can survive for many months outside the host at low temperatures.

Treatments commonly employed for these lesions include destructive, chemotherapeutic, virucidal, immunologic, and alternative modalities. Destructive treatments include cryotherapy, radiocautery, topical acids, cantharidin, surgical excision, laser ablation, and electrosurgery. Chemotherapeutic and virucidal therapies include salicylic acid, topical tretinoin, imiquimod, interferons, bleomycin, cidofovir, acyclovir, 5-fluorouracil, formaldehyde, and glutaraldehyde. Immunologic therapies include topical sensitizers, intralesional sensitizers, and cimetidine. Alternative therapies include radiation, acupuncture, ultrasound, hypnosis, localized heat therapy, folk therapies, and homeopathy.¹⁵ The authors' patients were treated with topical tretinoin application or radiofrequency ablation with good response.

Prevention is always better than the cure. Deferring the procedure until pre-existing warts are ablated, or if the procedure cannot be delayed, then strictly avoiding that area during the procedure, are of paramount importance. Secondly, beauty salon personnel should be educated about avoiding reuse of threads or blades during threading or shaving, respectively, and to use freshly laundered and hygienic towels on every new client. Tattooing should be carried out in a proper hygienic environment with fresh

unused needles. Moreover, all instruments (e.g., scissors, forceps, and razors) used for threading, shaving, and facials should be properly sterilized to avoid infection. The authors also emphasize that aestheticians defer such procedures in individuals with vitiligo, psoriasis, lichen planus, bacterial infections, warts, or molluscum.⁵

The authors have used the term "cosmetic warts" for warts arising out of various cosmetic procedures due to pseudo-Koebnerization. Although all of the cosmetic procedures discussed in this case series are widely practiced around the world, pseudo-Koebnerization is an under-reported entity. This article emphasizes the need to educate and sensitize patients and aestheticians on pseudo-Koebnerization, particularly because it is not uncommon and is easily preventable.

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