Cureus
Part of SPRINGER NATURE

Open Access Case Report

Follicular Mucinosis of the Eyebrow as a Cutaneous Clue to Classic Hodgkin Lymphoma: A Case Report

Review began 10/15/2026
Review ended 10/29/2026
Published 11/03/2026

© **Copyright** 2026
Sierra Franco et al. This is an open access article distributed under the terms of the Creative Commons Attribution License CC-BY 4.0., which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

DOI: 10.7759/cureus.119069

Andrea Sierra Franco [1], María de las Mercedes Hernández Torres [2], Ma. del Socorro Hernández Arana [1], Bryan Salvador Sol [1]

1. Dermatology, Instituto Dermatológico de Jalisco "Dr. José Barba Rubio", Zapopan, MEX 2. Dermatopathology, Instituto Dermatológico de Jalisco "Dr. José Barba Rubio", Zapopan, MEX

Corresponding author: Andrea Sierra Franco, andreasierra.derma@gmail.com

Abstract

Follicular mucinosis is an uncommon cutaneous reaction pattern characterized by mucin accumulation within the follicular epithelium, primarily in the outer root sheath. It may occur as a primary condition or in association with inflammatory, infectious, and neoplastic diseases. We report the case of a 26-year-old man who presented with a hypopigmented, infiltrated, pseudoalopecic plaque involving the right eyebrow, accompanied by cervical lymphadenopathy and weight loss. A skin biopsy demonstrated mucin deposition within the follicular epithelium, confirmed by Alcian blue staining. Given the associated systemic findings, a lymph node biopsy was performed and established the diagnosis of classic Hodgkin lymphoma, nodular sclerosis subtype. The patient received chemotherapy with the doxorubicin, bleomycin, vinblastine, and dacarbazine regimen and achieved a complete metabolic response on positron emission tomography/computed tomography, accompanied by resolution of the cutaneous lesion and regrowth of the eyebrow hair. This case illustrates that follicular mucinosis may provide a cutaneous clue to an underlying lymphoproliferative disorder and highlights the importance of systemic evaluation when it occurs in association with lymphadenopathy or constitutional symptoms.

Categories: Hematology, Pathology, Dermatology
Keywords: alopecia mucinosa, classic hodgkin lymphoma, eyebrow alopecia, follicular mucinosis, nodular sclerosis, toothpaste sign

Introduction

Follicular mucinosis is an uncommon cutaneous reaction pattern characterized by mucin accumulation within the follicular epithelium, predominantly in the outer root sheath and, less frequently, in the sebaceous epithelium. Clinically, it may present as infiltrated papules or plaques associated with localized alopecia or pseudoalopecia [1-3]. Although initially regarded as a distinct disease, follicular mucinosis is now recognized as either a primary condition or a finding associated with inflammatory, infectious, drug-related, and neoplastic disorders [1-4].

Among its neoplastic associations, the best documented are cutaneous T-cell lymphomas, particularly mycosis fungoides. In contrast, its association with classic Hodgkin lymphoma is exceptional and has been described in only a small number of cases. Classic Hodgkin lymphoma is characterized by Hodgkin/Reed-Sternberg cells within a mixed inflammatory background, and nodular sclerosis is a major histologic subtype characterized by fibrous bands subdividing the lymph node architecture. Diagnosis of follicular mucinosis relies on clinicopathologic correlation, with skin biopsy and mucin-specific stains such as Alcian blue confirming follicular mucin deposition. Dermoscopy may provide additional diagnostic clues, while lymphadenopathy, constitutional symptoms, or other atypical clinical features should prompt targeted systemic evaluation for an underlying lymphoproliferative disorder.

Case Presentation

A 26-year-old man developed localized scaling of the right eyebrow in December 2024. One week later, he noticed progressive hair loss in the affected area, followed approximately one month later by the appearance of a hypopigmented patch. During the clinical interview, he also reported unquantified weight loss.

Dermatologic examination revealed a 2.2 × 2.0 cm hypopigmented, infiltrated, pseudoalopecic plaque with irregular borders and overlying scale, involving the central third of the right eyebrow (Figure *1B*). Cervical lymphadenopathy was also noted (Figure *1A*). Dermoscopy showed reduced hair density, hairs oriented in multiple directions, central whitish scale, and whitish material protruding through several follicular ostia, a finding known as the "toothpaste sign" (Figure *1C*). The initial differential diagnoses included alopecia areata, lichen sclerosus, and seborrheic dermatitis. The infiltration of the plaque and the presence of follicular scaling prompted a skin biopsy, performed in late January 2025.

How to cite this article
Sierra Franco A, Hernández Torres M, Hernández Arana M, et al. (November 03, 2026) Follicular Mucinosis of the Eyebrow as a Cutaneous Clue to Classic Hodgkin Lymphoma: A Case Report. Cureus 18(11): e119069. DOI 10.7759/cureus.119069

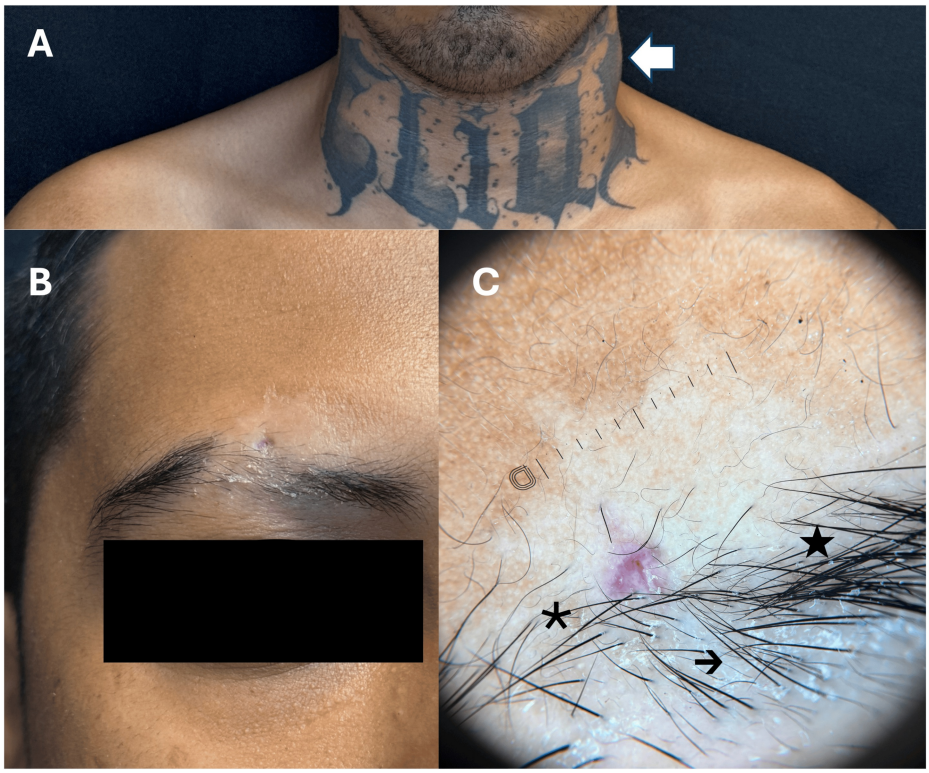


FIGURE 1: Clinical and dermoscopic findings

(A) Cropped clinical view of the cervical region showing cervical lymphadenopathy (arrow). (B) Hypopigmented, infiltrated, pseudoalopecic plaque involving the central third of the right eyebrow, with fine surface and perifollicular scaling. (C) Dermoscopy showing reduced hair density, multidirectional hairs (*), prominent follicular openings with whitish toothpaste-like material protruding from follicular ostia (★), and white perifollicular scale and altered eyebrow hairs (→).

Histopathologic examination revealed reticular degeneration of the follicular epithelium, with separation of outer root sheath keratinocytes by pale mucinous material. A sparse lymphocytic inflammatory infiltrate was observed in the perifollicular and perivascular regions of the dermis, without cytologic atypia or epidermotropism (Figures *2A*-*2B*). Alcian blue staining confirmed follicular and interstitial mucin deposition, supporting the diagnosis of follicular mucinosis (Figures *2C*-*2D*).

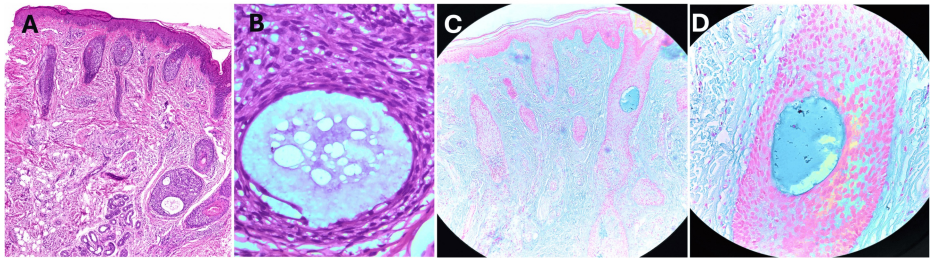


FIGURE 2: Histopathologic findings of follicular mucinosis

A) Low-power hematoxylin-eosin section showing multiple hair follicles with epithelial alterations and a sparse perifollicular and perivascular lymphocytic inflammatory infiltrate in the dermis (×100). (B) Higher-power hematoxylin-eosin view demonstrating reticular degeneration of the follicular epithelium, with intercellular separation and pale mucinous material within the outer root sheath (×400). (C) Low-power Alcian blue-stained section demonstrating follicular and interstitial mucin deposition (×100). (D) Higher-power Alcian blue-stained section highlighting mucinous material associated with the follicular epithelium (×400).

Laboratory studies showed a hemoglobin level of 12.2 g/dL, consistent with mild anemia, an elevated lactate dehydrogenase level of 268.7 U/L (reference range: 135-225 U/L), and an albumin level of 4.0 g/dL, with no other relevant abnormalities in the complete blood count, serum chemistry, or liver function tests. Given the cervical lymphadenopathy and weight loss, contrast-enhanced computed tomography of the neck, chest, and abdomen was performed. The study revealed cervical, anterior mediastinal, subcarinal, and lower

paratracheal lymphadenopathy, including a right cervical nodal conglomerate measuring 29 × 37 mm and a prevascular mediastinal conglomerate measuring 63 × 14 mm, with approximately 50% narrowing of the superior vena cava.

An excisional lymph node biopsy performed in late April 2025 showed an atypical lymphoid proliferation with a nodular architecture separated by fibrous bands. Large neoplastic cells, some of which were binucleated and had prominent nucleoli, were identified within a mixed inflammatory background and were morphologically consistent with Reed-Sternberg cells (Figures *3A*-*3B*). On immunohistochemistry, the neoplastic cells showed membranous positivity for CD30 (Figure *3C*) and CD15 (Figure *3D*), weak granular expression of CD20, and negativity for CD3 and Epstein-Barr virus latent membrane protein 1 (LMP1). These findings established the diagnosis of classic Hodgkin lymphoma, nodular sclerosis subtype, Ann Arbor stage IIB.

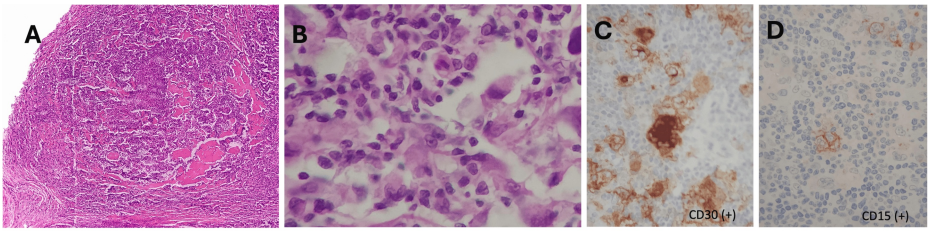


FIGURE 3: Histopathologic and immunohistochemical findings of the lymph node

(A) Low-power hematoxylin-eosin section showing broad collagenous bands arising from a thickened capsule and subdividing the nodal parenchyma into nodules (x40). (B) Higher-power view demonstrating scattered large atypical mono- and binucleated Hodgkin/Reed-Sternberg cells, including cells with lacunar-type morphology, within a mixed inflammatory background (x400). (C) Strong membranous and paranuclear Golgi-pattern CD30 expression in the atypical large cells (x100). (D) Focal CD15 expression in the neoplastic cells (x100). The combined morphologic and immunohistochemical findings support classic Hodgkin lymphoma, nodular sclerosis subtype.

The patient was referred to the Hematology Department and began chemotherapy with doxorubicin, bleomycin, vinblastine, and dacarbazine in late April 2025. By the fifth cycle, in October 2025, the hypopigmentation, infiltration, and scaling had resolved, with complete regrowth of the eyebrow hair. The patient completed seven cycles of chemotherapy in December 2025. Subsequent positron emission tomography/computed tomography showed residual mediastinal lymph nodes measuring up to 27 mm with an SUVmax of 1.7, consistent with a complete metabolic response (Lugano-Deauville score 2).

The patient remains under follow-up at our institute and under the care of the Hematology Department. The most recent imaging evaluation was performed in July 2026.

Discussion

Follicular mucinosis is a histopathologic reaction pattern characterized by the accumulation of acid mucin within the epithelium of the pilosebaceous unit, predominantly in the outer root sheath and, less frequently, in the sebaceous epithelium [1-4]. Mucin deposition separates follicular keratinocytes, disrupts follicular architecture, and may lead to loss of the hair shaft, accounting for its clinical presentation as alopecia or pseudoalopecia. Hair loss, however, is not required for diagnosis, which makes the term "follicular mucinosis" more accurate than the historical designation "alopecia mucinosa" [1-3].

Follicular mucinosis has traditionally been classified as primary or idiopathic and secondary. The primary form usually occurs in children and young adults as one or a few localized lesions involving the head or neck and generally follows a benign course. Secondary follicular mucinosis may occur in association with inflammatory, infectious, drug-related, and neoplastic disorders [2-4]. Among neoplastic conditions, its best-established association is with cutaneous T-cell lymphoma, particularly mycosis fungoides and its folliculotropic variant. Nevertheless, substantial clinical and histopathologic overlap exists between primary and secondary forms. Classification therefore requires consideration of the patient's age, the number and distribution of lesions, their clinical course, the characteristics of the inflammatory infiltrate, and longitudinal follow-up [2,3].

The pathogenesis of follicular mucinosis remains incompletely understood. Follicular keratinocytes have been proposed as the main source of mucin, with production potentially stimulated by cytokines released within the perifollicular microenvironment in response to T-cell activity [2,5]. The deposited mucin is rich in acid mucopolysaccharides and can be demonstrated using stains such as Alcian blue or colloidal iron [2,5]. Neither the amount nor the distribution of mucin, however, reliably distinguishes an idiopathic form from

one associated with lymphoma.

Unlike its well-established relationship with cutaneous T-cell lymphomas, the association between follicular mucinosis and classic Hodgkin lymphoma is exceptional and is supported mainly by isolated case reports [5-7]. The mechanism underlying this association is uncertain. Follicular mucinosis has been proposed to represent a reactive or paraneoplastic phenomenon driven by tumor-related immune activation rather than direct infiltration of the follicle by neoplastic cells. The onset of cutaneous lesions before or around the time of the hematologic diagnosis, together with their improvement after lymphoma treatment, supports this interpretation. However, the small number of reported cases precludes establishing a causal relationship.

In our patient, follicular mucinosis presented as a hypopigmented, infiltrated, pseudoalopecic plaque confined to the eyebrow. Its morphology initially overlapped with more common conditions, including alopecia areata, seborrheic dermatitis, and lichen sclerosus. The clinical infiltration, follicular scaling, cervical lymphadenopathy, and weight loss, however, justified a broader systemic evaluation. The subsequent diagnosis of classic Hodgkin lymphoma, nodular sclerosis subtype, and the resolution of the eyebrow lesion after chemotherapy support a close temporal association between the two conditions.

Dermoscopy provided an additional diagnostic clue by revealing whitish material protruding through several follicular ostia, a finding described as the "toothpaste sign" [8]. Although this sign has been proposed as a suggestive feature of follicular mucinosis, its diagnostic usefulness has not been established in larger series, and it should not be considered pathognomonic. When interpreted together with clinical infiltration and follicular scaling, it may increase diagnostic suspicion and help guide selection of the biopsy site. Definitive diagnosis continues to rely on histopathologic examination and demonstration of mucin within the follicular epithelium using special stains.

The main limitation of this report is its description of a single patient. In addition, the limited number of published cases prevents the identification of specific clinical or histopathologic features that reliably distinguish follicular mucinosis associated with Hodgkin lymphoma from idiopathic forms or those associated with other disorders. The resolution of the cutaneous lesion after chemotherapy should therefore be interpreted as a temporal association that supports, but does not establish, a reactive mechanism related to the malignancy.

This case shows that localized follicular mucinosis may provide a cutaneous clue to an underlying systemic disorder. The coexistence of lymphadenopathy, constitutional symptoms, clinical infiltration, or an atypical disease course should prompt an evaluation for a lymphoproliferative condition. In this patient, integration of the clinical, dermoscopic, histopathologic, and systemic findings was essential to reaching the diagnosis.

Conclusions

Follicular mucinosis may provide a cutaneous clue to an underlying lymphoproliferative disorder. Although its association with classic Hodgkin lymphoma is exceptional, an infiltrated folliculocentric lesion accompanied by lymphadenopathy or constitutional symptoms should prompt a targeted systemic evaluation. In this patient, integration of the clinical, dermoscopic, and histopathologic findings led to the diagnosis of lymphoma, while resolution of the skin lesion after chemotherapy supported a temporal association between the two conditions.

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.

Concept and design: Andrea Sierra Franco, Bryan Salvador Sol

Acquisition, analysis, or interpretation of data: Andrea Sierra Franco, María de las Mercedes Hernández Torres, Ma. del Socorro Hernández Arana, Bryan Salvador Sol

Drafting of the manuscript: Andrea Sierra Franco

Critical review of the manuscript for important intellectual content: Andrea Sierra Franco, María de las Mercedes Hernández Torres, Ma. del Socorro Hernández Arana, Bryan Salvador Sol

Supervision: Ma. del Socorro Hernández Arana

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.

Acknowledgements

The authors used ChatGPT (OpenAI, San Francisco, CA) during manuscript preparation to assist with language editing, clarity, and organization. All AI-assisted content was critically reviewed, verified, and revised by the authors, who take full responsibility for the accuracy and integrity of the final manuscript.

References

1. Pinkus H, Macaulay WL, Lund HZ, Delaney JR, Anderson HE, Hitch JM: Alopecia mucinosa; inflammatory plaques with alopecia characterized by root-sheath mucinosis. AMA Arch Derm. 1957, 76:419-24. 10.1001/archderm.1957.01550220027005
2. Khalil J, Kurban M, Abbas O: Follicular mucinosis: a review. Int J Dermatol. 2021, 60:159-65. 10.1111/ijd.15165
3. Cerroni L, Fink-Puches R, Bäck B, Kerl H: Follicular mucinosis: a critical reappraisal of clinicopathologic features and association with mycosis fungoides and Sézary syndrome. Arch Dermatol. 2002, 138:182-9. 10.1001/archderm.138.2.182
4. Rongioletti F, De Lucchi S, Meyes D, et al.: Follicular mucinosis: a clinicopathologic, histochemical, immunohistochemical and molecular study comparing the primary benign form and the mycosis fungoides-associated follicular mucinosis. J Cutan Pathol. 2010, 37:15-9. 10.1111/j.1600-0560.2009.01338.x
5. Geller S, Gomez CJ, Myskowski PL, Pulitzer M: Follicular mucinosis in patients with hematologic malignancies other than mycosis fungoides: a clinicopathologic study. J Am Acad Dermatol. 2019, 80:1704-11. 10.1016/j.jaad.2019.01.062
6. Stankler L, Ewen SW: Hodgkin's disease in a patient with follicular and dermal mucinosis and spontaneous ooze of mucin (mucinorrhoea). Br J Dermatol. 1975, 93:581-6. 10.1111/j.1365-2133.1975.tb02253.x
7. Ramon D, Jorda E, Molina I, Galan A, Torres V, Alcacer J, Monzo E: Follicular mucinosis and Hodgkin's disease. Int J Dermatol. 1992, 31:791-2. 10.1111/j.1365-4362.1992.tb04246.x
8. Mumford BP, Ryan A, Chong AH, Lasocki A: Follicular mucinosis with novel dermoscopic finding: the toothpaste sign. Clin Exp Dermatol. 2022, 47:969-70. 10.1111/ced.15083