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Trichodysplasia Spinulosa in a 7-Year-Old Boy Managed by Physical Extraction of Keratin Spicules

Michael Barton, BA^a, Suing Lockhart, ARNP^b, Robert Sidbury, MD^b, Richard Wang, MD^c, and Heather Brandling-Bennett, MD^b

^aUniversity of Washington School of Medicine, Seattle, WA

^bUniversity of Washington Pediatric Dermatology, Seattle, WA

^cUT Southwestern Medical Center, Dallas, TX

Abstract

Trichodysplasia spinulosa is an uncommon skin disease characterized by a folliculocentric papular eruption and keratin spine formation, classically appearing on the central face and ears. It almost always occurs in immunosuppressed patients and is linked to a viral etiology. Diagnostic tests including PCR are available for detection of the TS-associated polyomavirus (TSPyV). Effective treatment options include topical cidofovir and oral valganciclovir. We present a case diagnosed by PCR from skin scrapings and treated with physical extraction of the keratin spicules. Significant improvement was noted suggesting a safe, cost-effective treatment alternative.

Introduction

Trichodysplasia spinulosa (TS) is a rare follicular eruption, almost exclusively affecting immunosuppressed patients, usually in association with solid organ transplant or chemotherapy for leukemia or lymphoma^{1–5}. The eruption is characterized clinically by folliculocentric papules and keratin spine formation, classically involving the central face and ears with variable degrees of eyebrow and eyelash alopecia and possible progression to facial disfigurement. Infection by the TS-associated polyomavirus (TSPyV) likely contributes to the development of TS⁶. The diagnosis of TS can be confirmed by characteristic histopathologic findings or electron microscopy. The specific presence of TSPyV has been confirmed by PCR from biopsy samples or immunohistochemistry. Topical cidofovir (1–3%) cream and oral valganciclovir have been reported as possible treatment options^{7,8}. We present a case in which the presence of TSPyV was confirmed by PCR from

Address correspondence to: Michael Barton, University of Washington School of Medicine, 1959 NE Pacific St, Seattle WA 98195, mtbarton@uw.edu, (406) 390-5016.

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Michael Barton drafted the initial manuscript and approved the final manuscript as submitted.

Suing Lockhart and Drs. Sidbury and Brandling-Bennett evaluated and cared for the patient, provided information for the initial manuscript, revised the manuscript and approved the final manuscript as submitted.

Dr. Wang carried out PCR studies on the patient, revised the manuscript and approved the final manuscript as submitted.

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skin scrapings. Moreover, conventional treatments were not pursued and significant improvements were observed following manual extraction of the spicules.

Case Report

A 7-year-old boy with a history of pre-B cell ALL who underwent induction chemotherapy with vincristine and methotrexate, and consolidation with cytarabine, cyclophosphamide, and mercaptopurine. Approximately 6 months prior to presentation, he developed an erythematous, pruritic facial eruption 7–10 days following completion of his antineoplastic regimen. The eruption consisted of multiple pinpoint to 1mm follicular papules, many with central hyperkeratosis or white spicules, most notable over his central face including his forehead, eyebrows, cheeks, chin and nose; a mild distortion of the nares was noted. Involvement extended to the lobes and helices of both ears. Mild thinning of his eyebrows was appreciated. Topical steroids provided minimal improvement. Sunscreen was noted to exacerbate the eruption. Biopsy for microscopic examination was deferred. Instead, PCR on DNA extracted from plucked spicules and skin scrapings revealed the presence of TSPyV; positive and negative controls performed appropriately. Topical cidofovir was not available due to supply issues and oral valganciclovir was not pursued given the potential risks of therapy. Remarkably, manual extraction of spicules at home by the patient's parents resulted in significant improvement of the rash within 2 months and no further treatment was necessary.

Comments

Since its initial description in 1999, TS has become recognized as a rare skin disease seen almost exclusively in immunocompromised patients⁹. Originally linked to cyclosporine, it is now associated more broadly with iatrogenic immunosuppressive therapies commonly used in the setting of solid organ transplants and leukemia or lymphoma treatments. TS is characterized by erythematous to flesh-colored, folliculocentric, centro-facial and auricular papules with keratin spicule formation and varying degrees of alopecia. Affected individuals have ranged from 20 months to 70 years of age with no apparent gender predilection¹⁰.

The association between TS and a viral etiology was first suggested by electron microscopy⁹. Intranuclear viral particles were identified in hyperproliferating inner root sheath cells of lesional skin. The virus was successfully isolated and sequenced in 2010 and has its presence has been confirmed numerous times since then^{11–13}. It is still unclear whether TS is triggered by reactivation of a latent TSPyV infection or whether it represents a de novo infection in immunosuppressed patients. Recently, low levels of TSPyV viremia were detected by rtPCR in asymptomatic kidney transplant patients¹⁴. Additional prospective studies of immunosuppressed patients who have not yet developed clinical signs of TS could yield insights into the role of TSPyV in TS pathogenesis.

Although TS has a characteristic clinical appearance, the detection of a polyomavirus in lesional skin by EM or PCR confirms the diagnosis. Existing reports and series have used either fixed and fresh biopsy samples as the source of DNA for PCR studies. To our

knowledge, this is the first report of TSPyV detected using skin scrapings alone. This methodology may represent a less invasive means to confirm the diagnosis of TS.

Currently there is no gold standard treatment of TS, with most data supporting the use of topical cidofovir and oral valganciclovir. A cytosine analog inhibiting human polymerase activity, topical cidofovir (1–3%), twice daily may lead to mild-to-moderate improvement in TS eruptions⁷. However, as was this case here, it can be difficult and expensive to access. Oral valganciclovir, a guanosine analog inhibiting polymerase activity, can be effective however potential adverse effects include bone marrow suppression and drug interactions⁸. Topical imiquimod, corticosteroids, retinoids, antihistamines and benzoyl peroxide have been implemented with varying results.

To our knowledge this is the first report of manual extraction of the keratin spicules characterizing TS resulting in significant improvement of the facial eruption. While the results seem promising, it is important to recognize TS can also resolve spontaneously with the improvement of immune function and that this may have been the primary driving force in resolution of our patient's eruption¹⁵. However, given the barriers associated with standard of care, this safe and cost effective option may be worth considering in select patients.

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Abbreviations

TS	Trichodysplasia spinulosa
TSPyV	TS-associated polyomavirus

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Figure 1.
Trichodysplasia Spinulosa of the central face anterior view.

Figure 2.
TS of the central face antero-lateral view.