Myointimoma: A Rare Tumor of the Penis

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To the Editor:

Myointimoma is a benign tumor that was first described by Fetsch et al.1 in the year 2000. It is considered to be a rare tumor arising from the intima of the vessels of the corpora cavernosa of the penis, and has been included as a specific entity among the genitourinary tumors in the latest review by the World Health Organization in 2006. In our review of the literature using the term myointimoma, we found only 17 cases. Myointimoma is a tumor that is usually found at the level of the glans and corona of the penis and presents clinically as a palpable, asymptomatic nodule of variable size. It develops over a variable period of days or months (4 days to 6 months),2 but despite the fast rate of growth, it is not an aggressive tumor. It can occur at any age, with cases reported from 2 to 61 years.1 It is not related to a history of local trauma or to the presence or absence of circumcision or any concomitant disease (connective tissue diseases, diabetes mellitus, or other autoimmune disease).

Histologically it is characterized by a multinodular, mesenchymal proliferation that arises from the corpus cavernosum of the penis. The microscopic features that enable the diagnosis to be reached include the presence of a layer of spindle cells with a stellate pattern and with eosinophilic cytoplasm, set in a fibromyxoid matrix. It is situated in an intravascular position, in the form of nodules that occupy the endothelial lumen. There is no appreciable inflammatory infiltrate and mitoses are uncommon; there is no necrosis. Bundles of smooth muscle cells are observed at the periphery of the tumor. Although not essential for diagnosis of the tumor, immunohistochemical analysis can help in the differential diagnosis with other tumors of similar presentation. Cells are positive for α-smooth muscle actin, vimentin, and desmin (myoid origin) and negative for S-100 (melanocytic), CD34, CD31, epithelial membrane antigen, and factor VIII (endothelial origin). The peripheral stroma of the nodules is positive for CD34, CD31, neuron-specific enolase, and factor VIII antigen. Special stains, such as van Gieson stain, reveal abundant elastic fibers surrounding the nodular structures.3,2

Although tumors of the glans are usually rare, the differential diagnosis does include other tumors that present clinically as asymptomatic nodules, and that require histological differentiation from myointimoma.3,4 In particular, these other tumors include myofibroma, nodular fasciitis, leiomyoma, plexiform schwannoma, nerve sheath myxoma, and plexiform fibrohistiocytic tumor. Of all these, myofibroma is the main diagnosis to be considered, as many authors believe myointimoma to be a form of myofibroma, though arising exclusively in the penis, occupying the lumen of a vessel of the corpora cavernosa; these tumors are histologically identical and have a similar immunohistochemical pattern.4

The treatment of choice is surgical excision, though, given the tendency to remain stable and even to undergo involution, conservative management is chosen in the majority of cases. In the series by Fetsch et al,1 8 cases underwent remission and only 1 persisted after several years of follow-up; of the 5 cases reported by McKenny,2 none recurred after excision, as was also found in the cases reported by Robbins3 and Vardar.5

We present the case of a 74-year-old man in whom the only past history of note was positive serology for hepatitis C virus and benign prostatic hypertrophy. He was seen for a hard, asymptomatic nodule that had appeared on the glans 4 months earlier. The patient referred no history of trauma. On physical examination, there was a palpable, well-defined nodule of less than 1 cm in diameter, situated on the right side of the glans, close to the coronal sulcus. The nodule was not visible. The skin surface and color were unchanged and there were no signs of inflammation and no accompanying symptoms.

Histopathological study revealed histological changes diagnostic of myointimoma (nodular structures derived from the intima of the cavernous vessels, formed of elongated cells with no atypia or mitoses) (Figures 1 and 2). Due to the benign nature of the lesion, it was decided to perform outpatient follow-up. Ten months after the biopsy, the nodule was still present, with no structural changes, and it remained asymptomatic.

Figure 1. Low magnification histological image of the myointimoma, showing nodular structures that protrude into and completely occupy the vascular lumen (hematoxylin-eosin, x10).
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References

Spinulosis as a Manifestation of Demodicosis

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To the Editor:

Hyperkeratotic spicules are rare skin lesions of unknown origin, defined by the presence of multiple areas of circumscribed hyperkeratosis formed of keratotic material that protrudes from the stratum corneum.1 The lesions are seen particularly on the face. The disorder may be idiopathic or associated with various diseases such as hypovitaminosis A, chronic renal failure, Crohn disease, lymphoma, monoclonal gammopathy, and multiple myeloma.1,2

In this letter, we would like to report the case of a 43-year-old woman seen in our department with multiple hyperkeratotic spicules on the left cheek. Histopathology revealed keratotic material and multiple Demodex folliculorum in the dilated follicular infundibula.

The patient was a 43-year-old woman with a past history of depression and fibrocystic disease of the breast. She was seen for a 1-year history of multiple, asymptomatic lesions on the left cheek. The patient denied using cosmetics and had not performed any treatment except for facial cleansing with soap and water twice a day.

On examination, there were dozens of yellowish-white, filiform, follicular hyperkeratotic spicules of 1-to-3 mm in height on the left cheek (Figure 1). There was no diffuse facial erythema and there were no similar lesions on other areas of the body.

The laboratory studies performed included complete blood count, biochemistry, protein electrophoresis, alkaline

Figure 1. Multiple, filiform, follicular hyperkeratotic lesion on the left cheek.
phosphatase, β2-microglobulin, autoantibodies, thyroid hormones, and serology for hepatitis B virus, hepatitis C virus, and human immunodeficiency virus (HIV); all results were normal or negative. A biopsy was taken, and histopathological study revealed follicular infundibula occupied by keratin and remnants of *D. folliculorum* (Figure 2).

Complete resolution of the lesions was achieved by the daily application of 5% permethrin cream for 2 weeks.

*D. folliculorum* is a saprophytic mite that lives in the hair follicles. Prevalence varies between 10% and 50%, depending on the series.3 Predisposing factors for *Demodex* infestation include age (all elderly individuals are infested), certain hygiene habits, exposure to ultraviolet A and B radiation, the use of topical corticosteroids, metabolic disorders (diabetes mellitus), and states of immunosuppression (HIV, hematologic cancer, and topical or systemic immunosuppressants).4 Their presence in the skin is considered pathological when: a) they reach a density greater than or equal to 5 mites per cm², b) they are located in the dermis, or c) there is a response to antidermodex treatment (topical treatments such as 0.75% metronidazole, 5% permethrin, crotamiton, 10% benzyl benzoate, or salicylic acid, and oral treatments such as metronidazole, retinoids, or ivermectin).5 The clinical conditions with which infestation is associated are very variable: pityriasis folliculorum, rosacea-like demodicosis, demodicosis gravis (similar to severe granulomatous rosacea), rosacea, perioral dermatitis, blepharitis, pustular folliculitis (facial, though possibly more widespread in immunosuppressed patients), eosinophilic folliculitis, papulopustular rashes of the scalp, solitary granuloma, facial rash after phototherapy, facial hyperpigmentation, and others.3,5-7

Recently, there have been a number of reports of cases of facial spinulosis in which the histology has showed the presence of this mite and, curiously, all the patients described in the reports suffered from polycythemia vera (Table).8-10 The role of *Demodex* in the pathogenesis of this disorder is a source of controversy: in some cases no causative relationship was demonstrated due to the absence of clinical improvement with treatment and the presence of the mite in both healthy and diseased skin; in another case, resolution of the skin condition was only achieved by the interruption of treatment with hydroxyurea, and the authors considered that *Demodex* infestation was the result of the immunosuppressive effect of this drug.10 In our patient, the main disorder included in the differential diagnosis was *Demodex*-induced pityriasis folliculorum. This is characterized by follicular papules in the form of follicular plugs associated with dry scaling and diffuse facial erythema, giving rise to pruritus and a burning sensation; it is more common in women with poor facial

**Table.** Patients With Facial Spinulosis Associated With Multiple *Demodex folliculorum* in Dilated Follicular Infundibula

<table>
<thead>
<tr>
<th>Reference</th>
<th>Age/Sex</th>
<th>Past History</th>
<th>Intervala</th>
<th>Site</th>
<th>Treatment (Response)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fariña et al8</td>
<td>78 y/F</td>
<td>Polycythemia vera</td>
<td>2 wk</td>
<td>Face (mostly on the cheeks)</td>
<td>1% permethrin cream (FR)</td>
</tr>
<tr>
<td>Ballestero Díez et al9</td>
<td>76 y/F</td>
<td>Polycythemia vera, hypertension and DM</td>
<td>2 y</td>
<td>Face (mostly on the temporal and frontal regions, cheeks, chin, and ears)</td>
<td>5% permethrin cream (NR), 0.75% metronidazole cream (NR), Metronidazole po (NR)</td>
</tr>
<tr>
<td>Boutli et al10</td>
<td>71 y/M</td>
<td>Polycythemia vera</td>
<td>6 m</td>
<td>Both cheeks</td>
<td>1% metronidazole cream (NR). Metronidazole po (NR). Argon laser (NR). Isotretinoin po (NR). Withdrawal of hydroxyurea (R)</td>
</tr>
<tr>
<td>Monteagudo et al (present case)</td>
<td>43 y/F</td>
<td>Depression and fibrocystic disease of the breast</td>
<td>1 y</td>
<td>Left cheek</td>
<td>5% permethrin cream (FR)</td>
</tr>
</tbody>
</table>

Abbreviations: DM, diabetes mellitus; F, female; FR, favorable response to treatment; M, male; NR, no response to treatment.

a Time course of the lesions.
Clinical science letters

hygiene or inappropriate use of soaps, makeup-removing solutions, and creams. 4, 6

In conclusion, we present a new patient with follicular spicules on the face, with the presence of Demodex on histological study. We consider there to be a proven causative relationship because of clinical resolution after the application of permethrin.

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To the Editor:
The perineurium is a structure that surrounds and protects nerve fascicles, and is formed of groups of flattened cells well organized into 1 or more layers. These cells are characterized by expression of epithelial membrane antigen (EMA), vimentin, collagen IV, laminin, and CD99, and they are negative for S-100 and neurofilaments. Ultrastructurally, they present pyknotic vesicles, elongated cytoplasmic processes with a discontinuous basal lamina, scattered intermediate filaments, and rudimentary intercellular junctional complexes. Perineurioma is a rare, benign neoplasm first described in 1978. 1 It is derived from the perineural cells in the absence of other elements of the nerve sheath. There are 2 main variants, intraneural and soft-tissue perineurioma, which share cytologic, ultrastructural, and immunohistochemical features with perineural cells, but present significant clinical and histological differences. Recently, a third variant called cutaneous sclerosing perineurioma has been described; this tumor typically affects the fingers and palms of young patients.

We present the case of a 54-year-old woman with no past history of interest. She was seen for a common wart on the palm of the right-hand, which had been treated by electrocoagulation. On examination, 2 fibrous papules of 3 mm diameter were also observed on the palmar surface of both thumbs (Figure 1). The patient stated that they had been present for more than 20 years and that she had not sought medical care because they were stable and asymptomatic. Excision biopsy of the 2 papules showed similar findings: a well-defined but nonencapsulated proliferation formed of nodules (Figure 2) that, on greater magnification, showed a concentric (onion skin) pattern of spindle-shaped cells and a few epithelioid cells, with no atypia, in a dense collagen stroma (Figure 3A). Immunohistochemical analysis showed similar patterns in the cells making up the 2 nodular whorls, with intense EMA (Figure 3B) and vimentin expression. The other antibodies studied—cytokeratins, S-100, smooth-muscle actin, desmin, CD31, CD34, and factor XIIIa—were negative. The diagnosis was of multiple cutaneous sclerosing perineurioma.

Cutaneous sclerosing perineurioma is a benign tumor first described in 1997 by Fetsch and Miettinen. 2 Approximately 40 cases have been reported in the English-language
literature.\textsuperscript{2-7} It typically presents as a single, asymptomatic lesion on the fingers or palms of children or young adults, although it has also been reported in older patients (range, 9-67 years). It affects both sexes almost equally, although there is a male predominance in some series.\textsuperscript{2} It usually presents as a papule or nodule of fibrous consistency and of a few millimeters in diameter, although there are cases that have reached a size of 3.3 cm. Occasionally it is painful. The time to diagnosis is variable, from a few months to 40 years. To date, only 1 case of bilateral cutaneous sclerosing perineurioma has been published.\textsuperscript{3} The tumor shows a benign behavior, with no recurrence after excision, and it is not associated with any other disease.

The diagnosis of cutaneous sclerosing perineurioma requires histological and immunohistochemical analysis. A small, well-defined nodule is observed in the dermis or fat; the nodule is dense, fibrous, and contains scattered ovoid, epithelioid, or spindle-shaped cells that adopt a trabecular, onion-skin, or parallel pattern within a hyaline stroma. There are no mitoses, atypia, or necrosis. Immunohistochemistry is essential for diagnosis, and is characteristically positive for EMA and vimentin, with the absence of expression of S-100 and neurofilaments. Smooth-muscle actin\textsuperscript{2} and CD34 may be positive in some cases. Stains for factor XIIIa, desmin, and CD68 are negative. Other useful markers for diagnosis are CD99,\textsuperscript{4} CD10, glucose transporter type 1, and claudin-1. Electron microscopy reveals the characteristics of perineural cells. In some cases, the presence of Schwann cells and axons has been observed, demonstrating the close relationship with the peripheral nerve.\textsuperscript{3-7}

Interestingly, as occurs with other tumors of the nervous system such as meningiomas, ependymomas, or schwannomas, alterations of chromosome 22—specifically, of gene $NF2$, on chromosome 22q11.2-12—have been observed in the 3 variants of perineurioma. This $NF2$ tumor suppressor gene is also altered in meningioma, sporadic schwannomas, and familial neurofibromatosis 2. However, to date, there has been no case of perineurioma associated with neurofibromatosis.

Cutaneous sclerosing perineurioma is a little-known tumor that is possibly underdiagnosed and may be more common than reflected in the literature. As in this case, the lesion may remain undetected by the patient or histological study may not be performed due to its benign appearance. In addition, it is probably clinically confused with other, much more common fibrous lesions of the hands, such as giant cell tumor or tendon sheath fibroma, with a myxoid cyst or, if painful, with a glomus tumor. From a histological point of view, it must also be differentiated from sclerotic fibroma, epithelioid neurofibroma, and sclerosing adnexal tumors. We should therefore be aware of this tumor and include it in the differential diagnosis of fibrotic papular...
lesions of the fingers and palms of young individuals. Immunohistochemistry is characteristic.

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infants, and appears to be more common in girls (3:1). Advanced age of the mother may be a risk factor for the syndrome. It has a high lethality, with a mortality of 90% in the first year of life. The main causes of death are congenital heart diseases, apnea, and pneumonia. More than 130 different clinical abnormalities have been reported in these patients. They may present a delay in weight and height gain, cranial malformations with a characteristic facies and microcephaly, prominent occiput, low-set ears, and micrognathia; various congenital heart diseases, detectable in 90% of cases; urogenital malformations, such as horseshoe kidney; limb defects including the presence of trisomy hand or a prominent heel; and many further congenital malformations affecting the gastrointestinal and central nervous systems. The typical cutaneous features include ungual hypoplasia of the hands and feet, hirsutism affecting the forehead and back, absence of subcutaneous fat at birth, a dermatoglyphic pattern with ridges on the pulps of at least 6 fingers, and persistent reticulated lesions of cutis marmorata, as occurs in Down syndrome, Cornelia de Lange syndrome, congenital hypothyroidism, and neonatal lupus. The persistent cutis marmorata in these patients should not be confused with cutis marmorata telangiectatica congenita, which causes phlebectasia and telangiectasias associated with ulcers and limb atrophy.

In conclusion, we would like to highlight the importance of the cutaneous manifestations, which are present in more than 50% of patients with Edwards syndrome; in association with other multiple malformations, they can help to orientate the diagnosis. The definitive diagnosis is based on karyotyping, which will confirm the presence of trisomy 18.

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Dermatologic Toxicity to Sorafenib

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To the Editor:

Sorafenib is a recent orally administered drug in the family of tyrosine kinase inhibitors; it has proved highly effective in the treatment of advanced renal cell and hepatocellular carcinomas.1 Current research is investigating its application in the treatment of other tumors, such as metastatic melanoma or papillary thyroid carcinoma.2 However, as with all chemotherapy drugs sorafenib has adverse effects, both systemic and dermatological. More than 93% of patients receiving sorafenib in monotherapy will suffer from some form of skin reaction.

We present the case of a 53-year-old man, diagnosed with hepatocellular carcinoma secondary to chronic liver disease due to hepatitis C virus infection, who began treatment with sorafenib at a dose of 400 mg twice a day. After 2 weeks of treatment, the patient began experiencing slightly painful skin lesions on the palms of the hands and later on the soles of the feet, with no associated neurological symptoms. Physical examination revealed papules and plaques—some targetoid, edematous, and desquamative—located on the palms, the palmar surface of the fingers, and the soles of the feet (Figure 1).

Histology of tissue taken from a palmar lesion revealed a thick, orthokeratototic cornal layer in the epidermis, with an underlying area of parakeratosis and significant irregular acanthosis. Occasional necrotic keratinocytes were identified, with no sign of vacuolar degeneration of the basal layer. The blood vessels nearest the surface of the dermis were dilated and accompanied by a mild lymphocytic and histiocytic infiltrate (Figures 2 and 3).

The clinical findings and temporal relationship with the administration of sorafenib led to treatment with topical corticosteroids and a reduction of the drug dosage by half. This resulted in good response and progressive resolution of the skin lesions.

Figure 1. Edematous, desquamative papules and plaques in a symmetrical distribution on the palms and the soles of feet.
As small molecules or monoclonal antibodies, sorafenib blocks the activity of various structures within tyrosine kinase, slowing the progression of many solid tumors and of metastatic melanoma. It is administered orally, at a dose of 400 mg twice a day. However, its activity is not limited exclusively to the tumor and it is frequently associated with various adverse reactions such as hypertension, asthenia, anorexia, diarrhea, and skin disorders. More than 93% of patients on monotherapy with sorafenib will display adverse skin reactions, including alopecia (in up to 23% of cases), stomatitis (12%-35%), xerosis (11%-23%), or seborrheic dermatitis-like, erythematous, desquamative facial rashes (in up to 2% of cases).³

Cases have also been reported of subungual splinter hemorrhages, leukocytoclastic vasculitis,⁴ exudative erythema multiforme,⁵ and keratoacanthomas.⁶ But the most common skin reaction with this drug is the hand-foot syndrome, which appears in up to 62% of cases.⁵

We define this syndrome as a skin reaction that is rarely painful or associated with paresthesia, is sometimes bullous, and appears in 22% to 62% of patients being treated with sorafenib.⁷ It presents clinically as erythematous, edematous plaques associated with hyperkeratosis and desquamation in a symmetrical distribution on the palms and soles of the feet, with the occasional involvement of other sites, including the sides of the fingers and the periungual area.² The lesions tend to appear 2 to 4 weeks after starting treatment and are dose dependent, disappearing rapidly after the interruption of treatment.²

The cause is unknown, but the fact that this is a dose-dependent reaction suggests there is a direct toxic effect on keratinocytes in the skin, although these do not express vascular endothelial growth factor receptor, the target receptor of sorafenib.² From a histological point of view, orthokeratotic hyperkeratosis is seen in the epidermis with extensive parakeratosis in the stratum corneum and marked irregular epidermal hyperplasia with focal hypergranulosis. There is significant intercellular edema with exocytosis of lymphocytes within the hyperplastic epidermis. There is moderate edema of the papillary dermis and a superficial, perivascular lymphocytic infiltrate.¹ Differential diagnosis principally includes palmoplantar erythrodysesthesia caused by other chemotherapy agents—such as cytarabine, fluorouracil, capecitabine, or doxorubicin—where the lesions tend to be more extensive, are associated with paraesthesia and pain, and have characteristic histological findings.⁸ Apart from hyperkeratosis and parakeratosis of the corneal layer, spongiosis is present and apoptotic cells are observed in the epidermis, associated with vacuolar degeneration of the basal layer and a perivascular lymphocytic infiltrate in the mid dermis.⁹

Treatment consists either of reducing drug dosage or interruption of treatment for 1 or 2 weeks.² Several studies have concluded that the appearance of skin lesions associated with the use of sorafenib could also be related to greater response to the drug, just as is the case with other chemotherapy drugs such as epidermal growth factor receptor inhibitors.¹⁰ In conclusion, our patient presented edematous, hyperkeratotic, and virtually painless palmar and plantar lesions similar to those described in hand-foot syndrome, following treatment with sorafenib. The temporal relationship between administration of the drug and the appearance of the lesions, the histological study (typical although not characteristic), and improvement
of the symptoms following reduction of drug dosage confirmed the suspected diagnosis and agreed with the findings published by other authors.

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References

Nodular Secondary Syphilis

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To the Editor:
The reduction in the number of cases of syphilis since the advent of antibiotics has diminished knowledge of the disease. However, “the great simulator” is still amongst us and we must maintain a high degree of diagnostic suspicion. Common forms of clinical presentation are complemented by extremely rare cutaneous manifestations that complicate diagnosis, as in the case presented here.

A 58 year-old white man, with no relevant medical history, attended for an asymptomatic rash on the face and chest with onset 4 weeks previously (Figure 1). He reported no asthenia, fever, weight loss, night sweats, or other symptoms. On physical examination, the man had a healthy appearance, with multiple painless nodules of an intense pink color and firm consistency measuring approximately 1 cm in diameter located on the face and chest. There was no ulceration of the lesions. The palms, soles of the feet, and mucous membranes were unaffected. The hair and nails showed no abnormalities. There were multiple painless symmetrical adenopathies in the cervical and axillary regions, but with no sign of hepatosplenomegaly.

Figure 1.
Asymptomatic nodular lesions on the face
Histological findings in one of the lesions showed a preserved epidermis with a dense, granulomatous nodular dermal infiltrate that contained epithelioid histiocytes and multiple multinucleated giant cells of the Langerhans type, accompanied by a dense predominantly plasma cell infiltrate. The infiltrate presented a marked perivascular distribution, and small capillary vessels with edematous walls were present (Figure 2).

Nontreponemal tests with a titer of 1:32 were positive for Treponema pallidum-specific immunoglobulin G, and treponemal tests (hemoagglutination) were also positive. The patient was seronegative for HIV in 2 tests. He was diagnosed with secondary nodular syphilis and treated with penicillin G benzathine 2.4 million units per week for 3 weeks by intramuscular injection. The clinical course was favorable, with no adverse effects and with complete resolution of the lesions.

The lesions of secondary syphilis correspond to the phase of infection characterized by the widespread dissemination of spirochetes; the clinical manifestations may be varied. The generalized nonpruriginous papular and scaly rash (roseola syphilitica) is the most common cutaneous symptom; it may be accompanied by fever, arthromyalgia, weight loss, and enlarged lymph nodes. Serology (reagin or treponemal) always gives positive results in patients with secondary syphilis.

The nodular presentation of secondary syphilis is extremely uncommon, and although it was first described more than 20 years ago only a few cases have been published in the literature. Clinically, the lesions present as partially infiltrated plaques or nodules of a red-to-violaceous color, sometimes simulating pseudolymphoma or even panniculitis. The nodular eruption can be localized, with predilection for the face, mucous membranes, palms, and soles of the feet. The presence of ulceration or nodules tends to correspond to a late secondary stage and can indicate progression toward the third stage of the disease, with its potential associated morbidity and mortality.

Histological findings can show a granulomatous inflammation. The histological differential diagnosis must include various entities such as atypical mycobacteriosis, deep fungal infections, leprosy, tuberculosis, leishmaniasis, sarcoidosis, lymphoma, foreign body granuloma, and drug eruptions, among others.

Various hypotheses have been proposed to explain the formation of granulomatous nodular lesions in secondary syphilis. The most widely accepted hypotheses include a specific hypersensitivity reaction related to treponemal infection, or a long period of infection with progression towards the third stage.

In our patient there was a marked presence of diffuse nodules on the face and chest, with no sign of the palmar, plantar, or mucosal lesions typical of secondary syphilis. The diagnosis of secondary nodular syphilis allowing for early treatment of these cases relies on a thorough compilation of the patient’s medical records—full medical history with details of sexual activity, physical examination, and serological and histological findings—and a good response to treatment.

Unlike Sir William Ostler, as quoted by Sánchez, we do not believe that syphilis is the only disease a doctor needs to be familiar with in order to become an expert dermatologist. However, the fact that syphilis can simulate so many other illnesses means we must be cautious and remain alert to this diagnosis even when it presents with rare clinical manifestations.

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Localized Trichorrhexis Nodosa

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To the Editor:

Trichorrhexis nodosa (TN), also known as trichonodosis, was first described by Wilks in 1852. It is the most common of hair dysplasias associated with increased hair fragility. It is considered an anomalous response of the hair shaft to external trauma and is clinically characterized by dry, dull, and brittle hairs of different lengths with varying numbers of small grayish-white or yellowish nodules distributed irregularly along the shaft. These nodular formations are transverse fissures through which the hair can break off completely. If the nodules are located on the proximal portions of the hair, fracture of the shafts near the scalp will result in bald spots. If, on the other hand, they are located on the distal portion, the hairs will be fragile and of different lengths, and will show distal speckling and trichoptilosis, but no bald patches.

TN can be a congenital disorder, presenting as an isolated autosomal dominant defect, or it may be associated with ectodermal dysplasias, ichthyosis, or other syndromes. Acquired TN, however, is much more frequent and is classified into 3 major groups: proximal (predominantly among blacks) or distal (the most common in Spain) according to the area of the hair shaft in which the nodules appear, and localized. Very few cases of localized TN have been reported in the literature. Its main clinical characteristic is that it is limited to well defined hairy areas—generally the scalp, but also the beard, moustache, pubic hair, etc. We present the case of a 24-year-old man, with no relevant history, who said that for about the last 3 years he had had a lock of hair on the frontotemporal hairline that was different from the rest. The hairs were dry, brittle, and of varying lengths, with small nodules along the shafts (Figure 1). On examination, except for Hamilton class I male pattern baldness, no underlying cutaneous abnormality was found. The patient denied using topical hair products, but did mention that when studying he used a reading light that shone directly on the lock of anomalous hair and that he had a certain tendency
to rest that area on his hand. A complete laboratory workup yielded no significant findings. A sample of the hair was taken for light microscopic and polarized light examination, and images characteristic of TN were observed (Figure 2). Six months later, with no treatment other than insistence on the importance of avoiding further traumas to the area, the patient showed a clear improvement (Figure 3). The pathogenic mechanism underlying TN seems to be the loss of or decrease in cuticle cells in 1 or more areas of the hair shaft. As a result, the cortical fibers lose their protection, separate, swell, and are exposed to external trauma. This leads to complete or partial fractures and the characteristic TN nodules. Certain abnormalities in the amino acid composition (namely, a cystine deficiency) and in the synthesis of cortical keratins in the affected hair shafts have been described.

While TN usually appears in healthy hair repeatedly subjected to prolonged external trauma, it can also appear in hair shafts with underlying abnormalities associated with fragile hair, such as argininosuccinic aciduria, Menkes syndrome, Netherton syndrome, trichothiodystrophy, monilethrix, or hypothyroidism.

External trauma may be either chemical or physical: aggressive shampoos, frequent washing, salt water, excessive brushing, dyes, perming, tight hairstyles, application of heat, ultraviolet radiation, nervous tics, continual scratching, etc. Localized TN is usually associated with pruritic dermatoses (seborrheic dermatitis, pediculosis capitis, psoriasis, etc), trichotillomania, and other disorders that lead to the persistent manipulation of the area, scratching, and lichenification.

While diagnosis is primarily clinical, light or electron microscopic examination or polarized light examination can be useful, as it can show the typical image resembling 2 paint brushes facing each other with their bristles pushed together in the nodules and an image resembling a single paint brush at the site of the complete transverse fracture.

The differential diagnosis is usually not especially complicated and should include pediculosis capitis, peripilar keratin casts, the presence of exogenous material, white piedra, various mycoses, bubble hair, etc.

There is no specific treatment for TN. The only possible effective measure is to identify the predisposing factors and to avoid repeated traumas. Certain adjuvant treatments (such as hair repairers or vitamin complexes) can also be helpful.

In our patient, it is likely that a combination of artificial light and the patient’s persistent manipulation of the area was involved in the appearance of TN, as the simple avoidance of these behavioral habits led to a clear improvement in the appearance of his hair.

Problems With Phototesting for the Diagnosis of Solar Urticaria
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To the Editor:
Solar urticaria is an uncommon idiopathic photodermatosis that presents as transient erythema and wheals in sun-exposed areas immediately following exposure to ultraviolet (UV) B (280-320 nm) or UV-A radiation (320-400 nm), or to visible light (400-600 nm).1 The diagnosis of solar urticaria is seemingly simple and is based on the patient's clinical history and the results of phototesting. In daily clinical practice, however, there are some circumstances that can make diagnosis more difficult.

We present the case of a 43-year-old woman with no drug allergies or relevant medical or surgical history. She reported dermatological symptoms that had begun 14 months earlier. Her laboratory tests, which included biochemistry, blood count, C3-C4, immunoglobulin E, and antinuclear antibodies, were normal.

In her history taking she described episodes of transient pruritic rash that appeared when she was exposed to sunlight, either directly or through windows or curtains. She said that these episodes subsided in a matter of hours after she returned home and that the rash affected sun-exposed areas. As the symptoms were consistent with a diagnosis of solar urticaria, we told the patient to expose herself to natural sunlight for approximately 30 minutes. She subsequently returned to our clinic with pruritic wheals on areas that are not usually exposed to light—nape of the neck, retroauricular region, upper back, and area under her watch strap—and a very mild rash on the upper limbs. The face, back of the hands, and areas covered by clothing were not affected (Figure).

One week later we performed a phototest to confirm the diagnosis and to determine the spectrum of light responsible for the rash and the minimum urticarial dose. Various areas of the back were irradiated with the following light sources and doses:
1. UV-B source: UV-B 180 (Waldmann): 0.01 J/cm², 0.05 J/cm², 0.1 J/cm², and 0.15 J/cm².
2. UV-A source: PUVA 800 (Waldmann): 1 J/cm², 3 J/cm², 6 J/cm², and 10 J/cm².

Figure 1.
The results were negative for all the light sources used. The phototest was repeated 4 months later in 2 areas: the middle of the back and the medial surfaces of the upper limbs, again with negative results.

Phototesting to induce lesions with sources of artificial light is needed to confirm a diagnosis of solar urticaria; it also makes it possible to determine the degree of photosensitivity and the action spectrum for the lesions. Lesions appear most frequently on exposure to UV-A and visible light (the 320-500 nm range is the spectrum most frequently involved), and more rarely on exposure to UV-B, and in some cases, to infrared radiation. In most cases, the rash is found to be caused by a combination of spectra.

It must be borne in mind that a negative result obtained from a single light source does not rule out a diagnosis of solar urticaria. However, case series have been published in the dermatology literature describing patients with solar urticaria and repeatedly negative results in phototests with various spectra of sunlight, as in our case (Table). The most likely explanation for these results is that such patients require radiation with the total solar spectrum, rather than with partial spectra, to induce lesions.

Another factor that may make it difficult to determine the action spectrum in solar urticaria in some cases is the possible interaction between various wavelengths. In some patients, a double action spectrum has been described: one that is responsible for the appearance of lesions and another that inhibits this response. Usually, longer wavelengths (500-600 nm) inhibit shorter ones; when the patient is exposed to wavelengths of the inhibition spectrum before, during, or after exposure to those that cause solar urticaria, the result will be a less intense response or an absence of lesions altogether. In other, less frequent cases, there is an augmentation spectrum that intensifies the inflammatory reaction when exposure to that spectrum precedes exposure to the action spectrum.

The diagnosis of solar urticaria is based on the patient's clinical history and on the induction of lesions by phototesting. Diagnosis is usually simple, but there are circumstances that can affect phototest results. It is important to bear in mind that in some cases negative phototest results do not rule out solar urticaria and that there are cases in which lesions can only be reproduced by exposure to natural sunlight.

### Table. Published Case Series

<table>
<thead>
<tr>
<th>Study</th>
<th>No. of Patients</th>
<th>Negative Phototest</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beattie et al</td>
<td>83</td>
<td>3</td>
<td>3.6</td>
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<tr>
<td>Ryckaert and Roelandts</td>
<td>25</td>
<td>1</td>
<td></td>
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<tr>
<td>Monfrecola et al</td>
<td>57</td>
<td>3</td>
<td>5.2</td>
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<tr>
<td>Uetsu et al</td>
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<td>0</td>
<td>0</td>
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<tr>
<td>Eguino et al</td>
<td>21</td>
<td>1</td>
<td>4.7</td>
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<tr>
<td>Chon and Khoo</td>
<td>19</td>
<td>1</td>
<td>5.3</td>
</tr>
<tr>
<td>Total</td>
<td>9</td>
<td>3</td>
<td>3.7</td>
</tr>
</tbody>
</table>

*The number of patients included in the study and number and percentage of negative phototests are specified.

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Conflicts of Interest
The authors declare no conflicts of interest.

### References