



Ultrasound of Frequent Dermatologic Infections and Infestations

10

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10.1 Warts

10.1.1 Definition

Cutaneous infection with human papillomavirus.

10.1.2 Key Sonographic Signs

Common ultrasonographic findings in warts are (Figs. 10.1, 10.2, and 10.3, Videos 10.1 and 10.2) [1–3]:

- Palmar and plantar regions are commonly affected; other areas of involvement are the digits, including the periungual region.
- Hypoechoic, fusiform epidermal and dermal structure (wart)
- Plantar warts commonly present underlying bursitis.
- On color Doppler, variable degrees of vascularity (from hypovascular to hypervascular) may be detected at the bottom of the wart. Painful and active warts tend to show prominent blood flow.

Electronic Supplementary Material The online version of this chapter (https://doi.org/10.1007/978-3-319-89614-4_10) contains supplementary material, which is available to authorized users.

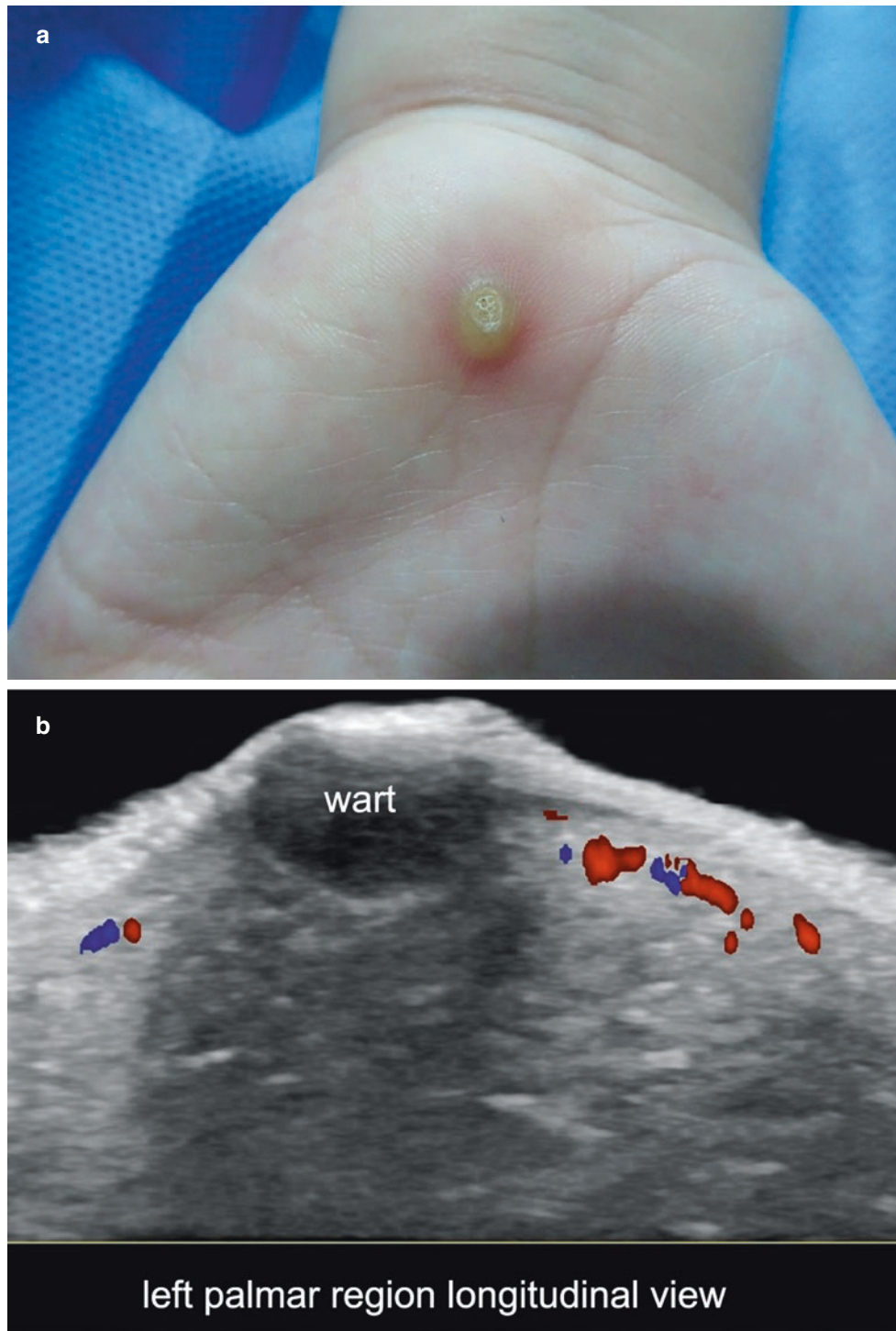


Fig. 10.1 Palmar wart. (a) Clinical photograph. (b) Color Doppler ultrasound (transverse view; left palmar region). This well-defined, hypoechoic fusiform structure (wart) affects epidermis and dermis. Slightly increased vascularity of the upper dermis is seen in the periphery of the lesion.

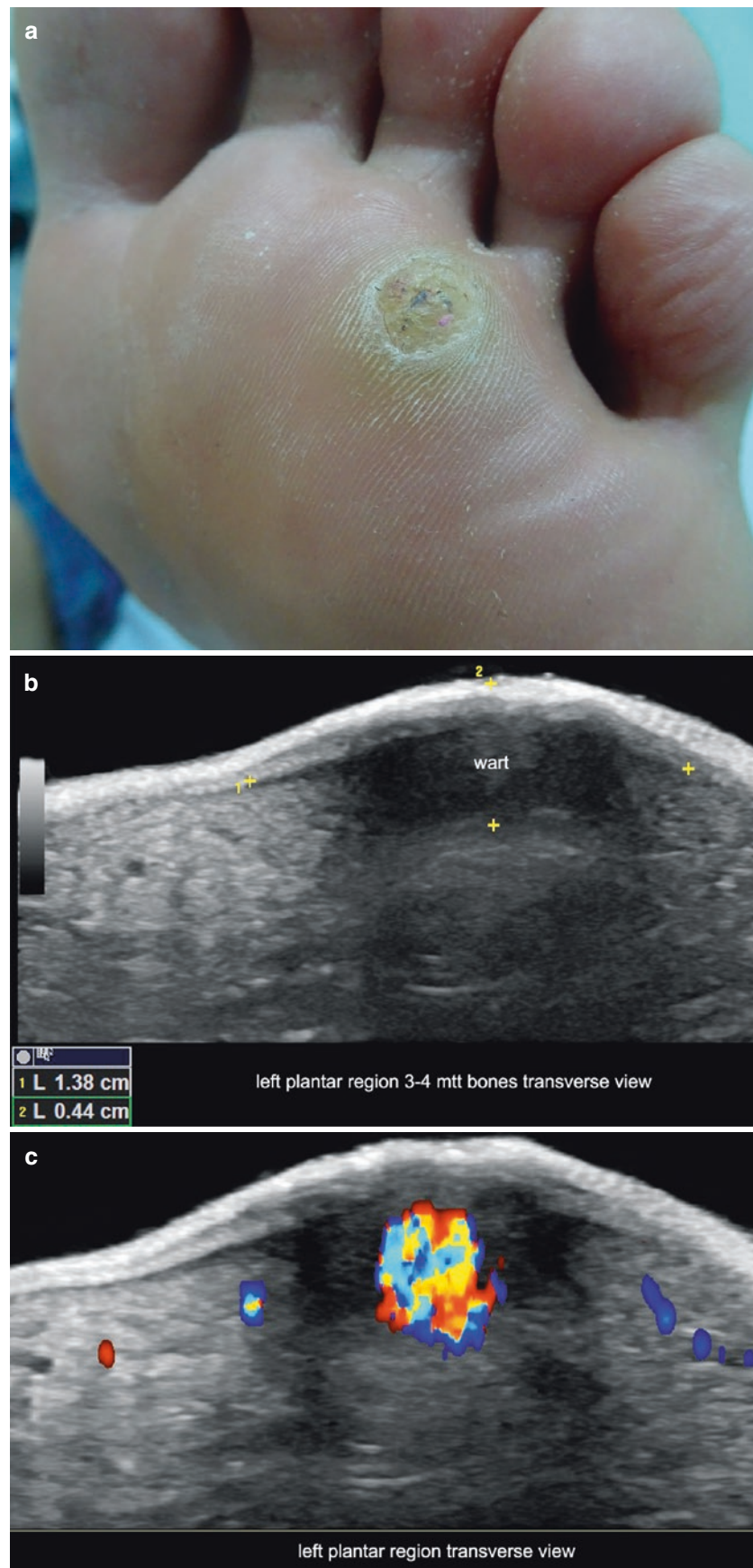


Fig. 10.2 Plantar wart. (a) Clinical lesion. (b, c) Ultrasound (transverse view; left plantar region; (b) greyscale; (c) color Doppler) shows 13.8-mm transverse \times 4.4-mm thickness hypoechoic, fusiform epider-

mal and dermal structure (between markers in (b)). On color Doppler, there is increased blood flow in the dermal part of the wart. See Video 10.1.

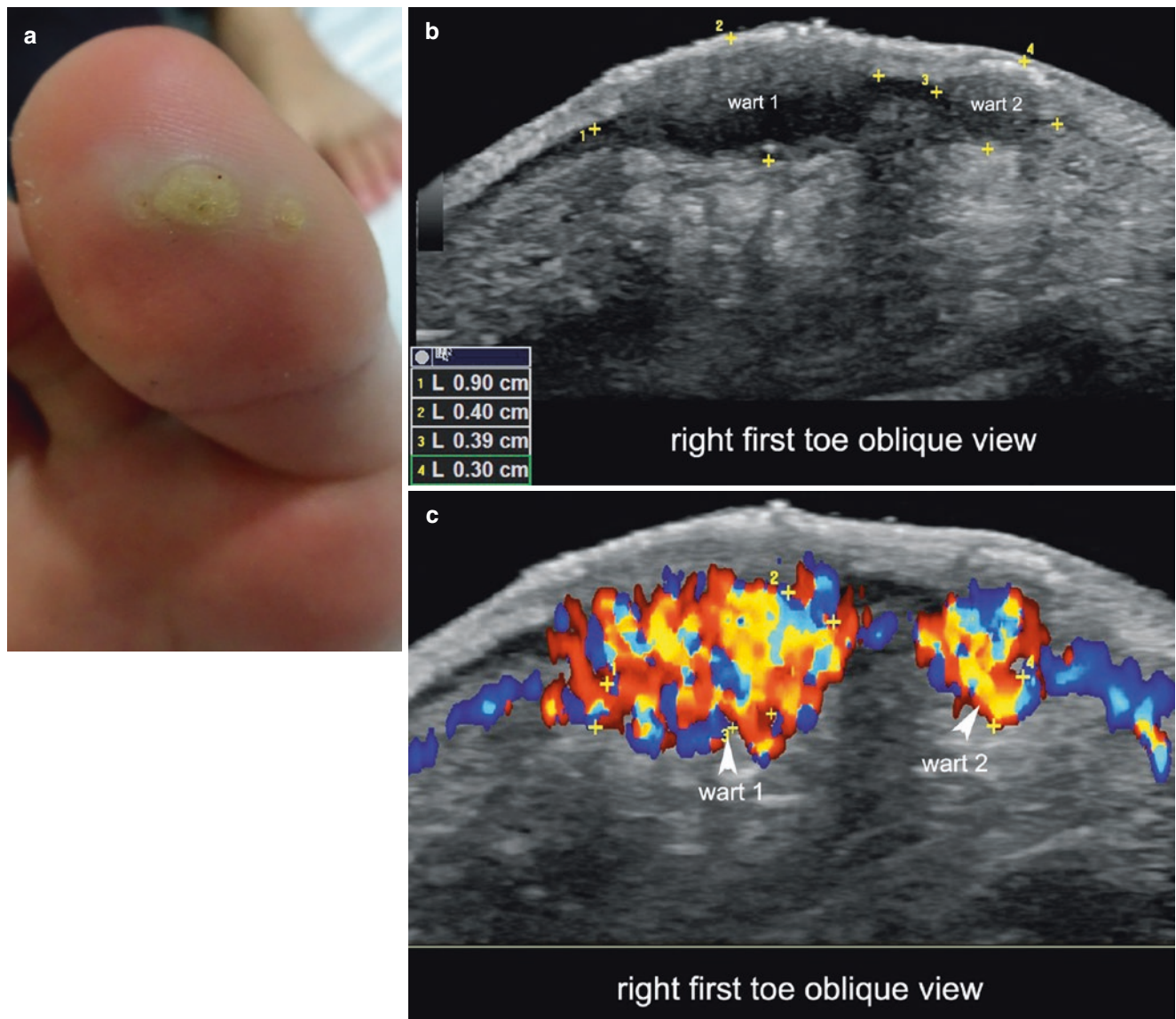


Fig. 10.3 Two plantar warts. (a) Clinical lesion. (b and c) Ultrasound (oblique views following the axes of both lesions; right first toe; wart 1 and wart 2; (b) greyscale; (c) color Doppler) demonstrates two neighboring well-defined, hypoechoic, fusiform epidermal and dermal structures compatible with warts. The larger wart is more laterally located

and measures 9.0 mm (transverse) \times 4.0 mm (thickness). The smaller wart measures 3.9 mm (transverse) \times 3.0 mm thickness. Notice the prominent vascularity in the dermal part of both warts. The markers in the color Doppler image show the thicknesses of the vessels in the lesion, which vary from 1.1 mm to 1.5 mm. See Video 10.2.

10.2 Mycetomas

10.2.1 Definition

Chronic granulomatous infections of the dermis and/or hypodermis. According to the cause, they can be divided into eumycetomas (fungus) and actinomycetomas (filamentous bacteria). These infections are more common in tropical regions or rural areas and frequently affect the limbs, particularly the feet [4–6].

10.2.2 Key Sonographic Signs

- Dermal and/or hypodermal hypoechoic focal zones or fistulous tracts

- Multiple and connected dermal and/or hypodermal fistulous tracts are most frequently detected in eumycetomas (Fig. 10.4), but they also can be detected in actinomycetomas (Fig. 10.5).
- Mixed-echogenicity dermal and/or hypodermal structures can be seen, which are composed of single or multiple hypoechoic dots surrounded by anechoic fluid, within round or oval pseudocystic structures that present hypoechoic borders. This appearance has been named the “dot-in-circle” sign [5, 6]. These dots also have been reported on MRI. This appearance is more commonly detected in actinomycetomas. however, it can be present in eumycetomas (Fig. 10.6).
- On color Doppler, degrees of blood flow in the periphery of the abnormalities may range from hypovascularity to hypervascularity.



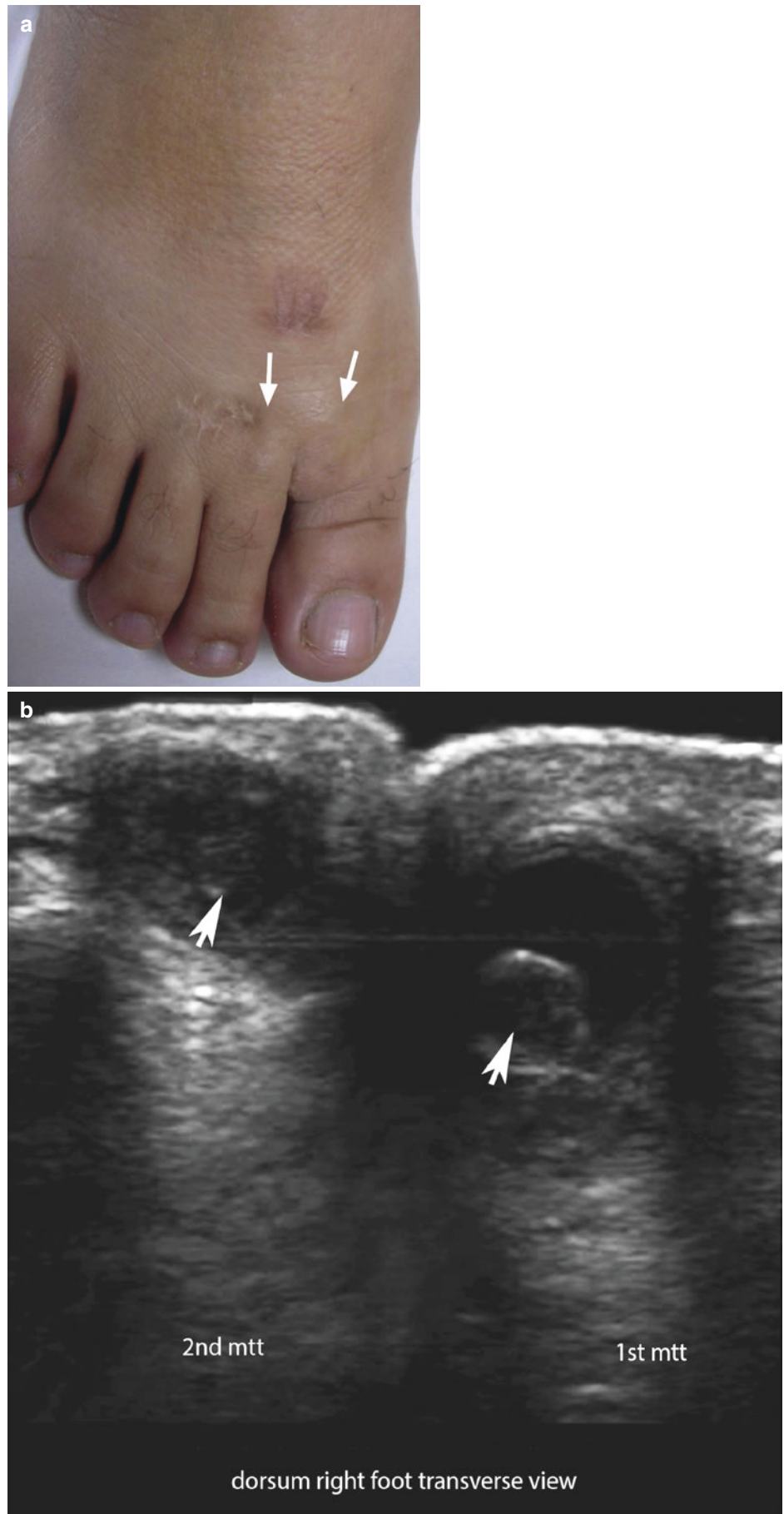
Fig. 10.4 Eumycetoma. (a) Clinical image. (b) Ultrasound (greyscale, transverse view; plantar region of the left foot) demonstrates multiple and connected hypodermal fistulous tracts (asterisks).



Fig. 10.5 Actinomycetoma. (a) Clinical photograph. (b) Ultrasound (greyscale, longitudinal view; lateral aspect of the dorsum of the right foot) shows a fistulous tract (*asterisk*) running through the dermis and

hypodermis. Slight blurring and increased echogenicity of the adjacent hypodermal tissues are also detected.

Fig. 10.6 Actinomycetoma. (a) Clinical image. (b) Ultrasound (greyscale; right foot, base of the first and second toes) demonstrates two hypoechoic dots (arrows) surrounded by anechoic fluid and within oval-shaped, hypoechoic hypodermal structures with hypoechoic borders. This appearance has been named the “dot-in-circle” sign.



10.3 Phaeohyphomycosis

10.3.1 Definition

Chronic fungal infection that may affect any corporal region but is usually found in the limbs, most commonly on the lower extremity of rural workers in tropical regions and/or immunosuppressed patients [7–10]. Some cases have been described in kidney transplant recipients [8]. It can present cutaneous verrucous to nodular plaques or swellings and is caused by multiple species of fungi that produce melanin.

10.3.2 Key Sonographic Signs

- Hypoechoic hypodermal round or oval-shaped structures that correlate with the presence of a prominent inflammatory and granulomatous reaction.
- Hypoechoic hypodermal fluid collections or tracts
- Posterior acoustic artifact may be detected because of the presence of vascularity in the periphery of lesions that contain fluid (blood) or are part of a fluid collection, or present a partially liquefied content (Fig. 10.7).
- On color Doppler, vascularity may vary according to the degree of inflammation.



Fig. 10.7 Phaeohyphomycosis. (a) Clinical photograph. (b) Ultrasound (greyscale, longitudinal view; right elbow) shows a well-defined, round, hypoechoic hypodermal structure that produces posterior acoustic reinforcement, mostly owing to partial liquefaction of the content.

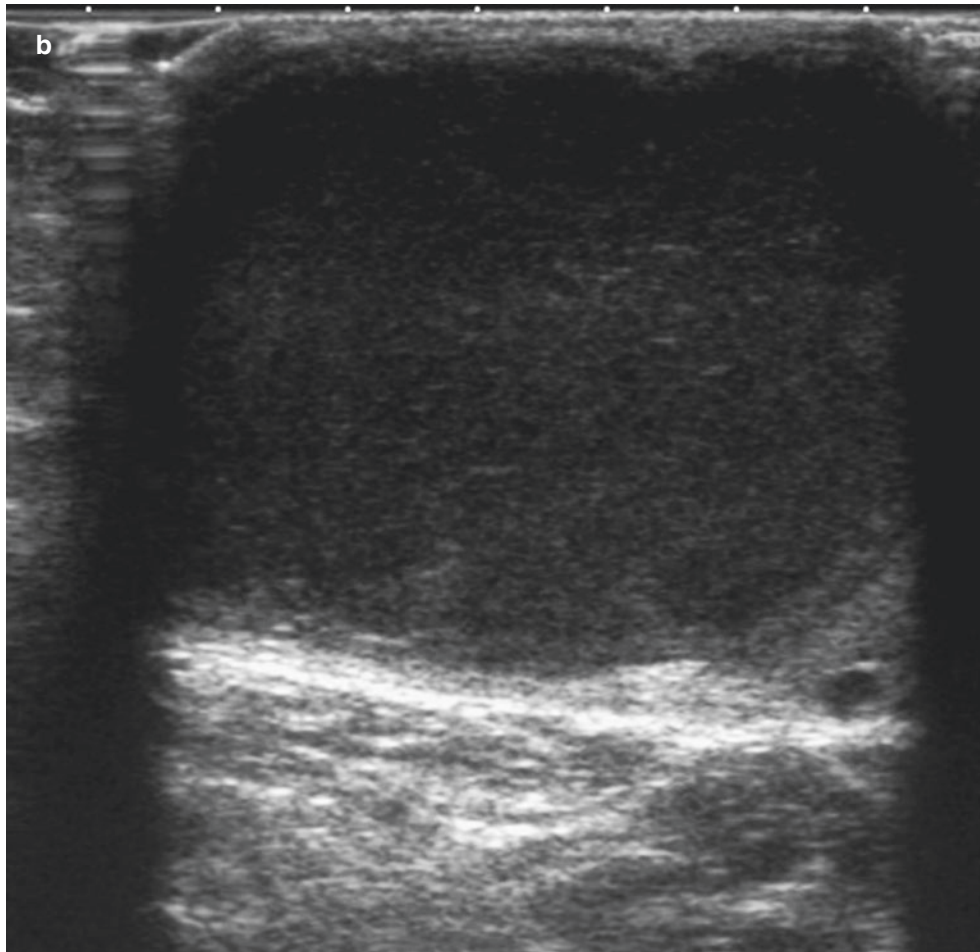


Fig. 10.7 (Continued)

10.4 Hyalohyphomycosis

10.4.1 Definition

Cutaneous infection with the fungus *Paecilomyces lilacinus* that can affect immunocompromised hosts or may be iatrogenically acquired [11, 12].

10.4.2 Key Sonographic Signs

- Hypoechoic hypodermal nodules that can form a conglomerate (Fig. 10.8)
- On color Doppler, blood flow may vary from hypovascularity to hypervascularity.

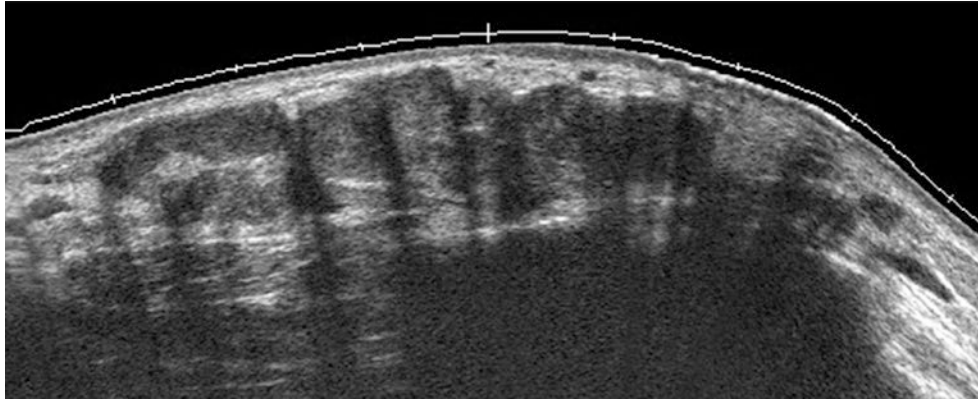


Fig. 10.8 Hyalohyphomycosis. Ultrasound (greyscale, transverse view; dorsum of the right wrist) shows conglomerate of hypoechoic hypodermal nodules.

10.5 Leishmaniasis

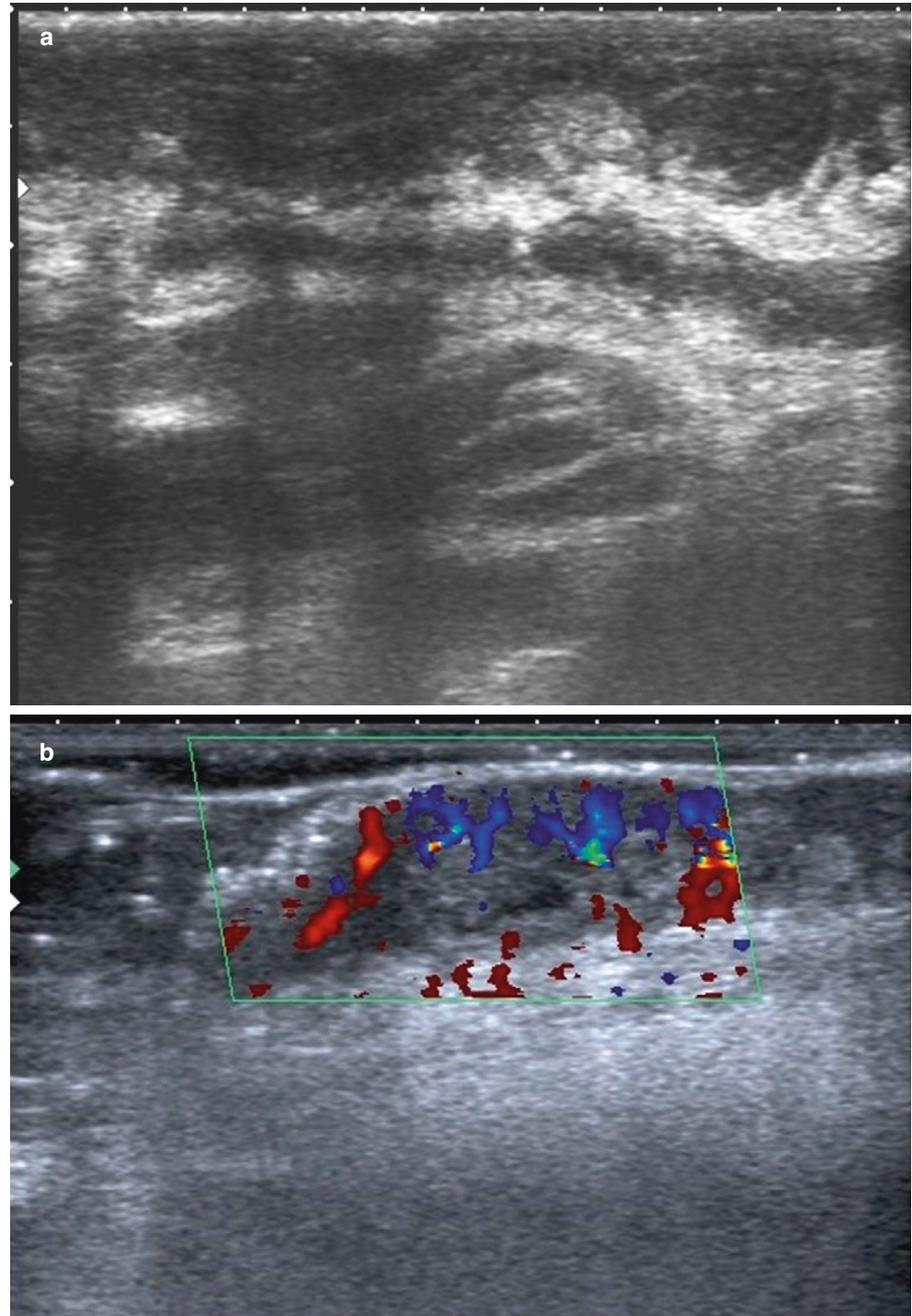
10.5.1 Definition

Chronic protozoan disease that presents three major forms: cutaneous, mucocutaneous, and visceral. This parasitic disease is caused by an intracellular protozoan that belongs to the genus *Leishmania* and is transmitted by a phlebotomine sand fly [13–17].

10.5.2 Key Sonographic Signs

- Thickening and hypoechogenicity of the dermis and hypodermis (Fig. 10.9).
- Areas of epidermal disruption may be detected
- Increased vascularity in the affected tissues

Fig. 10.9 Leishmaniasis (right side of the neck). (a) Ultrasound (greyscale, longitudinal view) shows thickening and hypoechogenicity of the dermis and hypodermis. (b) Color Doppler ultrasound (transverse view) demonstrates increased vascularity in the affected region.



10.6 Leprosy

10.6.1 Definition

Chronic granulomatous infection caused by *Mycobacterium leprae*, which affects the peripheral and cutaneous nerves. Of these, the ulnar nerve is most commonly involved.

10.6.2 Synonym

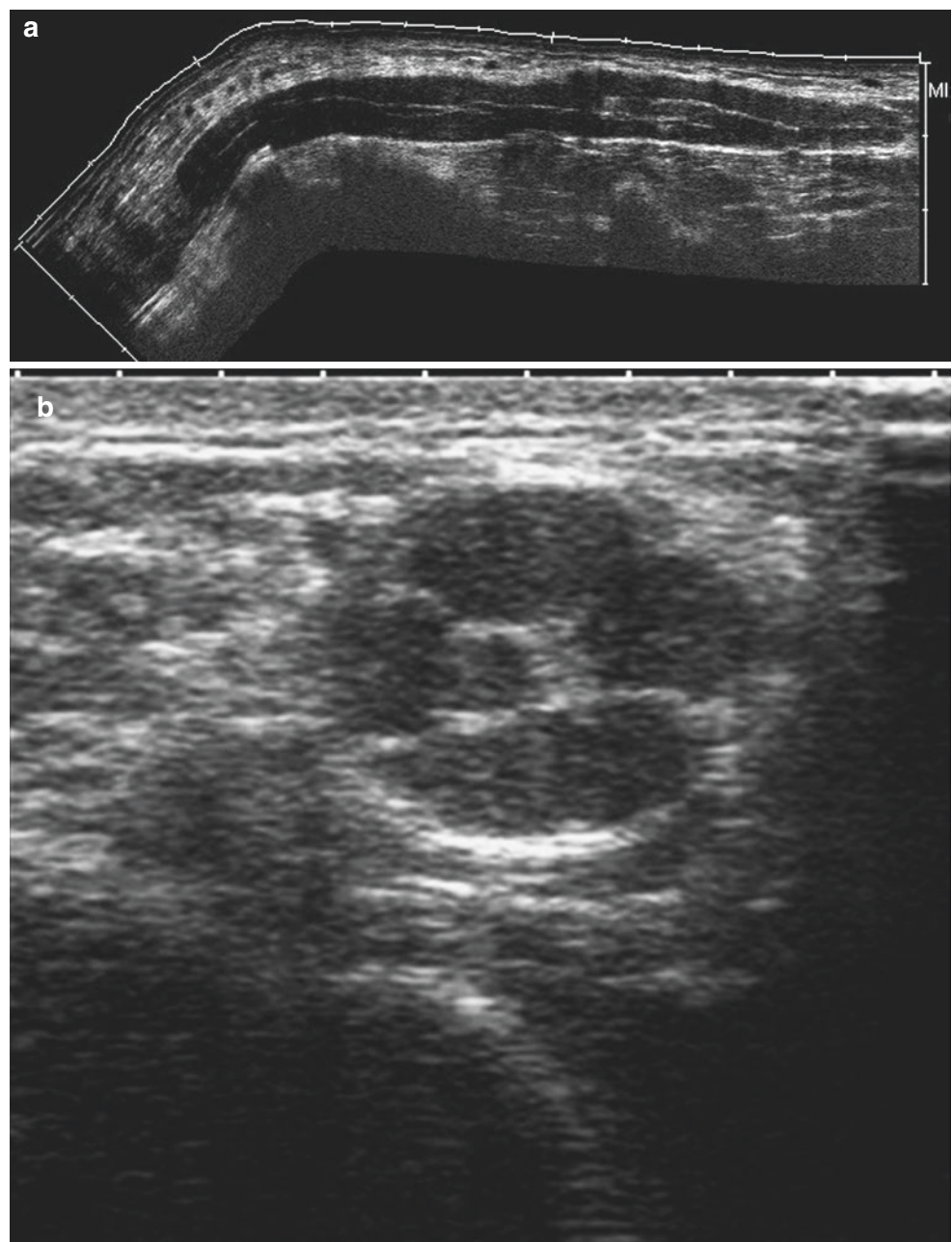
Hansen's disease.

10.6.3 Key Sonographic Signs

Common ultrasonographic signs of leprosy are (Fig. 10.10) [18–23]:

- Decreased echogenicity of the dermis and increased echogenicity of the hypodermis
- Diffuse enlargement and hypoechoogenicity of the underlying peripheral nerves. Commonly, this disease affects the ulnar nerve, with more severe thickening of this nerve above the medial epicondyle level.
- On color Doppler, vascularity may be variable and it can show hypovascularity or hypervascularity. Increased blood flow both intraneural and/or at the periphery of the neural tracts have been reported.

Fig. 10.10 Leprosy. Ultrasound of the right elbow region ((a) Panoramic longitudinal view; (b) transverse view; (c) transverse view comparative side-by-side; (d) color Doppler) shows diffuse thickening and hypoechoogenicity of the ulnar nerve. On color Doppler (d), there is increased vascularity around this nerve. Notice the increased echogenicity of the hypodermis on top of the ulnar nerve in (a).



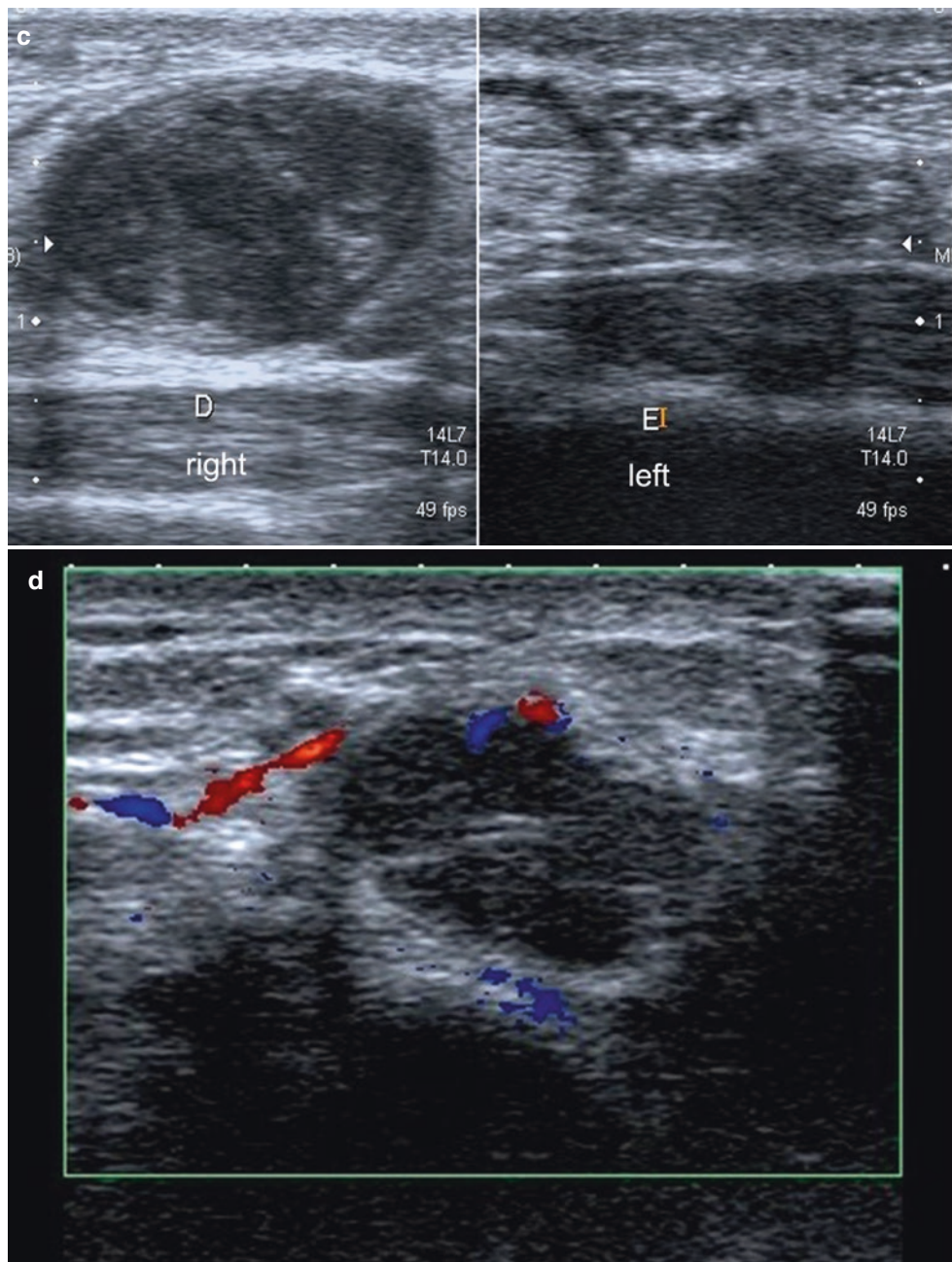


Fig. 10.10 (Continued)

10.7 Cutaneous Tuberculosis

10.7.1 Definition

Disease caused by *Mycobacterium tuberculosis*, which affects the skin by contiguous spread from underlying lymph nodes (scrofula), bones, or joints [24–26]. Clinically it can show cold abscesses, multiple ulcers, and draining sinus tracts.

10.7.2 Synonym

Scrofuloderma.

10.7.3 Key Sonographic Signs

- Hypoechoic hypodermal structure with prominent echoes and posterior acoustic reinforcement (Fig. 10.11)
- Hypoechoic dermal and hypodermal fistulous tracts that may or may not contain hyperechoic material due to the presence of caseum material
- On color Doppler, increased dermal and/or hypodermal blood flow may be detected in the periphery of the abnormalities.

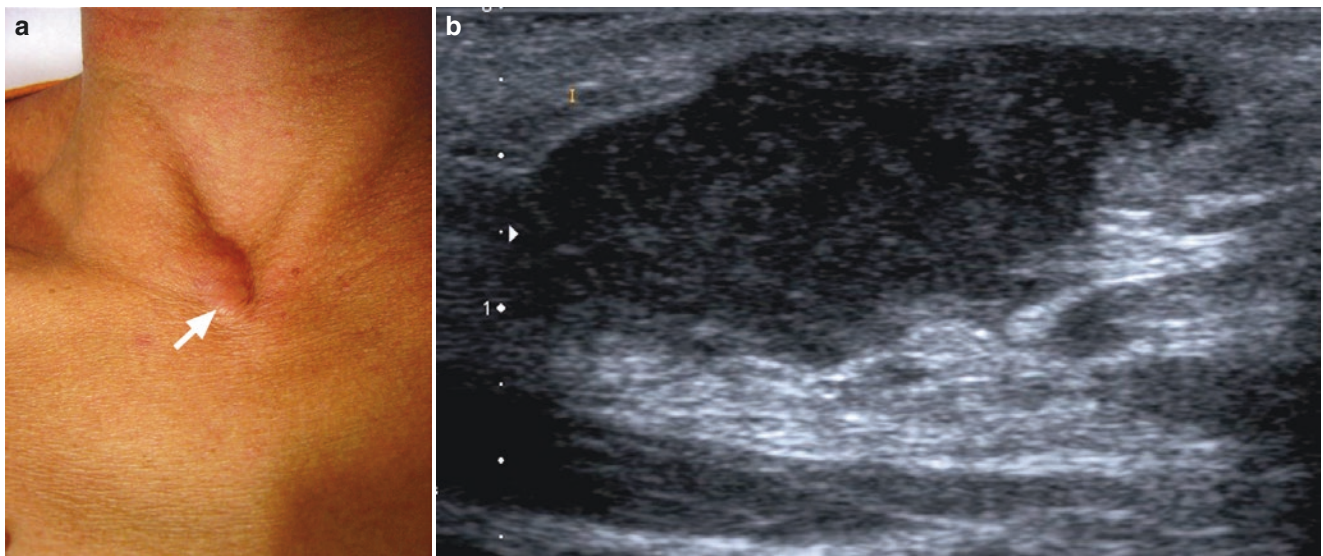


Fig. 10.11 Tuberculosis. (a) Clinical photograph of the anterior and distal part of the neck, close to the sternum notch region, showing an erythematous lump (arrow) on the right side. Ultrasound ((b) greyscale, longitudinal view; (c) greyscale, transverse view; (d) color Doppler,

transverse view) shows a hypoechoic hypodermal structure with prominent echoes and posterior acoustic reinforcement. On color Doppler (d), there is increased vascularity predominantly in the periphery, and some vessels within the structure.

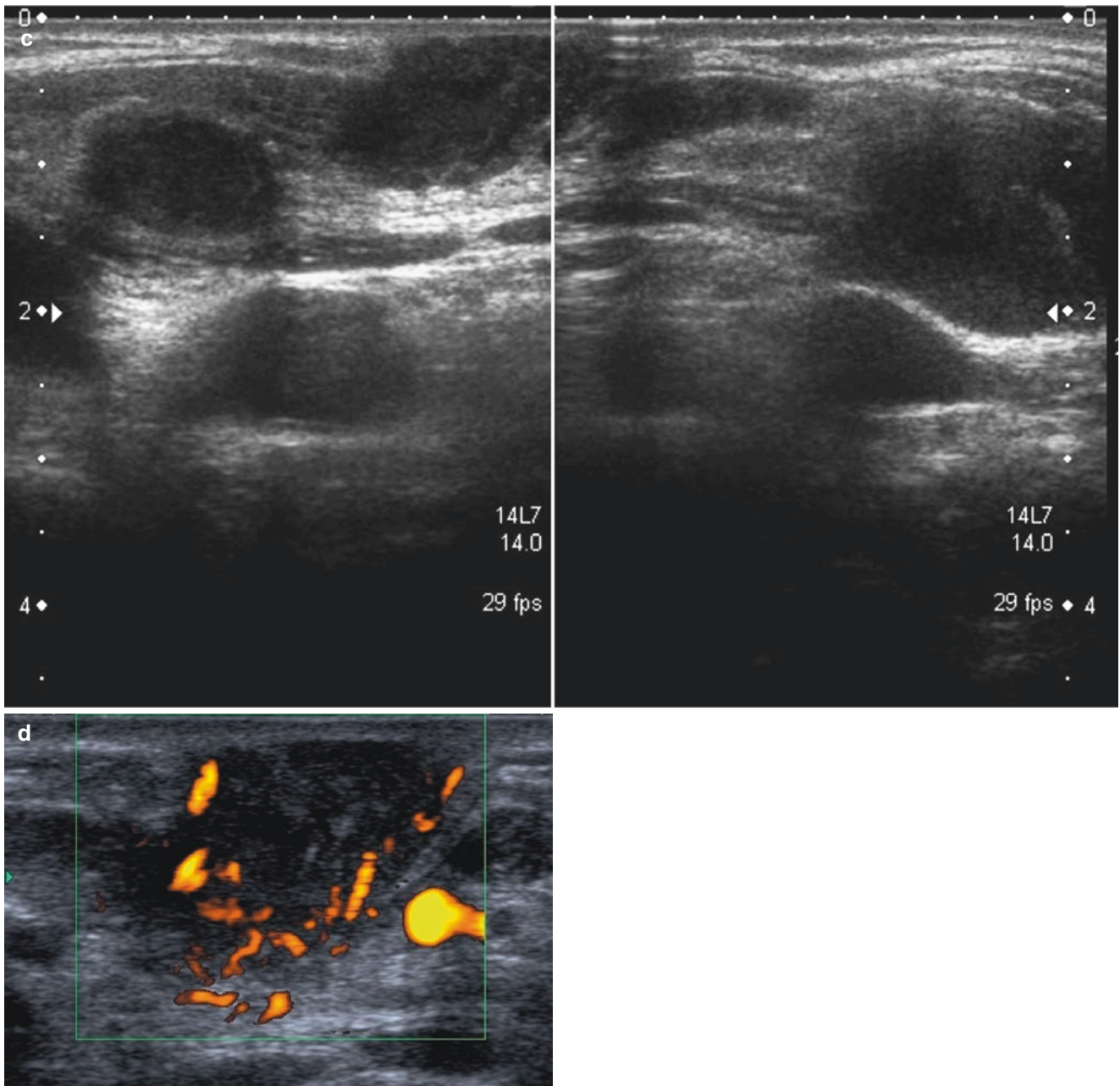


Fig. 10.11 (Continued)

10.8 Myiasis

10.8.1 Definition

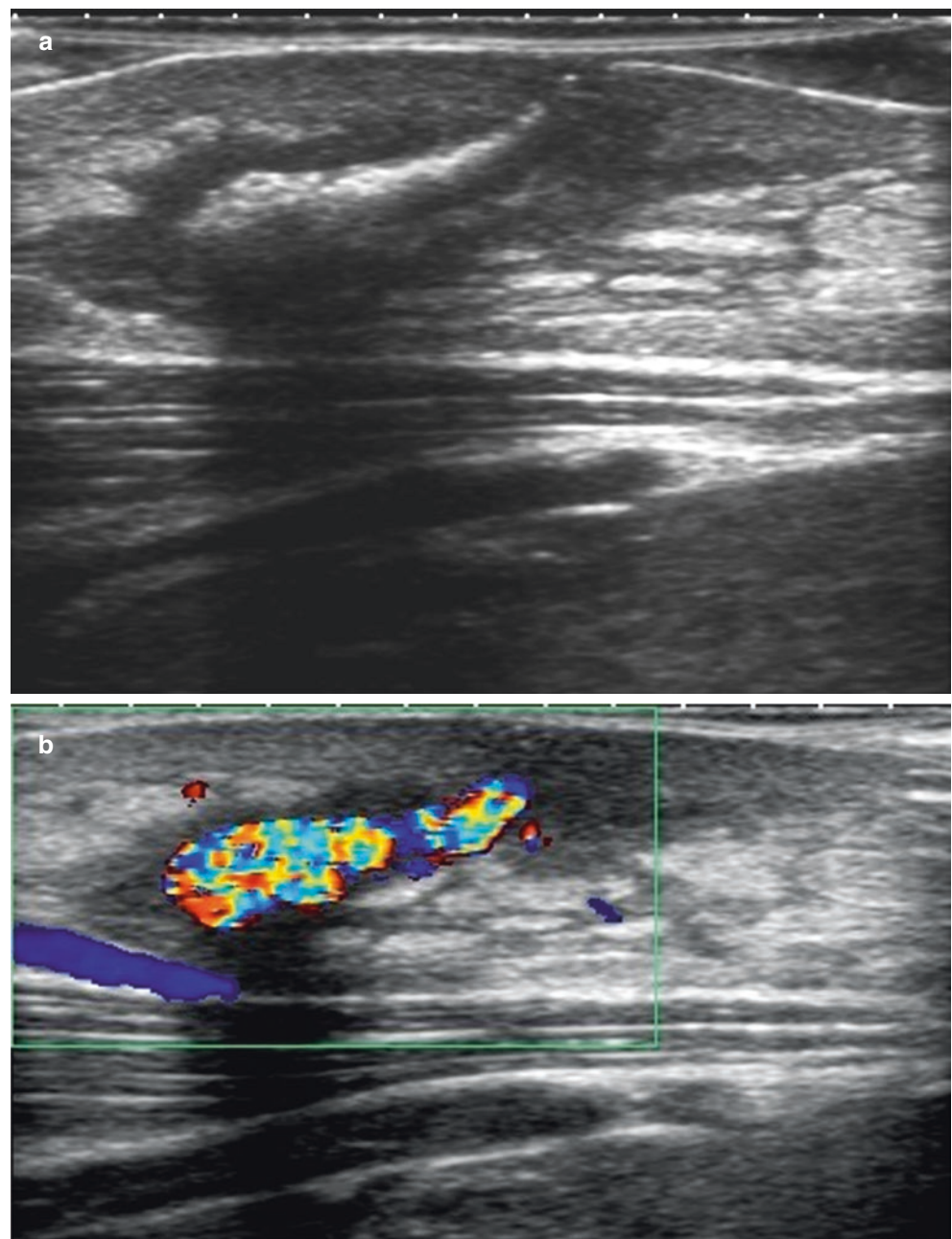
Infestation of the human skin by fly species such as the American *Dermatobia hominis* or African *Cordylobia anthropophaga*, which can use human beings as intermediate hosts for the maturation of their larvae. These larvae deposits may affect any part of the body, but the scalp, arm, and forearm have been reported as the anatomical regions most commonly affected by this parasitic infection.

Fig. 10.12 Myiasis. Ultrasound ((a) greyscale; (b) color Doppler) shows an oblique, hyperechoic hypodermal band-like structure with a slight posterior acoustic shadow that protrudes into the skin surface. Hypoechoogenicity is detected in the immediate surroundings of this structure, and hyperechogenicity with prominent fatty lobules and some anechoic fluid between the lobules is found on the periphery. Color Doppler (b) shows intense and localized noise or motion artifact within the hyperechoic linear image, owing to spontaneous movements of the larva.

10.8.2 Key Sonographic Signs

Common ultrasonographic findings in myiasis are (Figs. 10.12 and 10.13) [27–31]:

- Oval-shaped dermal and/or hypodermal structure with a hypoechoic rim and hyperechoic center
- These structures show spontaneous movement during the examination.
- On color Doppler, there is increased vascularity in the periphery, and a motion artifact can be detected within the structure with the movement of the larva.



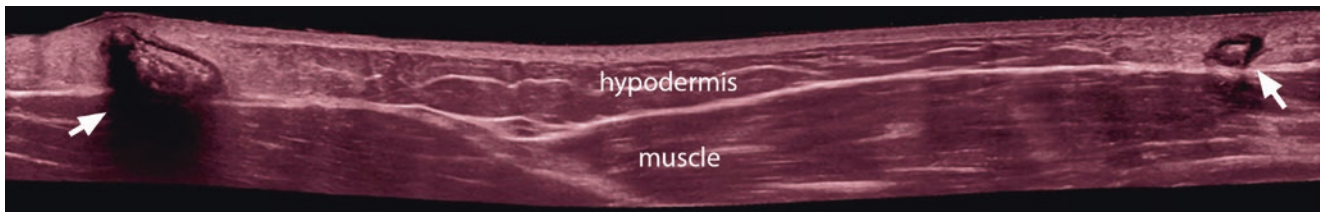


Fig. 10.13 Myiasis. Ultrasound (greyscale with a color filter, panoramic longitudinal view; right arm) shows two larval structures (arrows) with hyperechoic center and hypoechoic border. Notice the hyperechogenicity of

the hypodermis that surrounds both larvae. Dermal thickening and hypoechoic of the most superficial part of the dermis are also detected at both sites but are more prominent on top of the larger larva (left side of the image).

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