



## Filariasis diagnosed by real-time ultrasound scanning as filarial dance sign – A case report

Shekhar Gurung<sup>a</sup>, Saurab Karki<sup>b,\*</sup>, Krishna Kharal<sup>c</sup>, Sudeep Thapa<sup>d</sup>, Suresh Thapa<sup>d</sup>, Surakshya Baral<sup>e</sup>

<sup>a</sup> Shivanagar Primary Health Care Center, Chitwan, Nepal

<sup>b</sup> Military Hospital Itahari, Sunsari, Nepal

<sup>c</sup> Motipur Primary Health Care Center, Rupandehi, Nepal

<sup>d</sup> Lumbini Provincial Hospital, Butwal, Nepal

<sup>e</sup> Manipal College of Medical Sciences, Pokhara, Nepal

### ARTICLE INFO

#### Keywords:

Real-time ultrasound scanning  
Lymphatic filariasis  
Filarial dance sign

### ABSTRACT

**Introduction:** Lymphatic filariasis (LF) is a vector-borne illness caused due to *Wuchereria bancrofti*. Genital abnormalities may result from chronic inflammation of the lymphatic vessels and obstruction of the afferent vessels in Bancroftian filariasis. Doxycycline, albendazole, diethylcarbamazine, and ivermectin are among the treatments available.

**Case:** A 16-year male presented to our OPD with a complaint of left inguinal swelling for the past 6 Months. Examination of the swelling revealed a left-sided inguinal swelling of 5 × 4 cm with intact overlying skin. A provisional diagnosis of inguinal lymph varix was made, and real-time ultrasound scanning along with FNAC was performed. Swelling resolved after conservative management.

**Discussion:** Ultrasonography can easily observe adult worms due to their size and fast movements. Using pulsed-wave doppler mode, the characteristic movement profile of adult worms in pulsed-wave doppler mode can be distinguished from other movements (e.g., blood in venous vessels).

**Conclusion:** Ultrasound is the imaging modality of choice to detect filarial worms/microfilaria in the lymphatic system, which produces the classic twirling of microfilaria in the lymphatic system, known as the "filarial dance sign".

### Introduction

*Wuchereria bancrofti* causes lymphatic filariasis in tropical regions where mosquito vectors vary geographically, including *Culex*, *Anopheles*, *Aedes*, *Mansonia*, and *Coquillettidia* [1]. A human is a definitive host where the sexual stages develop. Travelers usually have insufficient exposure to filariasis to develop sufficiently high worm burdens, so the prevalence increases with age [2]. There is often an eosinophilic infiltrate with lymphangitis and lymphadenopathy, urticaria, and peripheral eosinophilia associated with local hypersensitivity. The pathophysiologically important sequelae include lymphangitis, lymphedema, fibrosis, sclerosis, and scarring [3].

The presence of blood eosinophilia is typical, sometimes exceeding 3/nL, and it serves as a screening test in patients with typical symptoms [4]. The best method of diagnosing LF is to detect circulating filarial

antigen (CFA) of *Wuchereria bancrofti*-DNA in the blood, circulating microfilariae, or adult worms in the lymphatics [5]. A general imaging examination or ultrasound can reveal the parasites' complications [5]. By using ultrasound, it is possible to detect moving adult worms in lymphatic vessels ("filarial dance sign") and to monitor the effectiveness of treatment [6]. The "filarial dance sign" has been observed in various organs, including the limbs, scrotum, breast and axillary lymphatics, and cords [7].

Asymptomatic patients should also be treated early to prevent lymphatic disease. Treatment success is less evident in patients with advanced disease with scars and fibrotic tissue. Typically, diethylcarbamazine (DEC, 6–10 mg/kg for up to 2 weeks) is the primary treatment [8]. Surgical drainage of the hydroceles can give immediate relief from symptoms, but recurrence is high without chemotherapy [9].

Herein, we report a case of a 16-year male who had presented with

\* Correspondence to: Military Hospital Itahari, Sunsari, Nepal.

E-mail address: [saurabkarki1010@gmail.com](mailto:saurabkarki1010@gmail.com) (S. Karki).

<https://doi.org/10.1016/j.idcr.2022.e01621>

Received 30 August 2022; Received in revised form 12 September 2022; Accepted 24 September 2022

Available online 29 September 2022

2214-2509/© 2022 The Authors. Published by Elsevier Ltd. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

left inguinal swelling for 6 months where real-time ultrasound scanning along with FNAC was performed revealing filariasis and the swelling resolved following conservative management. The study also highlights the different diagnostic modalities to identify this condition.

### Case report

A previously healthy 16-year male Presented to our outpatient department with a complaint of left inguinal swelling for the past 6 months. The swelling was Insidious and was first noticed while he was changing his clothes. However, he didn't feel pain, fever, and heaviness over the left side. Medical history and surgical history were not significant. He denies any history of trauma over the site. Previous illness indicating acute adenolymphangitis was not present. His genital exam revealed neither hydrocele nor varicocele, nor did he have lymphedema in his lower extremities.

General Examination revealed a moderately built, healthy young man with no signs of pallor, icterus, lymphadenopathy, edema, clubbing, dehydration, and cyanosis. His vitals were stable. Examination of the swelling revealed a left-sided inguinal node of 5 × 4 cm with intact overlying skin. The swelling was fluctuant, non-tender, and non-transilluminating. It didn't show any change in its shape and size on standing, lying down, or coughing. A provisional diagnosis of inguinal lymph varix was made.

Results of all baseline investigations, including complete blood counts and peripheral blood smear reports, were normal. However, a real-time ultrasound scanning of swelling revealed moving internal linear echoes interpreted as a dancing sign (Video and Fig. 1).

Ultrasound-guided Fine Needle Aspiration Cytology (FNAC) of swelling was undertaken, and a specimen was sent for further evaluation. Wet mount examination revealed twirling microfilaria confirming the diagnosis (Fig. 2). No abnormality was seen on the right side of the scrotum; therefore, He was started on Diethylcarbamazine 200 mg per day for three weeks. On the follow-up visit, the swelling was reduced in size and couldn't be appreciated on clinical examination.

### Discussion

Lymphatic filariasis is a vector-borne old devastating neglected tropical disease caused by three species of parasitic worms *W. bancrofti* (Bancroftian filariasis), *B. malayi*, and *B. timori* [10]. A variety of mosquito species transmit endemic parasites in the tropics of Africa, Asia, the Pacific Islands, and Latin America [3]. Worldwide, 120 million people are infected, with many suffering chronic disabling conditions such as elephantiasis, lymphedema, and hydrocele [11]. As a result of nests of adult worms in afferent lymphatic vessels, Bancroftian filariasis

is associated with genital abnormalities, which are thought to be the result of chronic inflammation and obstruction of the lymphatic system [12]. There are many genital complications associated with microfilaremia, although one study showed that half of the asymptomatic patients had radiographic abnormalities on scrotal ultrasound, even when they were asymptomatic. In our case, the patient complained of swelling over the groin region, but he didn't feel pain, fever, or heaviness [13].

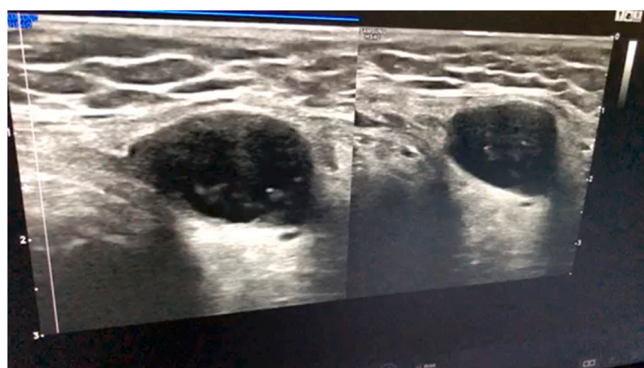
Individuals with relevant epidemiologic exposure should be suspected of lymphatic filariasis if they present with typical acute manifestations (fever, acute adenolymphangitis, acute dermatolymphangioadenitis, eosinophilia) or chronic manifestations (lymphedema, chyluria, hydrocele). Local symptoms (pitting lymphedema, hydrocele) are prominent signs of chronic infection within the skin and the surrounding tissues, especially the lower extremities [3]. If the lymphatic vessels are damaged, lymphedema may progress even without filarial infection, which may partly be explained by bacterial superinfection (e.g., interdigital microtrauma) [12]. A progressive non-pitting lymphedema with swelling of the limbs is characterized by hyperpigmentation and hyperkeratosis of the lymphatic vessels, and sometimes elephantiasis of the lower limbs [14]. The breast can be involved in females [15]. In our case, the patient has swelling on a left-sided inguinal node of 5 × 4 cm with intact overlying skin. The swelling was fluctuant, non-tender, and non-transilluminating. But his genital exam revealed neither hydrocele nor varicocele, nor did he have lymphedema in his lower extremities.

A definitive diagnosis of lymphatic filariasis can be established by detecting circulating filarial antigen (for *W. bancrofti* infection only), demonstration of microfilariae or filarial DNA in the blood, or adult worms in the lymphatics [16]. To diagnose filariasis, a high level of suspicion must be maintained, especially in the absence of eosinophilia and the absence of parasites in peripheral smear [17]. The lack of microfilariae in peripheral smear does not exclude filarial infection. Rarely microfilariae or adult worms are identified incidentally in tissue biopsies or cytological specimens. Eosinophilia is a common finding in peripheral blood smears which can surpass 3000/μL [18]. The frequency of eosinophilia due to filariasis is challenging to determine since other helminth infections frequently coexist among individuals in endemic areas [16]. In our case, the results of all baseline investigations, including complete blood counts and peripheral blood smear reports, were normal, but a real-time ultrasound scanning of swelling revealed moving internal linear echoes are Interpreted as a dancing sign.

USG-guided FNAC from cystic spaces can help in collecting an adequate specimen [19]. On wet mount microscopy, twirling motile microfilariae can be demonstrated [20]. However, microfilariae's motility may get hampered due to ambient temperature variability. USG-guided FNAC is a rapid, simple yet highly sensitive, and effective diagnostic technique [19]. However, a disadvantage is this is an invasive way of diagnosis. In this case, there was no evidence of lymphoedema of the lower limbs (except the swelling of the scrotum) or regional lymphadenopathy. Eosinophilia is a frequent association of parasitemia, which was absent. A peripheral smear to reveal parasitemia was collected at night time when the parasite load tends to be high, however, did not reveal microfilaria. The patient was successfully managed with diethylcarbamazine 200 mg Per day for three weeks.

### Conclusion

Hence, high-frequency along with high-resolution scrotal ultrasonography is an important tool to diagnose filarial infection of the scrotum. The appearance of motile filarial worms on ultrasonography correlates with the active release of microfilariae into the lymphatic vessels, indicating active infection. This is the only diagnostic modality that can show live filarial worms.



**Video 1.** Real-time sonography showing dancing filaria. A video clip is available online. Supplementary material related to this article can be found online at [doi:10.1016/j.idcr.2022.e01621](https://doi.org/10.1016/j.idcr.2022.e01621).

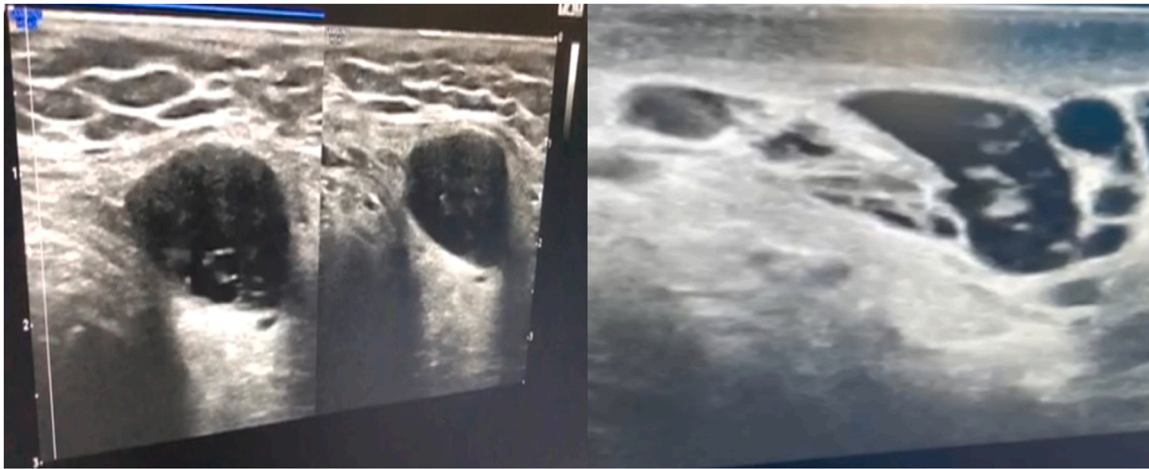


Fig. 1. Fig 2-Sonographic picture of Filaria.



Fig. 2. Microfilaria in a wet mount.

#### CRediT authorship contribution statement

**Author 1:** Led data collection, the concept of the study, and literature review. **Author 2:** Literature review, revised and edited the rough draft into the final manuscript. **Author 3:** Led data collection and literature review. **Author 4:** Literature review, revising, and editing the manuscript. **Author 5:** Literature review, revising, and editing the manuscript. **Author 6:** Literature review and writing the initial manuscript draft. All authors were involved in manuscript drafting and revising, and approved the final version.

#### Sources of funding

None.

#### Ethical approval

N/A.

#### Consent

Written informed consent was obtained from the patient for the publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

#### Conflicts of interest

None.

#### Acknowledgment

None.

#### References

- [1] Manguin S, Bangs MJ, Pothikasikorn J, Chareonviriyaphap T. Review on global transmission of human Plasmodium species and Wuchereria bancrofti by Anopheles mosquitoes. *Infect Genet Evol* 2010;10(2):159–77.
- [2] Evans DB, Gelband H, Vlassoff C. Social and economic factors and the control of lymphatic filariasis: a review. *Acta Trop* 1993;53(1):1–26.
- [3] Dietrich CF, Chaubal N, Hoerauf A, Kling K, Piontek MS, Steffgen L, et al. Review of dancing parasites in lymphatic filariasis. *Ultrasound Int Open* 2019;05(2):E65–74.
- [4] Dreyer G, Dreyer P, Piessens WF. Extralymphatic disease due to bancroftian filariasis. *Braz J Med Biol Res* 1999;32:1467–72.
- [5] Weil GJ, Ramzy RMR. Diagnostic tools for filariasis elimination programs. *Trends Parasitol* 2007;23(2):78–82.
- [6] Chaubal NG, Pradhan GM, Chaubal JN, Ramani SK. Dance of live adult filarial worms is a reliable sign of scrotal filarial infection. *J Ultrasound Med* 2003;22(8):765–9.
- [7] Mand S, Debrah A, Batsa L, Adjei O, Hoerauf A. Reliable and frequent detection of adult Wuchereria bancrofti in Ghanaian women by ultrasonography. *Trop Med Int Health* 2004;9(10):1111–4.
- [8] Moulia-Pelat JP, Nguyen LN, Glaziou P, Chanteau S, Gay VM, Martin PM, et al. Safety trial of single-dose treatments with a combination of ivermectin and diethylcarbamazine in bancroftian filariasis. *Trop Med Parasitol* 1993;44(2):79–82.
- [9] Norões J, Dreyer G. A mechanism for chronic filarial hydrocele with implications for its surgical repair. *PLoS Negl Trop Dis* 2010;4(6):e695.
- [10] Maizels R, Burke J, Sutanto I, Purnomo, Partono F. Secreted and surface antigens from larval stages of Wuchereria bancrofti, the major human lymphatic filarial parasite. *Mol Biochem Parasitol* 1986;19(1):27–34.
- [11] Streit T, Lafontant JG. Eliminating lymphatic filariasis. *Ann N Y Acad Sci* 2008;1136(1):53–63.
- [12] Rajasekaran S, Anuradha R, Manokaran G, Bethunaickan R. An overview of lymphatic filariasis lymphedema. *Lymphology* 2017;50(4):164–82.
- [13] Wiggers JB, Jang HJ, Keystone JS. Case report: filaria or megasperm? A cause of an ultrasonographic “filarial dance sign”. *Am J Trop Med Hyg* 2018;99(1):102–3.
- [14] Radhakrishnan K, Rockson SG. The clinical spectrum of lymphatic disease. *Ann N Y Acad Sci* 2008;1131(1):155–84.
- [15] Bandyopadhyay L. Lymphatic filariasis and the women of India. *Soc Sci Med* 1996;42(10):1401–10.
- [16] Rocha A, Braga C, Belém M, Carrera A, Aguiar-Santos A, Oliveira P, et al. Comparison of tests for the detection of circulating filarial antigen (Og4C3-ELISA and AD12-ICT) and ultrasound in diagnosis of lymphatic filariasis in individuals with microfilariae. *Mem Inst Oswaldo Cruz* 2009;104:621–5.
- [17] Ottesen EA, Duke BO, Karam M, Behbehani K. Strategies and tools for the control/elimination of lymphatic filariasis. *Bull World Health Organ* 1997;75(6):491–503.
- [18] Owusu-Agyei AK, Nabarro L. Helminth infections and differentials of eosinophilia. *Medicine* 2021;49(12):766–9.
- [19] Shrestha S, Shrestha R, Gokhale S. Filariasis diagnosed by real time sonographic imaging as filarial dance sign: a case report. *Nepal Med Coll J* 2019;21(2):160–3.
- [20] Dhawan AK, Bisherwal K, Grover C, Sharma S. An asymptomatic inguinal swelling: lymphatic filariasis. *Indian J Dermatol Venereol Leprol* 2016;82:446.