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Ultrasonographic Findings of Lipedema: Application of a Standardized Grading Method

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1. Abstract

1.1. Background: Lipedema is a chronic connective tissue disorder predominantly affecting women, often misdiagnosed. Although clinical examination remains foundational, ultrasound provides objective staging.

1.2. Case Presentation: A 35-year-old woman under conservative treatment for clinically

diagnosed lipedema underwent ultrasonographic evaluation. Measurements exceeded established thresholds, and the qualitative pattern corresponded to the LDHC 3 classification.

1.3. Conclusion: Ultrasonography, incorporating both cutoff measurements and qualitative pattern recognition, offers robust diagnostic confirmation and staging to inform management.

2. Introduction

Lipedema is characterized by symmetrical, disproportionate subcutaneous fat accumulation in the limbs, sparing the trunk, hands, and feet [3,4]. The diagnosis is often supported by ultrasound, which helps differentiate lipedema from similar clinical conditions like lymphedema or obesity. Objective measurement criteria (e.g., pre-tibial >11.7 mm, anterior thigh >17.9 mm, lateral leg >8.4 mm, medial leg >7.0 mm) have been validated for staging [1]. Additionally, the recently proposed Lipedema Dermal and Hypodermal Classification (LDHC) integrates qualitative features nsuch as septa integrity and nodularity—into staging, with LDHC 3 characterized by disrupted septa, hyperechoic nodules, dermal irregularities, and bulging deep hypodermis [2].

3. Case Presentation

A 35-year-old woman sought follow-up for progressive bilateral lower limb enlargement since adolescence, associated with pain on palpation, easy bruising, and limb heaviness.

Clinical Examination:

- Bilateral thigh and leg enlargement, sparing the feet (negative Stemmer sign).
- Palpable subcutaneous nodules.
- No pitting edema (negative Godet sign).
- BMI: 29 kg/m².
- No signs of venous insufficiency.

Ultrasound Evaluation:

Performed using a high-frequency linear transducers (14-22 MHz), following both quantitative and qualitative standardized protocols.

- Quantitative findings (cutoff criteria):
- Pre-tibial region: thickness >11.7 mm (bilaterally)
- Anterior thigh: thickness >17.9 mm
- Lateral leg: thickness >8.4 mm
- Medial supramalleolar region: thickness >7.0 mm

These values align with diagnostic thresholds for lipedema [1].

- Qualitative pattern (LDHC):
- Disrupted septa, irregular superficial hypodermis
- Prominent hyperechoic nodules
- Bulging deep hypodermis
- Irregular dermis–hypodermis junction.

These features define the LDHC 3 pattern [2].

Diagnosis:

Clinical and ultrasound findings matched the LDHC 3 classification.

4. Discussion

This case illustrates the synergy of quantitative and qualitative

ultrasonographic assessment in diagnosing and staging lipedema:

- Quantitative measurements provided reproducible thresholds for confirming subcutaneous thickening above diagnostic cutoffs [1].
- LDHC classification adds morphological insight identifying ecogenic nodules, septal disruption, and dermal irregularities—that enrich staging accuracy and clinical relevance [2].

Together, these methods enhance diagnostic confidence, help differentiate from lymphedema or obesity, and may guide treatment decisions and monitoring.

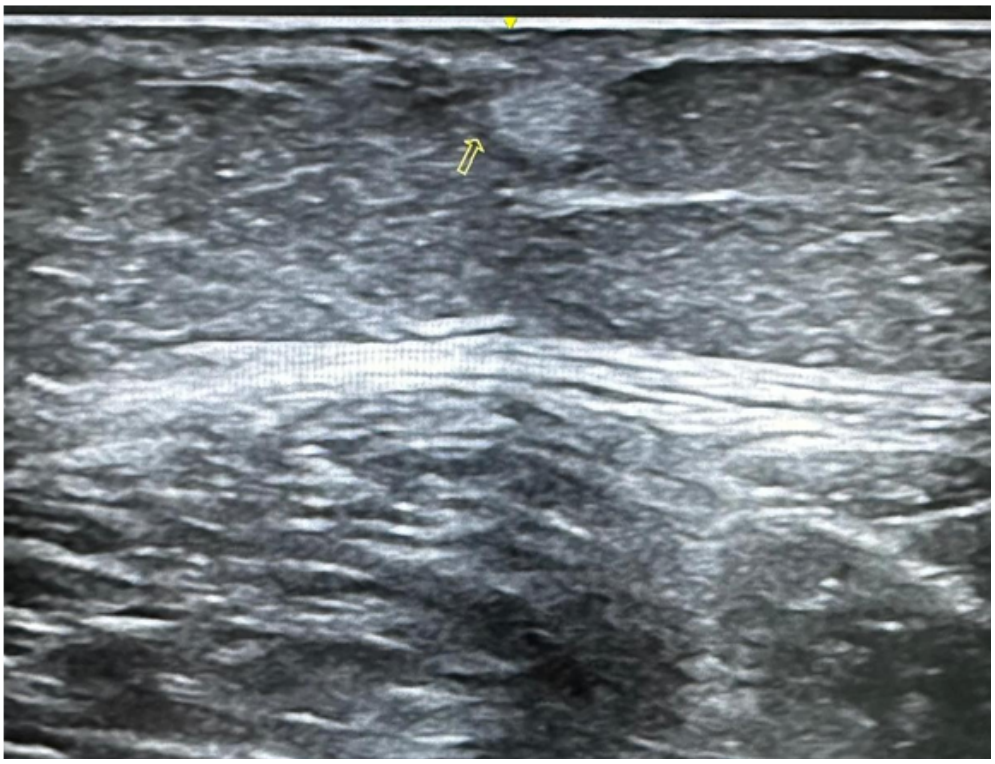

Figure 1: Ultrasound image of affected regions with illustrative hyperechoic nodule and septal disruption.

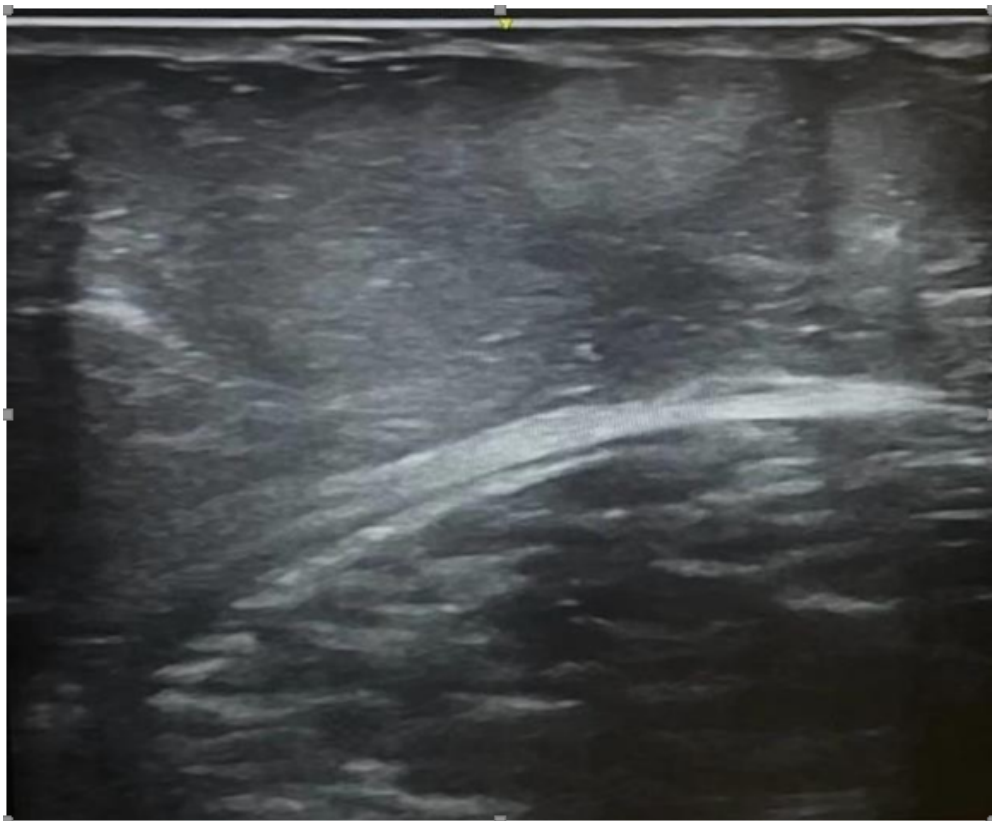

Figure 2: Ultrasonographic demonstration of the LDHC 3 ultrasound pattern: bulging hypodermis, disrupted septa, hyperechoic nodules, and irregular dermis hypodermis interface.

5. Conclusion

Ultrasound is a valuable complement to clinical diagnosis in lipedema. The combined use of standardized measurement thresholds and LDHC pattern recognition enables accurate, reproducible staging. This case confirms the utility of both approaches in advanced (stage 3) lipedema and supports their integration into routine evaluation and management.

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