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# Rapidly growing subcutaneous mass in an infant

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## Abstract

Fibrous hamartoma of infancy (FHI) is a benign mesenchymal tumor of young children. It has a broad clinical differential diagnosis and is often clinically confused for vascular and malignant soft tissue neoplasms. Recognition of the unique histologic features of FHI, a triphasic population of mature adipose tissue, mature fibrous tissue, and immature mesenchymal tissue, will ensure the correct diagnosis. In this report we present a case of this rare entity, including the associated clinical, radiologic, and histologic findings.

*Keywords: soft tissue tumors, radiology, hamartoma, mesenchyme, pediatric pathology*

## Introduction

Fibrous hamartoma of infancy (FHI) is a benign soft tissue neoplasm primarily found in the pediatric population with 90% of cases occurring in patients less than 2 years old [1]. Owing to its rarity, it is often neglected in the differential diagnosis of masses occurring in newborns and young children. Fibrous hamartoma of infancy often has an alarming clinical presentation with a rapid growth phase resulting in a large mass that can occur on any cutaneous surface and is clinically suspicious for vascular tumors or malignant entities such as liposarcoma. The radiologic features of FHI may serve as a clue to the diagnosis. However, direct tissue examination is the only means to confirming the diagnosis. The histology of FHI characteristically reveals a triphasic

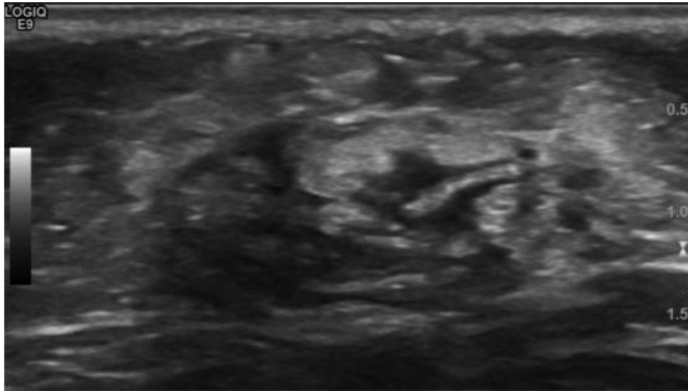
morphology containing mature adipose tissue, mature fibrous tissue, and immature mesenchymal tissue arranged in an organoid pattern. Surgical excision is curative, though local recurrence may occur. In this report we present a case of FHI and discuss its clinical course and review its radiographic and histologic features.

## Case Synopsis

A previously healthy 9-month-old girl presented for evaluation of a rapidly enlarging tumor on her upper back that appeared 2-3 months ago. It initially exhibited a rapid growth phase, followed by slow, steady growth over the preceding few weeks. It was soft to touch and did not elicit pain when manipulated. Physical examination revealed a poorly defined subcutaneous nodule with a central dell on the upper back that lay over the cervical spine and



**Figure 1.** Overlying the cervical spine is a 4x4 cm nodule with a central depression with overlying red-brown hyperpigmentation.



**Figure 2.** Ultrasound. Gray-scale ultrasonographic image demonstrates an ill-defined, lobular heterogeneous lesion with mixed components that resemble fat and fibrous tissues in a “serpentine pattern” with minimal internal vascularity.

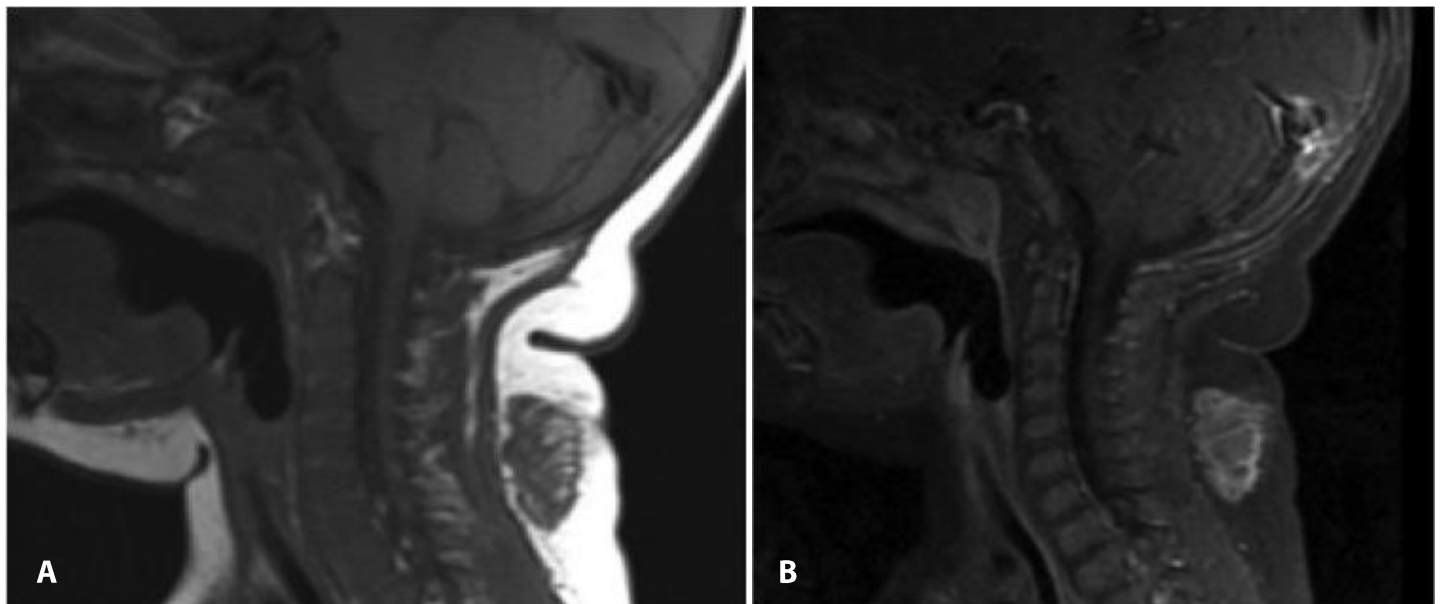
measured 4×4 cm (**Figure 1**). The nodule was freely mobile and the overlying skin displayed faint red-brown discoloration. Initially, an ultrasound was obtained and demonstrated an ill-defined, lobular soft tissue mass in the subcutis in a “serpentine pattern” (**Figure 2**).

Post contrast magnetic resonance imaging (MRI) with sagittal T1-weighted images with and without fat-suppression (FS) illustrated a heterogeneous mass in the posterior cervical subcutaneous tissues containing fat and soft tissue strands (**Figure 3a**). In the FS image, the fibrous tissue components

enhanced relative to the fat (**Figure 3b**). The patient was referred to the general surgery department for complete excision. The resection specimen was stained with hematoxylin-and-eosin and sent for histopathologic review (**Figure 4**). Histopathologic examination of the resection specimen revealed a triphasic morphology containing mature adipose tissue, mature fibrous tissue, and immature mesenchymal tissue. These findings are diagnostic of fibrous hamartoma of infancy. The patient recovered from the procedure experiencing no complications. She underwent physical examination and ultrasonography of the excision site every 3 months for the first year after surgery without evidence of recurrence.

### Case Discussion

Fibrous hamartoma of infancy is a rare, benign mesenchymal neoplasm that arises in subcutaneous tissue. It occurs at birth or shortly thereafter with a mean age of onset of 15 months and 90% of cases occurring in patients less than 2 years old [1]. Males predominate with a ratio approaching 3:1. Clinically, FHI presents as an asymptomatic subcutaneous solid mass that initially exhibits rapid growth and reaches an average size of 3 cm, although giant tumors have



**Figure 3.** Magnetic Resonance Imaging. Sagittal T1-weighted (A) and T1-weighted, fat-suppressed (FS), (B) post-contrast images show a heterogeneous mass in the posterior cervical subcutaneous tissues containing fat and soft tissue strands. In the FS image, the interspersed fat signal is diminished relative to the soft tissue strands.



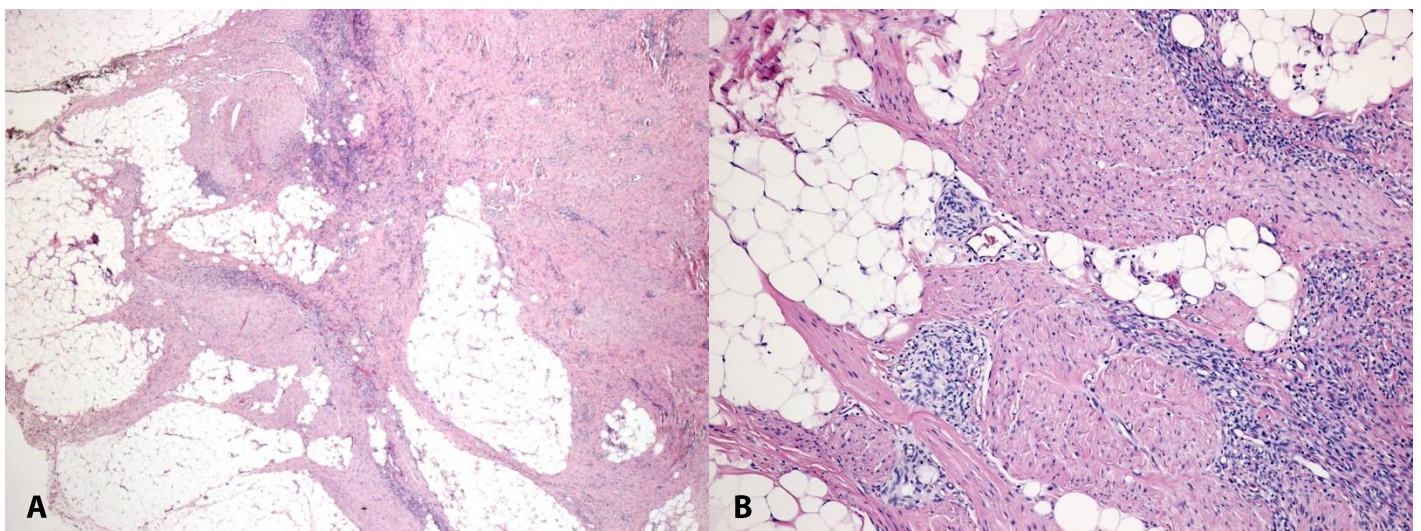
been reported [2]. The most common locations include the arms, axillae, back, and external genitalia; but they can occur almost anywhere. Lesions are rarely multifocal, and overlying cutaneous changes are infrequent but may include discoloration (hyperpigmentation), edema, hyperhidrosis, hypertrichosis, or skin tethering.

Radiologic imaging may help narrow the differential diagnosis in terms of the type of lesion, i.e., cystic versus vascular versus soft tissue neoplasm. Ultrasound may illustrate a heterogeneous, hyperechoic, "serpentine" or "layered" mass with no significant vascularity and with lobular, poorly defined margins. MRI findings include an ill-defined fatty mass with scattered heterogeneous soft tissue bands in a reticular pattern, which, when present, is suggestive of FHI [3-5]. Given the radiologic overlap with features of soft-tissue sarcomas, a biopsy is still necessary to achieve an accurate diagnosis [2].

The histologic hallmark of FHI is that of a poorly defined subcutaneous tumor containing three tissue types in an organoid pattern: haphazardly arrayed fibrocollagenous fascicles of fibroblasts and myofibroblasts, small vascular nests of myxoid, oval to stellate primitive mesenchymal cells, and intervening foci of mature adipose tissue. The relative density of the three components may be evenly distributed. However, either the fatty or fibroblastic tissue may predominate (rarely,

immature mesenchymal cells are in abundance). Histologic changes in overlying skin may include eccrine gland hyperplasia with or without duct dilation and/or papillary projections, eccrine squamous syringometaplasia, epidermal acanthosis, basofollicular induction, or an increase in vellus hair follicles [6]. Mitoses are rare and necrosis is not a feature. An immunohistochemical stain for smooth muscle actin stains the fibroblastic areas, S-100 stains the fat, and CD34 stains the primitive mesenchymal component [7].

The differential diagnosis is broad and varies depending on which tissue predominates. In adipose-rich tumors, lipoblastoma, and lipofibromatosis should be excluded. Lipoblastomas have a circumscribed, lobular morphology as well as rearrangements of the pleomorphic adenoma gene 1 (*PLAG1*). If fibroblastic tissue is abundant, then desmoid-type fibromatosis, myofibroma (infantile myofibromatosis), and calcifying aponeurotic fibroma may be considered. A predominance of CD34+ primitive mesenchymal cells or hyalinization and cracking artifact with slit-like spaces (pseudoangiomatous pattern) may resemble giant cell fibroblastoma or vascular tumors, which can be ruled out by testing for a platelet derived growth factor subunit B (*PDGFB*) gene rearrangement and immunostaining for lymphovascular endothelial markers (CD31, D2-40), respectively. If sarcomatous features are present, then infantile fibrosarcoma and



**Figure 4.** Resection specimen with low (A) and high-power (B) views revealing a poorly defined triphasic organoid morphology containing mature adipose tissue, mature fibrous tissue, and immature mesenchymal tissue. H&E, **A**), 2x; **B**), 100x.

spindle cell rhabdomyosarcoma should be ruled out via either immunohistochemical stains (e.g., desmin, myogenin for rhabdomyosarcoma) or genetic studies such as ETS variant 6 (*ETV6*) gene rearrangement for infantile fibrosarcoma [7, 8].

The treatment of choice is conservative excision. Although FHI runs a benign clinical course, local recurrence may occur owing to poor tumor circumscription [7]. Malignant transformation has not been reported. The pathogenesis of FHI is unknown, but occasional reports of genetic aberration as well as a tendency for local recurrence

suggest a neoplastic process rather than a hamartoma. Recently there has been a report demonstrating epidermal growth factor receptor (*EGFR*) exon 20 insertion/deletion mutations within 4 of 4 FHIs and the authors proposed this might serve as an ancillary test for diagnosis in challenging cases. In addition, this suggests that possible treatment options may include tyrosine kinase inhibitors for difficult to resect lesions [9]. Clinically, FHI may mimic several life-threatening malignancies. However, recognition of the classic, triphasic histology by the pathologist will lead to the correct diagnosis of this entity.

## References

1. Carretto E, Dall'Igna P, Alaggio R, Siracusa F, Granata C, Ferrari A, Cecchetto G. Fibrous hamartoma of infancy: an Italian multi-institutional experience. *J Am Acad Dermatol*. 2006 May;54(5):800-3. [PMID:16635660].
2. McGowan J 4th, Smith CD, Maize J Jr, Cook J. Giant fibrous hamartoma of infancy: a report of two cases and review of the literature. *J Am Acad Dermatol*. 2011 Mar;64(3):579-86. [PMID: 20598395].
3. Lee S, Choi YH, Cheon JE, Kim MJ, Lee MJ, Koh MJ. Ultrasonographic features of fibrous hamartoma of infancy. *Skeletal Radiol*. 2014 May;43(5):649-53. [PMID: 24535316].
4. Stensby JD, Conces MR, Nacey NC. Benign fibrous hamartoma of infancy: a case of MR imaging paralleling histologic findings. *Skeletal Radiol*. 2014 Nov;43(11):1639-43. [PMID: 24970668].
5. Sargar KM, Sheybani EF, Shenoy A, Aranake-Chrisinger J, Khanna G. Pediatric Fibroblastic and Myofibroblastic Tumors: A Pictorial Review. *Radiographics*. 2016 Jul-Aug;36(4):1195-214. [PMID: 27399243].
6. Grynspan D, Meir K, Senger C, Ball NJ. Cutaneous changes in fibrous hamartoma of infancy. *J Cutan Pathol*. 2007 Jan;34(1):39-43. [PMID: 17214853].
7. Saab ST, McClain CM, Coffin CM. Fibrous hamartoma of infancy: a clinicopathologic analysis of 60 cases. *Am J Surg Pathol*. 2014 Mar;38(3):394-401. [PMID: 24525510].
8. Al-Ibraheemi A, Martinez A, Weiss SW, Kozakewich HP, Perez-Atayde AR, Tran H, Parham DM, Sukov WR, Fritchie KJ, Folpe AL. Fibrous hamartoma of infancy: a clinicopathologic study of 145 cases, including 2 with sarcomatous features. *Mod Pathol*. 2017 Apr;30(4):474-485. [PMID: 28059097].
9. Park JY, Cohen C, Lopez D, Ramos E, Wagenfuehr J, Rakheja D. EGFR Exon 20 Insertion/Duplication Mutations Characterize Fibrous Hamartoma of Infancy. *Am J Surg Pathol*. 2016 Dec;40(12):1713-1718. [PMID: 27631514].