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Suspected Trichodysplasia Spinulosa in a Child With Leukemia in Remission: A Case Report and Literature Review

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Abstract

Trichodysplasia spinulosa (TS) is a rare follicular eruption associated with trichodysplasia spinulosa polyomavirus in immunocompromised patients. A nine-year-old girl with a history of leukemia diagnosed at five years and in remission for 17 months presented with keratotic projections arising from follicular openings and perifollicular keratotic plugs. Skin biopsy, polymerase chain reaction, and molecular testing were recommended but were declined by the legal guardian; therefore, a presumptive diagnosis of TS was made based on the clinical and dermoscopic findings. A literature review identified 25 previously reported pediatric cases through July 2026. Unlike most published patients, this child was not receiving active immunosuppressive therapy. We hypothesize that TS may occur in nonclassical settings; however, the diagnostic uncertainty must be acknowledged when histopathologic and virologic confirmation are unavailable.

Categories: Oncology, Pediatrics, Dermatology
Keywords: dermoscopy, immunosuppresion, leukemia, polyomavirus, trichodysplasia spinulosa, tspyv

Introduction

Trichodysplasia spinulosa (TS) is a rare follicular dermatosis associated with immunosuppression and characterized by keratotic follicular papules with central spicules, predominantly affecting the central face. Its pathogenesis has been linked to infection by the trichodysplasia spinulosa-associated polyomavirus (TSPyV) in follicular inner root sheath cells, whose replication appears to be favored in patients with impaired cellular immunity, particularly those with hematologic malignancies, solid organ transplantation, or previous exposure to immunosuppressive therapies [1-4].

The purpose of this report is to describe a case of suspected TS in a pediatric patient with a history of leukemia in remission, highlighting the potential relationship between persistent immune dysregulation and the development of this uncommon condition. Clinically, TS may present with follicular papules, keratotic spicules, alopecia, and progressive facial thickening, usually involving the central face. Progressive disease may cause madarosis and leonine facies. Although most reported cases have occurred in transplant recipients, TS has also been described in patients with hematologic malignancies and previous immunosuppressive treatment [2-6].

The rarity of this condition and its potential to mimic other follicular dermatoses underscore the importance of recognizing its clinical manifestations. We report a pediatric case with characteristic clinical and dermoscopic findings suggestive of TS in the setting of leukemia remission [7]. While clinical and dermoscopic findings can raise suspicion, definitive confirmation requires appropriate histopathologic and/or molecular investigations.

Case Presentation

History and physical examination

A nine-year-old female was referred to the dermatology clinic for evaluation of a generalized, persistent papular eruption. Her past medical history was notable for leukemia diagnosed at five years of age, for which she required supportive platelet and plasma transfusions. Detailed oncologic records, including the specific leukemia subtype, specific chemotherapy regimens, and the exact date of hematologic remission, were unavailable for review, representing a limitation of this report. However, it was confirmed that systemic chemotherapy had been discontinued 17 months before the current dermatologic evaluation.

The patient had a prior history of childhood atopic dermatitis with intermittent control. Following the cessation of chemotherapy, she remained dermatologically stable for approximately eight to nine months before developing multiple small, keratotic papules over most of her body surface area. Consequently, the eruption had been present for approximately eight to nine months at the time of our dermatologic

assessment.

Before presentation at our unit, the patient was evaluated by external dermatologists who managed the eruption as atopic dermatitis. The therapeutic regimen prescribed externally included sequential trials of oral antihistamines (levocetirizine and desloratadine), topical corticosteroids (hydrocortisone cream and desonide 0.05% lotion), emollients, lipid-replenishing cleansers, topical glycolic acid exfoliation, and photoprotection over a six-month period, with minimal to no clinical improvement.

Physical examination revealed numerous keratotic follicular papules resulting in a generalized follicular eruption that affected the entire cutaneous surface. The lesions prominently invaded the central face, trunk, and extremities, giving the skin a characteristic rough, sandpaper-like texture (Figure *1*).

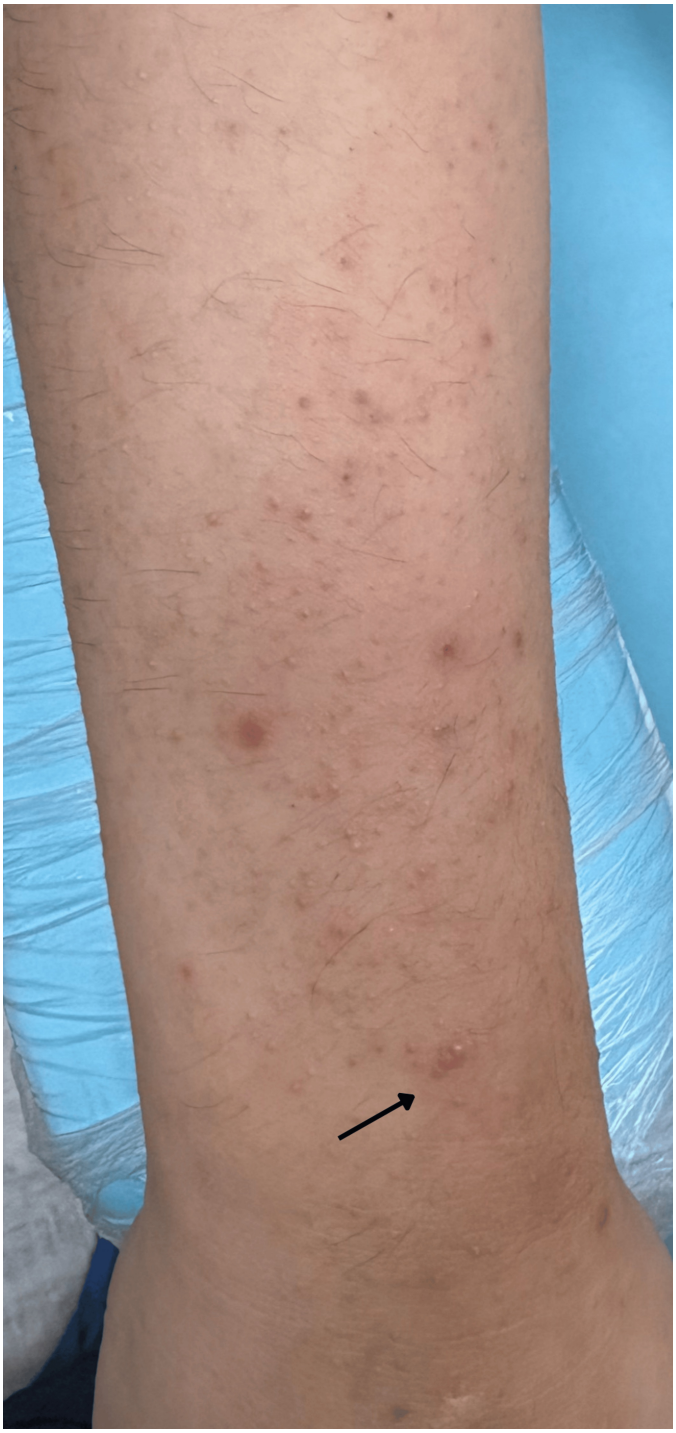


FIGURE 1: Hyperkeratotic perifollicular papules of the forearm.

Erythematous hyperkeratotic perifollicular papules involving the forearm, producing a rough cutaneous surface. The arrow indicates a representative keratotic follicular papule.

Detailed evaluation of the facial hair-bearing areas revealed a non-scarring madarosis, characterized by the complete absence of eyebrows and severely sparse eyelashes; no significant scalp alopecia or mucosal involvement was present. Although the central face was significantly affected, clinical photographs of the facial region could not be obtained. The patient's father declined consent for facial imaging to protect the child's privacy and comfort, which represents an additional limitation in visually documenting the full clinical extent of the presentation.

Investigations

Dermoscopic examination of the lesions located on the arm demonstrated characteristic filiform keratotic

spicules emerging from follicular openings, accompanied by perifollicular keratotic plugs and whitish follicular projections (Figures 2A, 2B).

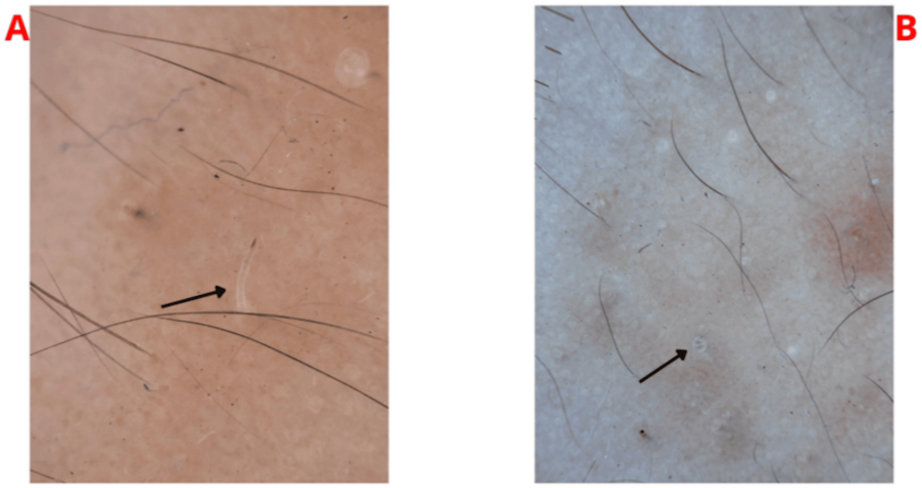


FIGURE 2: Dermoscopic findings in suspected trichodysplasia spinulosa.

(A) Dermoscopy reveals characteristic filiform, whitish-translucent keratotic spicules protruding from the follicular ostia, accompanied by perifollicular keratotic plugs and faint fine linear vessels in the background. Normal hair shafts are absent in the affected follicles. These findings are highly characteristic of the abnormal follicular keratinization induced by the polyomavirus in trichodysplasia spinulosa.

(B) Higher-magnification dermoscopic image demonstrating perifollicular keratotic plugs and whitish spicules consistent with follicular hyperkeratosis. The arrow indicates a perifollicular keratotic plug.

Based on the clinical morphology, dermoscopic features, and background of prior oncologic therapy, TS was considered the primary clinical diagnosis. To confirm the diagnosis, a skin biopsy for histopathologic examination, viral polymerase chain reaction (PCR) testing for TSPyV, and molecular testing were recommended both by the referring physicians and our medical team. However, the patient's legal guardians declined all invasive procedures and diagnostic testing. The absence of baseline laboratory records, combined with the refusal of confirmatory tissue biopsy and molecular assays, represents a primary limitation in this case report.

Treatment and outcome

Given the family's refusal of diagnostic testing and the presumptive nature of the diagnosis, a conservative symptomatic approach was adopted. The patient was managed with a keratolytic emollient containing 20% urea applied twice daily to the affected areas on the trunk and extremities, along with nightly barrier repair therapy and strict photoprotection. During a three-month dermatologic follow-up period, the eruption remained clinically stable, defined as no significant increase in the number of papules or spicules and no progression of alopecia, though without substantial resolution of the existing lesions. It is important to note that stability during symptomatic treatment does not establish treatment efficacy, nor does it confirm the underlying diagnosis.

Discussion

TS was formally described by Haycox et al. in 1999 [8]; since then, it has been recognized as a rare follicular dermatosis, with fewer than 20 pediatric cases initially reported in the literature. The identification of TSPyV in 2010 significantly advanced the understanding of its pathogenesis, establishing its association with immunosuppression and distinguishing it from other follicular disorders [9]. Most reported cases have occurred in solid organ transplant recipients, whereas its occurrence in patients with hematologic malignancies remains uncommon. The presentation of suspected TS in a patient with leukemia in remission suggests that susceptibility to the disease may persist even after completion of oncologic treatment. This observation raises the possibility that residual immune dysregulation may contribute to the clinical expression of TSPyV infection.

To contextualize the present case, a literature search was conducted in PubMed in July 2026 to identify previously reported cases of TS in pediatric patients. The search strategy included the terms "trichodysplasia spinulosa," "trichodysplasia spinulosa-associated polyomavirus," "trichodysplasia spinulosa polyomavirus," and "TSPyV." A complementary search combined these terms with pediatric-related terms, including "child,"

"pediatric," "infant," and "adolescent." The filters Humans, Child: birth-18 years, Case Reports, and publication dates from 2020 to 2026 were applied. Eligible reports included human subjects younger than 18 years at the onset of skin lesions, with a histopathologically or molecularly confirmed, or clinically presumed, diagnosis of TS. Articles published in English or Spanish were considered.

Records retrieved from both searches were reviewed, and duplicate publications were identified by comparing titles, authors, publication years, DOIs, and PubMed identifiers. Full-text articles were assessed to identify eligible pediatric patients and avoid counting the same patient more than once. When overlapping cases were suspected, clinical and demographic characteristics were compared across publications. Individual patients, rather than publications, were used as the unit of analysis.

The prior pediatric review by Rusk et al. [10] summarized 19 pediatric cases. Subsequent searches identified six additional pediatric cases published between 2020 and 2026. Including the present case, a total of 26 pediatric cases of suspected or confirmed TS have been documented in the literature. To address clinical distribution, "generalized involvement" was systematically defined as the clinical extension of keratotic papules beyond the characteristic centrofacial region to encompass the trunk and/or extremities. Based on this uniform definition, generalized involvement was observed in 16 of the 26 pediatric cases (61.5%). The clinical, diagnostic, and virologic characteristics of all cases are summarized in Table *1*.

Source (Author, Year)	Age/Sex	Underlying condition	Immunosuppression status at eruption	Clinical distribution	Characteristic histology	TSPyV PCR	Polyomavirus immunostaining
Wyatt et al., 2005 [11]	8/Male	Kidney transplant	Active (tacrolimus, MMF, prednisone)	Face and ears	Yes	Not reported	Not reported
van der Meijdenet al., 2010 [9]	15/Male	Heart transplant	Active (tacrolimus, MMF, methylprednisolone)	Generalized (face, ears, legs)	Yes	Positive (discovery)	Not reported
Burns et al., 2011 [12]	9/Female	Pre-B ALL	Active (6-MP, MTX, vincristine, dexa)	Generalized (face, arms, legs)	Yes	Not reported	Not reported
Matthews et al., 2011 [13]	7/Female	Pre-B ALL	Active (unknown regimen)	Generalized (face, ears, ext.)	Yes	Positive	Not reported
Berk et al., 2013 [14]	14/Female	Lung transplant	Active (cyclosporine, MMF, MTX, prednisone)	Face	Yes	Not reported	Not reported
Celeiro-Muñoz et al., 2014 [15]	5/Male	Lymphoblastic leukemia	Active (MTX, 6-MP)	Generalized (face, neck, arms, thighs)	Yes	Not reported	Not reported
Nguyen et al., 2015 [16]	7/Male	Pre-B ALL	Active (vincristine, MTX, 6-MP)	Generalized (face, trunk, ext.)	Yes	Not reported	Not reported
Santesteban et al., 2015 [17]	20 months/Female	Multivisceral transplant	Active (prednisone, tacrolimus)	Face	Yes	Not reported	Not reported
Schwieger-Briel et al., 2015 [18]	5/Female	Heart transplant	Active	Face	Yes	Not reported	Not reported
Barton et al., 2017 [19]	7/Male	Pre-B ALL	Active (vincristine, MTX, cytarabine, etc.)	Face and ears	Deferred	Positive (plucked spine)	Not reported
Coogle et al., 2017 [20]	11/Male	Kidney transplant	Active (tacrolimus, MMF)	Generalized (face, trunk, arms, legs)	Yes	Not reported	Not reported
Kadam et al., 2017 [21]	6/Male	ALL	Active	Generalized (face, trunk, legs)	Yes	Positive	Not reported
Barone et al., 2019 [22]	9/Female	Kidney transplant	Active (tacrolimus, MMF, prednisone)	Generalized (face, trunk, arms)	Yes	Not reported	Not reported
Frigerio et al., 2019 [23]	7/Male	Pre-B ALL	Active (vincristine, MTX, 6-MP)	Generalized (face, trunk, arms)	Yes	Not reported	Positive (IHC Vp1)
Chamseddin et al., 2019 [7]	6/Female	Bowel and colon transplant	Active (prednisolone, tacrolimus, sirolimus)	Generalized (central face, trunk, ext.)	Yes	Positive (spine, blood, urine)	Not reported
Borgogna et al., 2019 [24]	7/Male	Kidney transplant	Active (tacrolimus, MMF, prednisone)	Generalized (face, neck, back, ext.)	Yes	Positive	Positive (urine decoy cells)
Rusk et al., 2020	8/Male	Kidney transplant	Active (tacrolimus, prednisone,	Face and scalp	Yes	Not reported	Positive (SV40T)

[10]			MMF)				
Rusk et al., 2020 [10]	11/Male	Bone marrow and lung transplant	Active (tacrolimus, prednisolone, MMF)	Generalized (face, ears, scalp, trunk, ext.)	Yes	Not reported	Positive (SV40T)
Stephan et al., 2020 [25]	6/Male	Heart transplant	Active (tacrolimus, MMF; prednisone stopped 1 month prior)	Face	Yes	Not reported	Not reported
Naeem et al., 2022 [26]	4/Male	Lymphoma (T-LBL)	Active (nelarabine, cyclophosphamide, etoposide)	Generalized (face and trunk)	Yes	Positive	Not reported
O'Brian et al., 2023 [27]	6/Female	ALL	Active (vincristine, MTX, dexa, PEG-asparaginase)	Generalized (face, trunk, extremities)	Yes	Positive (PCR from biopsy)	Not reported
Laferté et al.,2025 [28]	8/Female	Kidney transplant	Active (tacrolimus, MMF, prednisone)	Face	Yes	Positive	Not reported
Pande et al., 2025 [29]	10/Female	Kidney transplant	Active (tacrolimus, MMF, prednisone)	Generalized (face, arms, back, thighs)	Yes	Positive	Not reported
Hansen et al., 2025 [30]	10/Male	Kidney transplant	Active (tacrolimus, prednisone, MPA, tocilizumab)	Face, ears, scalp	Yes	Positive (blood)	Positive
Tomita et al., 2026 [31]	13/Female	Kidney transplant	Active (tacrolimus, MMF, methylprednisolone)	Face	Yes	Positive	Not reported
Present case	9/Female	Leukemia in remission	Prior (no active immunosuppressive therapy at eruption)	Generalized (face, trunk, extremities)	Declined	Declined	Declined

TABLE 1: Reported pediatric cases of trichodysplasia spinulosa published in the literature through 2026.

ALL = acute lymphoblastic leukemia; MTX = methotrexate; 6-MP = 6-mercaptopurine; MMF = mycophenolate mofetil; MPA = mycophenolic acid; IHC = immunohistochemistry; SV40T = Simian virus 40 large T antigen

Patients with TS typically present with follicular papules involving the central face, often accompanied by keratotic spicules and varying degrees of eyebrow and eyelash alopecia. In severe cases, progressive facial infiltration may result in leonine facies and significant cosmetic disfigurement. Histopathologic findings are characterized by distended hair follicles with abnormal maturation, enlarged inner root sheath cells containing abundant trichohyalin granules, and keratin spicules measuring 1-3 mm in length protruding from affected follicles [32]. A comparative summary of the main clinical, diagnostic, and therapeutic features reported in the pediatric literature, together with those observed in the present case, is presented in Table 2.

Characteristic	Findings
Number of previously reported pediatric cases	25 cases
Age range	20 months–15 years
Most common underlying conditions	Lymphoblastic leukemia; kidney transplantation
Active immunosuppression	Predominant in transplant recipients
Most common clinical pattern	Centrofacial follicular papules with keratotic spicules
Generalized (extension beyond the centrofacial region to the trunk and/or extremities)	16 of 26 cases (61.5%)
Eyebrow/Eyelash alopecia	Reported in a subset of cases
Histopathologic confirmation	Commonly reported
TSPyV confirmation	PCR/IHC in selected cases
Most frequently reported therapies	Cidofovir, valganciclovir, reduction of immunosuppression, etc.
Present case	Leukemia in remission; no active immunosuppression; presumptive diagnosis; 20% urea; clinically stable

TABLE 2: Comparative summary of clinical, diagnostic, and therapeutic features of pediatric trichodysplasia spinulosa cases.

TSPyV = trichodysplasia spinulosa-associated polyomavirus; PCR = polymerase chain reaction; IHC = immunohistochemistry

The clinical findings observed in our patient are consistent with previous reports, particularly the presence of keratotic follicular papules with a centrofacial distribution. Dermoscopic examination revealed filiform projections emerging from follicular openings, corresponding to infundibular hyperkeratosis. In addition, whitish keratotic plugs forming follicular spicules were identified. Fine perifollicular linear vessels have also been described in some cases, although this finding is not consistently observed. These dermoscopic features are thought to reflect the abnormal proliferation of the inner root sheath induced by TSPyV and may aid in distinguishing TS from other follicular dermatoses. Although not pathognomonic, these findings provide valuable diagnostic support when interpreted within the appropriate clinical context.

The differential diagnosis was evaluated based on clinical findings. Keratosis pilaris typically affects the extensor surfaces of the proximal extremities and lacks both the true protruding keratotic spicules and the severe facial alopecia seen in our patient. Keratosis pilaris spinulosa decalvans was considered less likely as it typically begins in infancy and leads to scarring (cicatricial) alopecia, unlike the non-scarring madarosis observed here. Demodex-associated folliculitis can present with facial roughness, but it is characterized by fine whitish scaling rather than hard, elongated spicules. Lichen spinulosus presents as grouped follicular papules forming circumscribed plaques, lacking a predilection for the central face. Finally, treatment-associated follicular eruptions were excluded given the absence of targeted therapy in the patient's known history. While these alternative diagnoses were considered less favored based on morphology, the absence of definitive histologic or molecular confirmation leaves a degree of diagnostic uncertainty [7].

In our patient, chemotherapy had been discontinued before the eruption. Contemporaneous hematologic or immune assessments were unavailable; therefore, her exact immune status at the time of the eruption remains unknown. We hypothesize that residual alterations in cellular immunity might contribute to the clinical expression of TSPyV. Similar post-treatment presentations have been documented, such as a seven-year-old patient who developed TS shortly after completing chemotherapy. When traditional skin biopsy is declined, less invasive molecular approaches can be considered. Specifically, TSPyV PCR utilizing plucked keratotic spicules and skin scrapings has been successfully employed to confirm TS in pediatric patients, offering a valuable diagnostic alternative that avoids biopsy-related scarring. We recognize that not discussing or offering this specific non-invasive molecular test during the initial evaluation was a limitation in our diagnostic approach.

TS generally follows a chronic course while profound immunosuppression persists. Clinical improvement has been reported following the restoration of immune function or the use of targeted pharmacologic interventions. Specifically, antiviral agents such as topical 1% to 3% cidofovir or oral valganciclovir are utilized to directly inhibit viral DNA polymerase and halt TSPyV replication. Additionally, oral isotretinoin has been employed to normalize follicular keratinization and promote the clearance of keratotic spicules.

However, no standardized treatment protocol has been established, and current evidence is largely limited to case reports and small case series.

The present report has several limitations. Histopathologic confirmation and molecular detection of TSPyV were not performed; therefore, a definitive diagnosis could not be established. However, the characteristic clinical and dermoscopic findings, together with the patient's history of leukemia-associated immunosuppression and the exclusion of major differential diagnoses, strongly supported a presumptive diagnosis of TS. Furthermore, the conclusions drawn from this study are inherently limited by the nature of a single-case report.

Conclusions

TS should be considered in the differential diagnosis of follicular dermatoses in patients with a history of profound immunosuppression, including those who have completed chemotherapy. The recognition of suspected TS in nonclassical settings remains challenging, especially when confirmatory histopathologic and molecular testing are unavailable. This case underscores the diagnostic uncertainty encountered in clinical practice when invasive procedures are declined. Maintaining a broad differential diagnosis is essential to guide appropriate investigations. When feasible, less invasive methods such as non-invasive TSPyV PCR from plucked spicules should be pursued to establish a definitive diagnosis.

Additional Information

Author Contributions

All authors have reviewed the final version to be published and agreed to be accountable for all aspects of the work.

Acquisition, analysis, or interpretation of data: Dayana Marbelia Perez Nava, Yuri Igor Lopez Carrera

Drafting of the manuscript: Dayana Marbelia Perez Nava

Critical review of the manuscript for important intellectual content: Dayana Marbelia Perez Nava, Yuri Igor Lopez Carrera

Concept and design: Yuri Igor Lopez Carrera

Supervision: Yuri Igor Lopez Carrera

Disclosures

Human subjects: Informed consent for treatment and open access publication was obtained or waived by all participants in this study. **Conflicts of interest:** In compliance with the ICMJE uniform disclosure form, all authors declare the following: **Payment/services info:** All authors have declared that no financial support was received from any organization for the submitted work. **Financial relationships:** All authors have declared that they have no financial relationships at present or within the previous three years with any organizations that might have an interest in the submitted work. **Other relationships:** All authors have declared that there are no other relationships or activities that could appear to have influenced the submitted work.

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