The Filarial Dance Sign in Scrotal Filarial Infection

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Learning objectives

- High-frequency, high-resolution scrotal ultrasonography is a valuable technique for diagnosing scrotal filarial infection in symptomatic patients.
- In nonendemic areas, where filariasis is often not the first differential diagnosis in a patient with scrotal pain and swelling, HRUS can facilitate a definitive diagnosis of filariasis and identification of unsuspected cases even before chronic manifestations such as lymphedema hydrocele have appeared.
- The appearance of motile filarial worms on ultrasonography correlates with active release of microfilaria into the lymphatic vessels and hence indicates active infection.
- Ultrasonography is the only diagnostic modality that can show live adult filarial worms; therefore, it is an ideal technique for following patients receiving therapy.
Background

Wuchereria bancrofti is the causative agent of the scrotal filariasis.

**Epidemiology:**

Wuchereria bancrofti is distributed widely throughout the tropics and subtropics \[1\] and is a major cause of morbidity in parts of Asia, Africa, and the western Pacific region. It is estimated that approximately 120 million people are affected worldwide; of these, 75 million are asymptomatic.

**Life Cycle:**

Adult worms are found in the lymphatic vessels and lymph nodes of humans only; there is no animal reservoir. \[2\] After copulation, the female adult worm gives birth to live microfilaria. These are released into the lymphatic vessels and ultimately find their way into the bloodstream. In most strains, they circulate in the blood in the largest numbers at night and are said to have nocturnal periodicity. Female mosquitoes of the Culex, Aedes, and Anopheles genera act as intermediate hosts. The mosquitoes ingest the microfilaria during a blood meal. The microfilaria then passes into the midgut of the mosquito and invade the intestinal wall, and within 24 hours, most find their way to the thoracic muscles, where they metamorphose into larvae within 1 to 3 weeks. The larvae migrate to the tip of the proboscis sheath and penetrate into the skin of the human host during the next blood meal. The larvae localize in the lymphatic vessels of the human host and develop into adult worms. Incubation periods are usually 6 months to 1 year, and adult worms can live for 15 years or more. \[3\]

**Clinical Features:**

Many patients are asymptomatic with microfilaremia. Clinical manifestations are either acute or chronic. The cardinal manifestation is acute lymphangitis, usually with associated lymphadenitis. Patients may have fever, headache, backache, and nausea. Acute funiculitis, epididymitis, or orchitis may also be seen. Microfilaria is difficult to show during the acute phase. Chronic manifestations include lymphadenopathy, hydrocele, chyluria, lymphedema and elephantiasis.
**Diagnosis:**

- Demonstration of microfilaria in blood smears and occasionally in hydrocele fluid or chylous urine.
- Serologic tests may be of some value, but these cannot differentiate between the various forms of filariasis or between past and present infections.
- Standard techniques for visualizing the lymphatic system (lymphangiography and lymphoscintigraphy) are cumbersome and, moreover, do not directly identify or localize the parasites.
- Ultrasonography, by localizing the adult worms, permits assessment of the response to therapy.
Findings and procedure details

Ultrasound scanning technique:

The patient is scanned in the supine position with support the scrotum. The penis is positioned over the patient's suprapubic region. The initial scanning is performed with a high-frequency (5- to 12-MHz) linear array transducer. Serial transverse and sagittal images of each testis and epididymis are obtained in addition to at least 1 image showing both testicles for direct comparison of testicular echogenicity, echo texture, and, in addition, scrotal thickness. Pulsed Doppler ultrasonography is used to assess and document blood flow in the epididymis and testis.

Ultrasound Imaging Features:

Tubular anechoic channels are seen adjacent to the testes and epididymides. These channels did not show flow on colour flow imaging and were presumed to be lymphatic vessels. Within some segments of these channels, echogenic linear structures with a persistent random twirling motion observed. (Filarial Dance Sign) On pulsed Doppler imaging, a peculiar rhythmic pattern of movement was shown. Unilateral or bilateral affection with associated hydrocele may be present some times. (Figure :1, 2)

USG guided aspiration:

- Under ultrasonographic guidance with 24-gauge needles.
- The needles were placed in the anechoic scrotal channels (presumed to be lymphatic vessels), which had positive findings for the Filarial Dance Sign.
- Clear fluid was aspirated from the anechoic channels.
- The aspirates were subjected to light microscopy. (Figure :3)

Treatment:

Patients received oral DEC in the dose of 6 mg/kg of body weight per day for 3 weeks.

Outcome and follow-up:

Follow-up ultrasonographic examinations conducted after therapy to monitor worm movements and to see dead worm calcifications. (Figure :4)
**Fig. 1:** Dilated scrotal lymphatic vessels appearing as anechoic tubular channels containing echogenic linear undulating structures, which represent the adult filarial worms. These structures have the peculiar movements' characteristic of the Filarial Dance Sign on real-time ultrasonography.

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Fig. 2: Ultrasound image shows normal right testis (open white arrow) with microfilaria in dilated lymphatic on its medial aspect. (green arrow)

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**Fig. 3:** Wet mount preparation of the aspirated scrotal fluid shows microfilaria.

Fig. 4: Dead worm shown as an echogenic tubular structure without movement on real-time ultrasonography. (open white arrow)

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Conclusion

High-resolution ultrasonography is a useful technique for diagnosing scrotal filariasis in symptomatic patients and is very useful in the follow-up period for assessing the response of worms to treatment.
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