

# “Low-Fat” Pseudoangiomatic Spindle Cell Lipoma: A Rare Variant With Loss of 13q14 Region

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**Abstract:** Spindle cell and pleomorphic lipoma constitute a spectrum of lipomatous lesions with characteristic clinical, morphologic, immunohistochemical, and molecular features. Multiple variants have been previously described including vascular, fibrous, plexiform, and those with significantly less fat termed “low-fat” and “fat-free” by Folpe. Cytogenetically, spindle cell lipomas frequently display monoallelic loss of 13q14 region, an abnormality also found in cellular angiofibroma and mammary-type myofibroblastoma. Pseudoangiomatic spindle cell lipoma, originally described by Fletcher et al in 1994, is a rare variant within the spindle cell/pleomorphic lipoma spectrum, with less than 20 published cases. It consists of an admixture of spindle cells, “ropey” collagen, variable amounts of mature fat, and irregular, branching slit-like vascular spaces. The authors present a case of a 1-cm subcutaneous lesion excised from the neck of a 70-year-old man with classic histologic and immunohistochemical features of “low-fat” pseudoangiomatic spindle cell lipoma. Fluorescence in situ hybridization demonstrated a loss of 13q14 region, a characteristic presumed cytogenetic finding of spindle cell lipoma, which has been previously unconfirmed in this variant.

**Key Words:** spindle cell lipoma, pseudoangiomatic, 13q14, fluorescence in situ hybridization

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## INTRODUCTION

Pseudoangiomatic spindle cell lipoma, originally described by Fletcher et al,<sup>1</sup> is a rare variant within the spindle cell/pleomorphic lipoma spectrum, with less than 20 published cases.<sup>2,3</sup> It consists of an admixture of spindle cells, “ropey” collagen, variable amounts of mature fat, and irregular branching slit-like pseudovascular spaces.<sup>1</sup> Although this variant has similar clinical features and exhibits no known difference in biologic behavior or prognosis, it may pose a diagnostic challenge for pathologists and dermatopathologists.

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The authors declare no conflicts of interest.

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## CASE REPORT

A 70-year-old man without pertinent medical history presented with a 1-cm subcutaneous nodule situated on his neck. An excisional biopsy was performed.

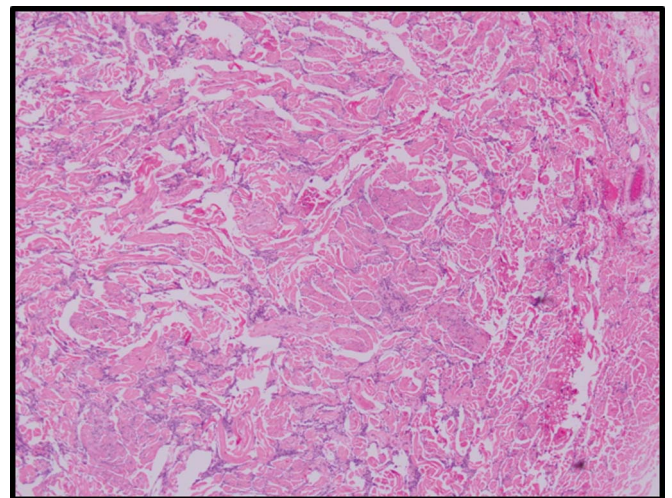
## MATERIALS AND METHODS

The biopsy was fixed with 10% buffered formalin, embedded in paraffin, and stained with hematoxylin and eosin (H&E). Immunohistochemical stains performed included S-100, EMA, CD31, HHV-8, CD45, CD34, and BCL-2. Fluorescence in situ hybridization was performed on an unstained slide using Vysis FOXO1 Break Apart Probe (Abbott Molecular, Des Plaines, IL).

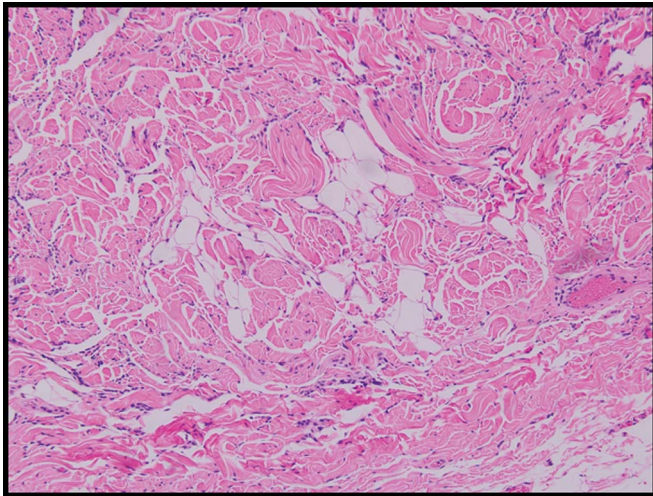
## RESULTS

Microscopic examination of hematoxylin and eosin-stained slides revealed a proliferation of cells with bland, round, monomorphic nuclei and scant cytoplasm interspersed between bundles of thick, eosinophilic collagen, and vascular-like spaces (Figs. 1–3). Scant unremarkable mature adipocytes and mast cells were also present. Immunohistochemical stains were performed to further characterize the spindle cell proliferation.

Immunohistochemical stains revealed the monomorphic cells were positive for CD34 and BCL-2. These cells failed to



**FIGURE 1.** H&E at ×4 magnification demonstrating thick eosinophilic collagen and vascular-like spaces.



**FIGURE 2.** H&E at  $\times 20$  magnification demonstrating scant mature adipocytes.

stain with S-100, EMA, CD31, HHV-8, and CD45 (Fig. 4). Fluorescence in situ hybridization using Vysis FOXO1 Break Apart Probe Kit (Abbott Molecular) revealed a monoallelic loss of 13q14 region in 94 of 166 (57%) cells surveyed (Fig. 5). Given the histologic appearance, immunohistochemical profile, and cytogenetic abnormality, this lesion was classified as a "low-fat" spindle cell lipoma, pseudoangiomatous variant.

### DISCUSSION

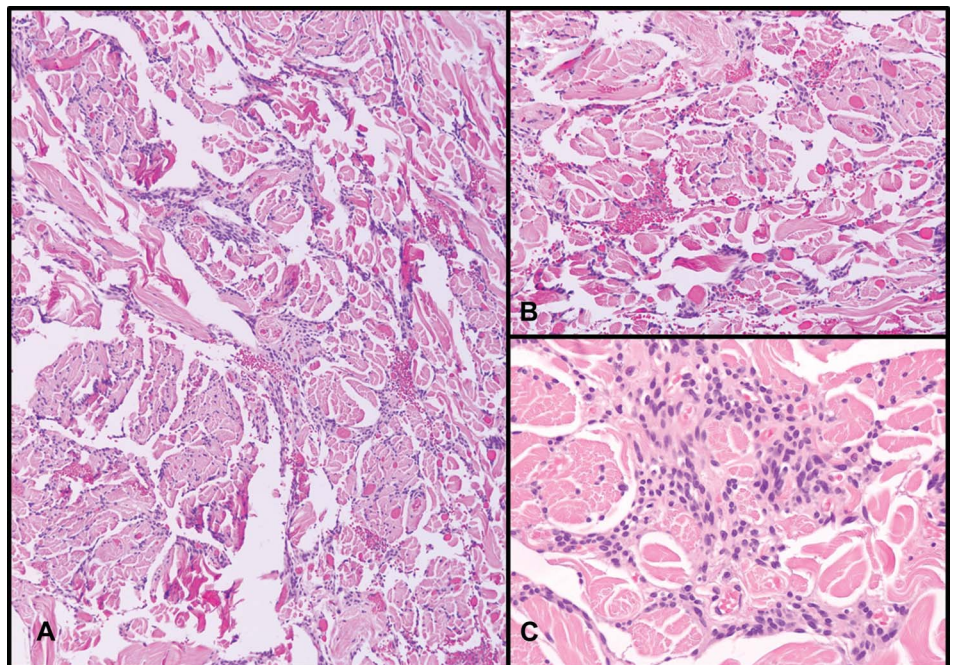
Spindle cell and pleomorphic lipomas represent a spectrum of histologic and clinically similar benign lipomatous

neoplasms. Clinically, they typically present as an asymptomatic subcutaneous nodule on the upper back, posterior neck, or shoulders of older men. Given their benign clinical behavior, conservative local excision is considered adequate treatment.<sup>4</sup> Histologically, spindle cell lipomas are composed of mature adipose tissue, thick "ropey" eosinophilic collagen, and bland spindle cells arranged in parallel arrays with a "school of fish appearance." Variable background myxoid matrix and blood vessels are also present. Immunohistochemically, the spindle cell component stains with CD34 and BCL-2, whereas S-100 is typically negative. Multiple variants including pseudoangiomatous, plexiform, vascular, fibrous, and composite lesions have been described, which may broaden the potential differential diagnosis.<sup>5</sup> Additionally, Billings and Folpe<sup>3</sup> describe "low-fat" and "fat-free" variants, which may contain little to no adipose tissue, further complicating diagnosis.

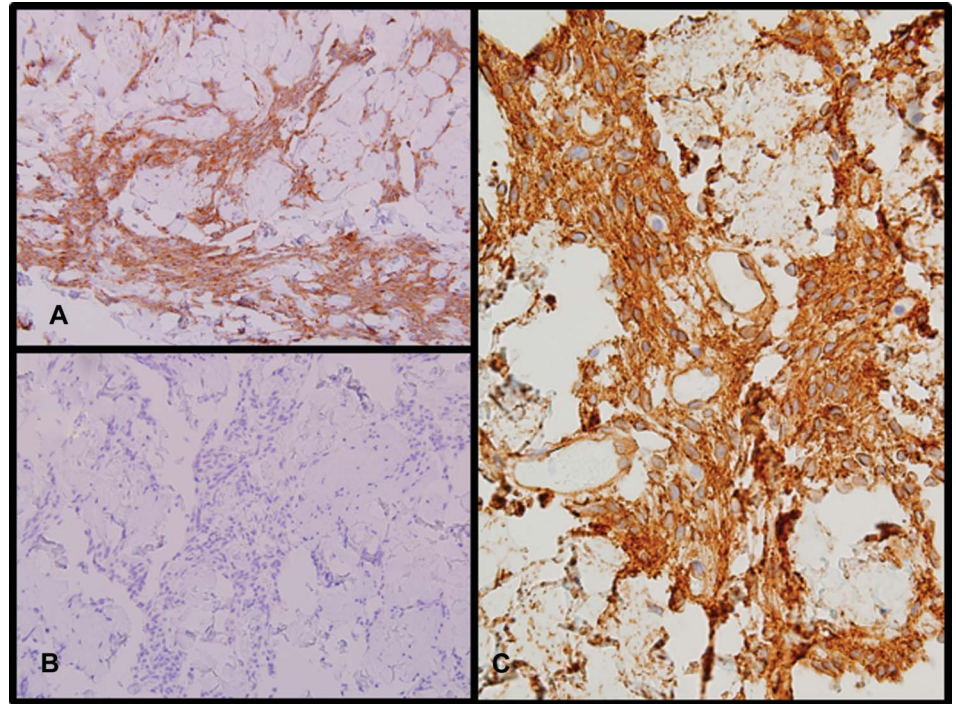
Regarding the case presented, the pseudoangiomatous and "low-fat" variants of spindle cell lipoma are rare, and exceedingly rare in combination, with a single case previously reported in the English literature.<sup>5</sup> Histologically, the pseudoangiomatous variant comprised branching, dilated vascular-like spaces in addition to the typical variable amounts of mature fat, ropey collagen, and spindle cells distributed in parallel arrays.<sup>5,6</sup> As with prototypic variant, immunohistochemical staining reveals CD34 and BCL-2 positivity in spindle cells. As with other spindle cell lipoma variants, patients are typically older men with a median tumor size of approximately 3 cm.<sup>2</sup> To date, there has been no difference in clinical behavior or prognosis described. Although the pathogenesis of this variant is uncertain, Fletcher et al<sup>1</sup> speculate that the pattern may be a result of myxoid degeneration.

Monosomy or partial loss of chromosome 16 has been documented in the majority of spindle cell lipomas.<sup>4</sup>

**FIGURE 3.** A, H&E at  $\times 10$  magnification demonstrating a spindle cell proliferation distributed within thick eosinophilic collagen and vascular-like spaces. B, H&E at  $\times 20$  demonstrating vascular-like spaces containing erythrocytes. C, H&E at  $\times 40$  magnification demonstrating monomorphic, bland cells with round nuclei, scant cytoplasm, and indistinct cell borders.







**FIGURE 4.** Immunohistochemical stains. A, BCL-2 at  $\times 20$  magnification. B, S-100 at  $\times 20$  magnification. C, CD34 at  $\times 40$  magnification.

Monoallelic loss of the long arm of chromosome 13 (13q) has also been previously described in conventional spindle cell lipomas.<sup>7</sup> Similar cytogenetic findings have been documented in mammary-type myofibroblastoma and cellular angiofibroma.<sup>7</sup> Given the cytogenetic and histologic similarities, many have proposed that spindle cell lipoma, mammary-type myofibroblastoma, and cellular angiofibroma represent a family of related neoplasms.

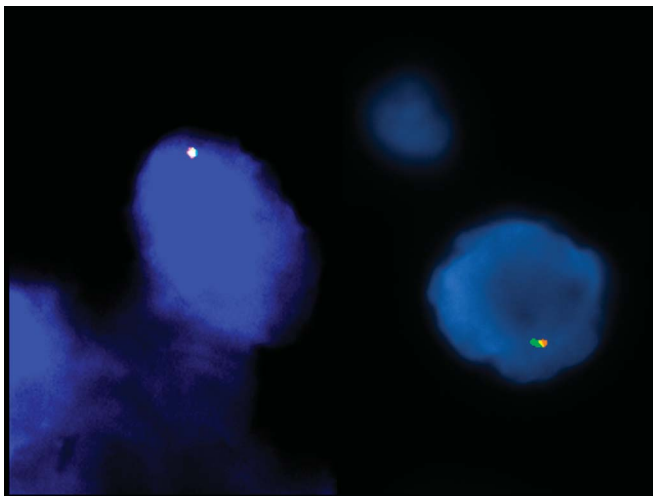
Two successful ancillary techniques have been previously published to document monoallelic loss of 13q in spindle cell lipomas and other cytogenetically related lesions. Magro et al<sup>8</sup> described the use of fluorescence in situ

hybridization (FISH) analysis targeted at 13q14 using a FOXO1 break apart probe, also used in the diagnosis of alveolar rhabdomyosarcoma, whereas Chen et al<sup>7</sup> described the use of Rb immunohistochemical staining to confirm the loss of RB1, also located in the 13q14 region. FISH testing on the case presented confirmed the presence of this cytogenetic abnormality in the “low-fat” pseudoangiomatous variant, which was previously unconfirmed.

Although the “low-fat” and pseudoangiomatous variants of spindle cell lipoma bear no significant clinical or prognostic significance, they pose a substantial diagnostic challenge to pathologists and dermatopathologists who may be unfamiliar with these variants. Awareness of histologic variants and possible varying amounts of intralesional fat, use of ancillary studies, including immunohistochemistry and FISH, and suspicion given the clinical context are useful in the diagnosis of this rare lesion.

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**FIGURE 5.** FISH demonstrating single fusion signal consistent with monoallelic loss of 13q14.

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