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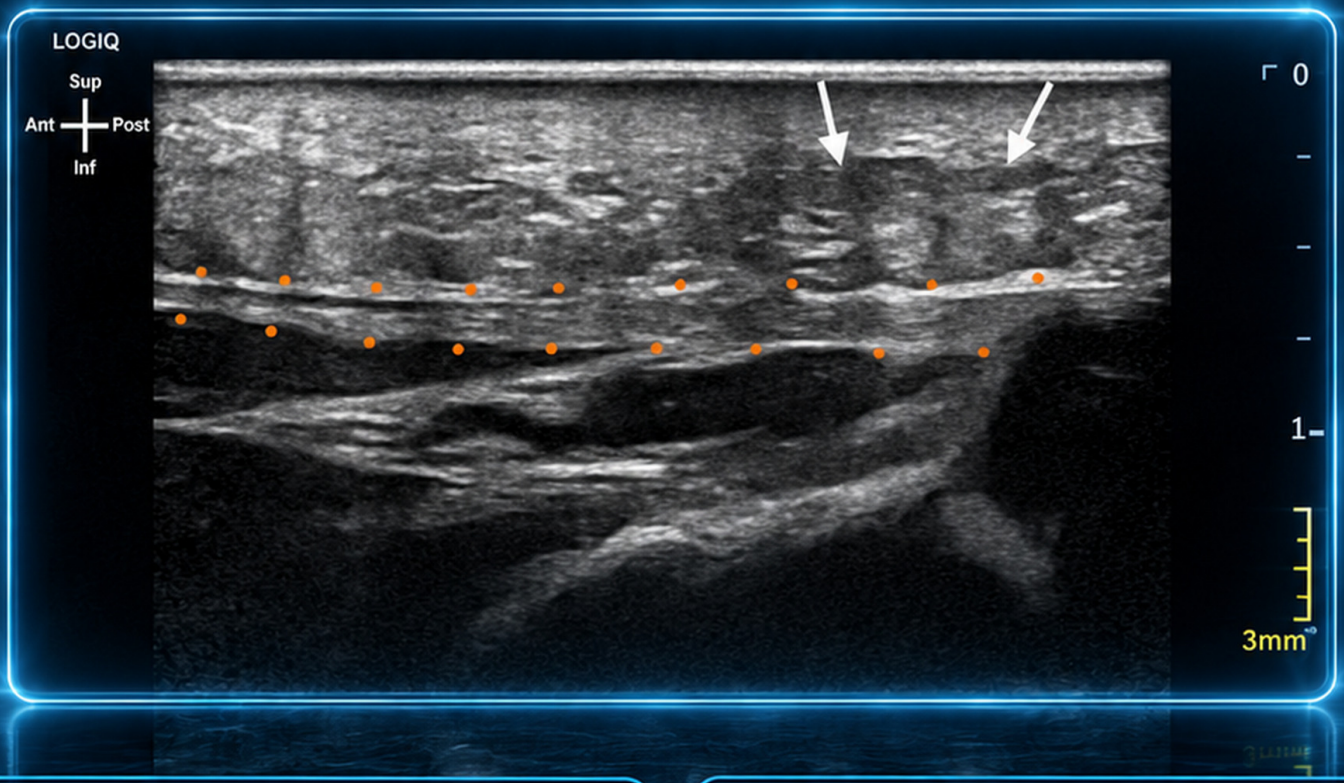
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CASE REPORT

BILATERAL PRECALCANEAL CONGENITAL FIBROLIPOMATOUS HAMARTOMAS IN AN ELEVEN-WEEK-OLD INFANT: A CASE REPORT OF CHARACTERISTIC ULTRASOUND FINDINGS

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BELGIUM · LUXEMBOURG



EARLY INFANCY
Eleven-week-old infant with asymptomatic heel nodules

BILATERAL PRESENTATION
Symmetrical anteromedial plantar heel nodules

ULTRASOUND FINDINGS
Superficial nodules with continuous underlying plantar fascia

DIAGNOSTIC CAUTION
Clinical and sonographic diagnosis; no histology or follow-up

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Bilateral precalcaneal congenital fibrolipomatous hamartomas in an eleven-week-old infant: a case report of characteristic ultrasound findings

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Abstract

Precalcaneal congenital fibrolipomatous hamartomas (PCFHs) are benign subcutaneous nodules of infancy, typically located on the medial plantar heel and often bilateral. We report an eleven-week-old full-term male infant with symmetrical bilateral anteromedial plantar heel nodules. Ultrasound showed well-defined, oval, hypoechoic subcutaneous nodules. The plantar fascia remained continuous, with no sonographic evidence of involvement of the underlying muscles or osseous structures. Based on the age, characteristic location, bilateral symmetry, and sonographic features, bilateral PCFH was considered the most consistent diagnosis. No biopsy or MRI was performed, and no longitudinal follow-up was available. Conservative management with parental reassurance was recommended. Recognition of this characteristic clinical and sonographic pattern may help support conservative management and avoid unnecessary invasive investigation in typical cases.

Keywords: infant; precalcaneal congenital fibrolipomatous hamartoma; plantar nodule; ultrasonography; case report

Publication Question

What characteristic clinical and ultrasound findings can support a diagnosis of bilateral precalcaneal congenital fibrolipomatous hamartomas in an infant, and what features should prompt consideration of alternative diagnoses or further investigation?

Introduction

Bilateral plantar nodules in an infant may prompt evaluation for congenital, vascular, inflammatory, or neoplastic soft-tissue lesions. Precalcaneal congenital fibrolipomatous hamartomas (PCFHs), also described in the literature under related terms such as infantile pedal papules and congenital adipose plantar nodules, are benign lesions that typically present at birth or during early infancy as soft, skin-coloured, asymptomatic, often bilateral and symmetrical nodules on the medial plantar heel, just anterior to the calcaneus (1,2,3,4,5,6). Their diagnosis is primarily clinical, and biopsy is generally unnecessary when the presentation is typical (2,3). Ultrasound may be useful when the lesions are referred for imaging or when a clinical feature raises diagnostic uncertainty. A published PCFH case documented a superficial lesion without infiltration of underlying structures, but with a slightly hyperechoic rather than hypoechoic appearance (7).

We report an eleven-week-old infant with bilateral lesions and describe the clinical and sonographic features that made PCFH the most consistent diagnosis while explicitly acknowledging the absence of histological confirmation and longitudinal follow-up.

Case report

Patient information and clinical findings

An eleven-week-old full-term male infant was referred for ultrasound evaluation of bilateral plantar soft-tissue nodules. There was no relevant personal or family medical history, and no relevant genetic or other background factors were reported. No previous investigations or treatments had been undertaken for the lesions.

The nodules had first been noticed several weeks before presentation. The parents reported an apparent increase in size over the following weeks; however, no serial measurements were available to document objective growth. The lesions remained asymptomatic, with no apparent tenderness, functional impairment, or associated skin changes. Clinical examination demonstrated symmetrical, skin-coloured, approximately 1-cm subcutaneous nodules in the anteromedial plantar heel region, immediately anterior to the calcaneus and at the proximal plantar arch, on both feet (Figure 1).

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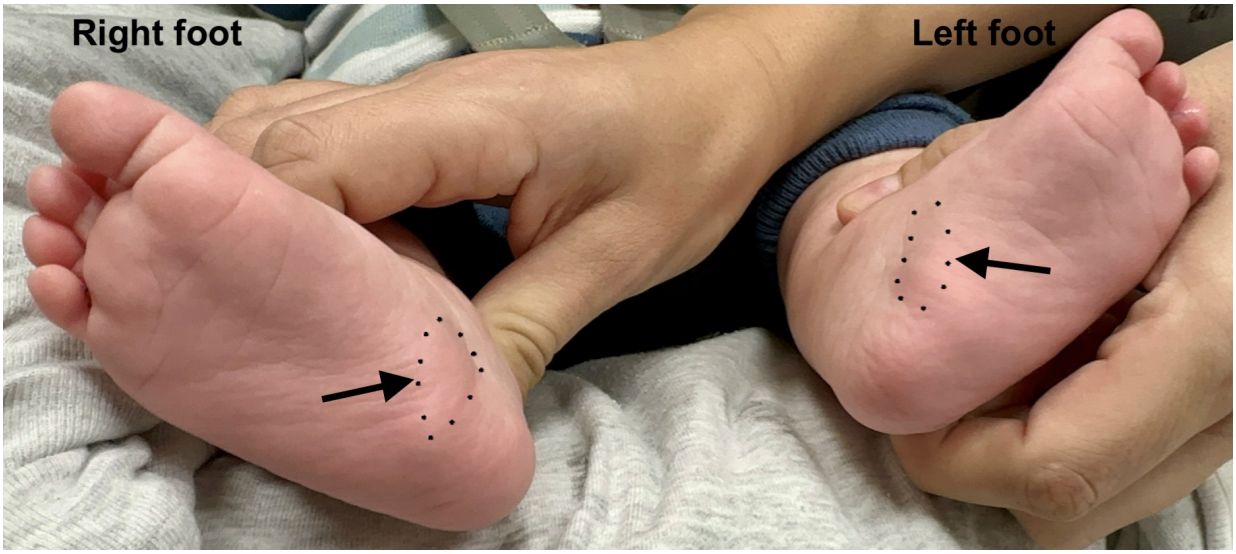


Figure 1. Clinical photograph of the plantar aspect of both feet, demonstrating symmetrical, bilateral, skin-coloured subcutaneous nodules in the anteromedial plantar heel regions, immediately anterior to the calcaneus (black arrows), with their margins delineated by small black dots.

Diagnostic assessment

Ultrasound was performed using a General Electric LOGIQ ultrasound system with a high-frequency linear probe (L6–24 MHz). The examination was mildly limited by foot movements. On both sides, the lesions appeared as well-defined, oval, hypoechoic subcutaneous nodules relative to the surrounding subcutaneous fat. The lesions showed identical morphology and echogenicity bilaterally; representative images are provided in Figures 2 and 3. The plantar fascia was clearly visualized bilaterally and remained continuous beneath the lesions, without a visible fascial defect or interruption (Figure 3). There was no sonographic evidence of involvement of the underlying plantar muscles or osseous structures. Taken together, the age, typical anteromedial plantar heel location, bilateral symmetry, superficial well-defined morphology, and preservation of the plantar fascia and deeper structures were most consistent with PCFH. No biopsy or MRI was performed. The diagnosis therefore remains clinical and sonographic rather than histologically confirmed.

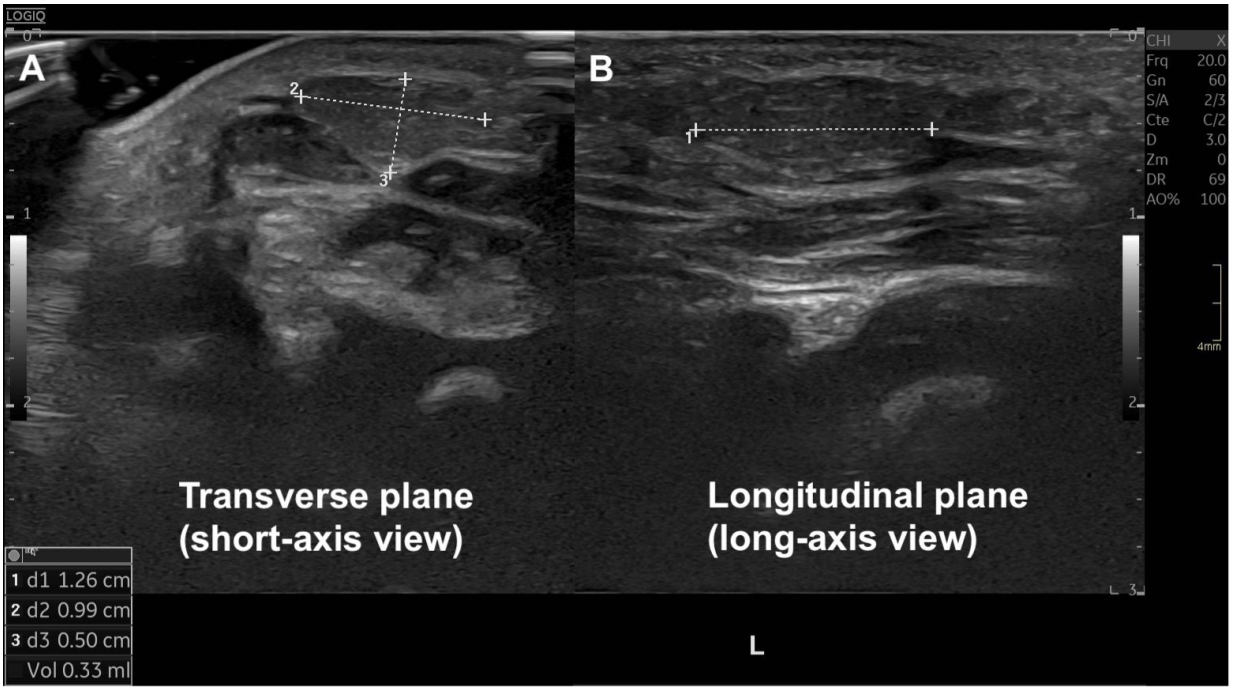


Figure 2. B-mode ultrasound of the left anteromedial plantar heel nodule in transverse (A) and longitudinal (B) planes. The displayed caliper measurements are 0.99 × 0.50 cm in panel A and 1.26 cm in panel B. Dotted calipers indicate the measurement axes.

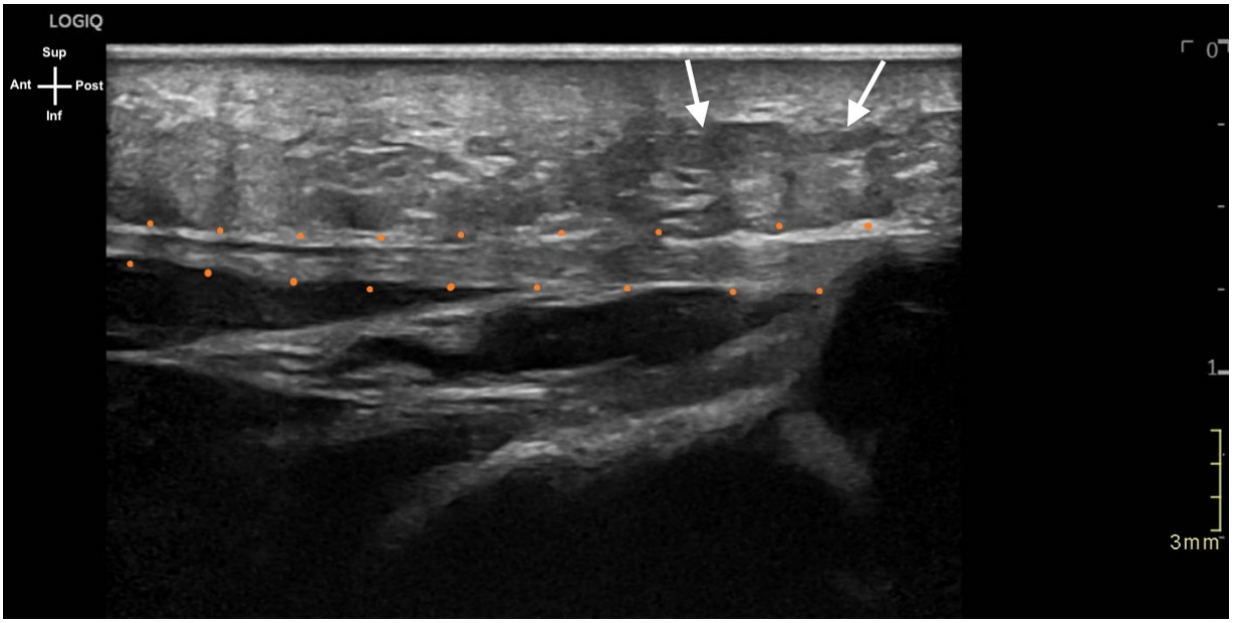


Figure 3. Sagittal ultrasound image of the right foot, as confirmed by the authors, showing the subcutaneous nodule (white arrows) and the underlying plantar fascia (small orange dots). The fascia appears continuous, with no visible fascial defect.

Diagnostic reasoning and differential diagnosis

The differential diagnosis was assessed against the observed clinical and sonographic pattern. Piezogenic pedal papules were considered because they can be bilateral and occur on the medial heels; however, classic piezogenic pedal papules are small papules that become prominent with standing or direct pressure and flatten when pressure is removed. Ultrasound may show fat globules protruding into the dermis (8,9). In a non-weight-bearing eleven-week-old infant, persistent approximately 1-cm nodules with the typical PCFH distribution were considered more consistent with infantile pedal papules/PCFH than with pressure-dependent piezogenic papules.

Fibrous hamartoma of infancy (FHI) was also considered. FHI usually presents as a solitary, poorly circumscribed subcutaneous mass, most often outside the foot, and may enlarge during infancy. In the precalcaneal region, FHI has been described as an ill-defined heterogeneous hypoechoic mass; MRI may show characteristic mixtures of fat, fibrous, and myxoid tissue, and definitive diagnosis is histopathological (9,10). The bilateral symmetrical distribution and well-defined superficial appearance in this infant were less typical of FHI, although imaging alone cannot absolutely exclude it.

Juvenile plantar fibromatosis and related benign anteromedial plantar nodules of childhood were considered because these lesions may be bilateral and occur on the anteromedial heel. Plantar fibromatosis represents fibrous tissue proliferation related to the plantar fascia and is usually encountered in adolescence or early adulthood, although a benign paediatric heel-pad presentation is also described (11). In the present case, the plantar fascia remained continuous beneath the nodules without a visible fascial mass or interruption, which argued against a lesion arising from the fascia.

Lipoma and lipoblastoma were considered as other fat-containing lesions. Lipomas in children are uncommon and have variable ultrasound appearances, while lipoblastomas generally occur in children younger than three years and are often well-defined, predominantly hyperechoic or mixed-echoic masses, sometimes with septa or cystic spaces (12). Their usual larger, heterogeneous, and/or predominantly fatty imaging appearance and the lack of the characteristic symmetrical anteromedial heel distribution made them less consistent with the present findings.

Vascular malformation was considered because superficial vascular lesions may occur in infancy and can be subtle on clinical examination. Venous malformations are typically compressible and may appear heterogeneous or spongiform on imaging (12,13). In this case, skin-colour changes were not reported. Compressibility was not documented, and the available colour Doppler documentation was insufficient to reliably characterize vascularity, so a vascular lesion cannot be excluded on those grounds alone.

Other congenital or neoplastic plantar masses may be considered when the clinical course or imaging pattern is atypical. Features that would increase concern include rapid or objectively documented enlargement, pain or functional impairment, fixation, deep extension, bone involvement, an atypical location, marked asymmetry, internal vascularity on Doppler assessment, or persistent diagnostic uncertainty. In such circumstances, targeted repeat ultrasound, MRI, and/or biopsy should be considered according to the clinical context (9,12).

Discussion

PCFHs are benign lesions that typically present at birth or during early infancy as soft, skin-coloured, asymptomatic nodules on the medial plantar aspect of the heel. Bilateral and symmetrical involvement is well described, and the lesions may increase in size in proportion to the growth of the child (2,3,4,5,6). The characteristic location, young age at presentation, and bilateral symmetry are therefore important clinical features supporting the diagnosis.

In the present case, the lesions showed the typical clinical distribution, with symmetrical nodules located in the anteromedial plantar heel region, immediately anterior to the calcaneus. Their superficial location and lack of symptoms

were also consistent with the usual clinical presentation of PCFH. The absence of skin changes, pain, or functional impairment further supported a benign superficial process.

Ultrasound provided additional information about the location and extent of the lesions. Both nodules were well-defined, oval, and hypoechoic relative to the surrounding subcutaneous fat. Importantly, the plantar fascia remained continuous beneath the lesions, with no sonographic evidence of involvement of the underlying plantar muscles or osseous structures. These findings supported the superficial and non-invasive nature of the lesions.

Published PCFH ultrasound findings include a slightly hyperechoic lesion (7), which differs from the hypoechoic appearance observed in our patient. Hypoechogenicity should therefore not be considered a specific or pathognomonic feature.

The differential diagnosis is important because several other lesions may present as plantar nodules in infants or young children. Piezogenic pedal papules are usually pressure-dependent and become more prominent with weight bearing, making them less likely in a non-weight-bearing infant with persistent approximately 1-cm nodules. Fibrous hamartoma of infancy may occur during infancy but is more commonly solitary and poorly circumscribed, with a heterogeneous appearance and variable involvement of fat, fibrous, and myxoid tissue (9,10). Juvenile plantar fibromatosis is related to the plantar fascia and is usually seen in adolescence or early adulthood, with a benign paediatric heel-pad variant also described (11). Lipoma and lipoblastoma may present as fat-containing masses, but their imaging appearance and usual distribution are less characteristic of the lesions observed in this case (12). Finally, a vascular malformation should be considered when there is compressibility, skin discoloration, or other clinical features suggestive of a vascular lesion (12,13).

The preservation of the plantar fascia in this case is also relevant to the proposed pathogenesis of PCFH. Several mechanisms have been suggested, including hamartomatous proliferation of adipose and connective tissue, incomplete involution of fetal plantar tissue, and herniation of adipose tissue (7). The continuous plantar fascia observed in our patient does not support the presence of an obvious fascial defect; however, this isolated observation cannot establish or exclude any particular pathogenic mechanism.

When the clinical and ultrasound findings are characteristic, PCFH can generally be managed conservatively, and biopsy or additional imaging may not be necessary. However, further investigation should be considered when the presentation is atypical or when the diagnosis remains uncertain. Features that may warrant additional assessment include objectively documented rapid enlargement, pain, fixation, deep extension, bone involvement, marked asymmetry, internal vascularity on Doppler assessment, or an atypical location. Depending on the clinical and imaging findings, repeat ultrasound, MRI, and/or biopsy may then be appropriate (6,9,12).

The main limitations of this case are the absence of histopathological confirmation and longitudinal follow-up. Although colour Doppler assessment was performed, the image quality was insufficient to provide a representative image for publication, limiting the documentation of the lesions' vascular characteristics. Compressibility was not documented. Accordingly, neither the presence nor the absence of internal vascularity or compressibility could be reliably established from the available documentation. Biopsy was not performed because the lesions were asymptomatic and their clinical and sonographic features were considered most consistent with PCFH. Furthermore, the apparent increase in lesion size reported by the parents could not be objectively confirmed because no serial measurements were available. No subsequent clinical or imaging assessment was performed. Therefore, this case illustrates a clinical and sonographic presentation suggestive of PCFH but does not provide histological confirmation or information on the lesions' subsequent evolution.

Overall, the combination of early age, characteristic bilateral and symmetrical anteromedial plantar heel location, superficial well-defined morphology, and preservation of the plantar fascia and deeper structures supported a diagnosis of bilateral PCFH in this infant. Recognition of this pattern may help clinicians distinguish PCFH from other plantar soft-tissue lesions and avoid unnecessary invasive investigation in typical cases.

Follow-up and outcomes

No formal clinical or imaging follow-up was performed after the initial assessment. No subsequent lesion measurements, symptom assessment, or imaging outcomes are therefore available. This absence of follow-up is a limitation of the report.

Timeline

Time	Clinical event
Several weeks before presentation	Parents noticed small, symmetrical nodules in the anteromedial plantar heel region of both feet.
Following weeks	Parents observed an apparent increase in size; no serial measurements were obtained. The lesions remained asymptomatic.
At 11 weeks of age	Clinical examination confirmed symmetrical, skin-coloured, approximately 1-cm subcutaneous nodules in the anteromedial plantar heel region, immediately anterior to the calcaneus and at the proximal plantar arch.
Same assessment	Ultrasound showed bilateral, well-defined, oval, hypoechoic subcutaneous nodules. The plantar fascia remained continuous, with no sonographic evidence of plantar muscle or osseous involvement.
After ultrasound	The clinical and sonographic findings were considered most consistent with bilateral PCFH. No biopsy, MRI, or longitudinal imaging follow-up was performed. Conservative management and parental reassurance were recommended.

Therapeutic intervention

No invasive or pharmacological treatment was undertaken. Conservative management with parental reassurance was recommended.

Patient perspective

A direct patient perspective was not available because the patient was an eleven-week-old infant. The parents were informed about the benign nature of the working diagnosis, the absence of histological confirmation, the rationale for conservative management, and the circumstances that would warrant reassessment.

Learning Points

• Precalcaneal congenital fibrolipomatous hamartomas should be considered in infants with symmetrical, bilateral, skin-coloured nodules along the medial plantar heels.

• Ultrasound may support the diagnosis by demonstrating superficial subcutaneous nodules, which were well-defined and hypoechoic in this case, with preservation of the underlying plantar fascia.

• Recognition of this characteristic clinical and sonographic pattern may support conservative management in typical cases and help avoid unnecessary biopsy or additional imaging.

• Atypical features, including objectively documented rapid enlargement, pain, fixation, deep extension, bone involvement, marked asymmetry, atypical location, internal vascularity on Doppler assessment, or persistent diagnostic uncertainty, should prompt consideration of alternative diagnoses and further investigation.

Declarations

Ethics approval: Formal ethics approval was not required according to the applicable institutional requirements of CHIREC Delta Hospital.

Consent for publication: Written informed parental consent was obtained for publication of the case details and clinical images. The consent specifically included publication of the clinical photograph and online open-access publication.

Competing Interests: The authors declare that they have no competing interests.

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Data availability: Not applicable. No datasets were generated or analyzed for this case report.

Author Contributions: GB performed the ultrasound examination, contributed to the literature review, and drafted the manuscript. CC and PS reviewed and revised the manuscript. All authors approved the final version of the manuscript and accept responsibility for its content.

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