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Original Research Article

Role of Cytology in the Diagnosis of Atypically Presenting Filariasis: Evaluation of a Tertiary Care Hospital Experience

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Abstract

Background: Filariasis is a global health problem. Lymphatic filariasis is India's second most common vector-borne disease and a major contributor to chronic deformities like elephantiasis. The disease is widespread in India, and highly endemic zones are present in several states, particularly Chhattisgarh, Uttar Pradesh, Bihar, Orissa, Jharkhand and Andhra Pradesh. Filariasis can rarely present as asymptomatic swellings in various unusual sites in the body and very uncommonly as a sole finding in effusion cytology. Therefore, cytology plays a crucial role in the incidental diagnosis of filariasis in clinically unsuspected cases. This study aims to analyze cytology's role in diagnosing filariasis, especially in clinically unsuspected cases, and to study the cytological findings associated with filariasis in these cases.

Materials and Methods: This study was conducted in Chhattisgarh Institute of Medical Sciences, Bilaspur. The records from the department of cytology Chhattisgarh Institute of Medical Sciences were searched from January 2022 to Dec 2025. We collected the cases for this study from our routine cytology cases (FNAC/Body fluids) over four years. Two pathologists then evaluated all the diagnosed cases of filariasis in cytology. Descriptive statistical analysis was done wherever required. In four-year study period we found eight cases of filariasis in routine cytology smears (FNAC/Body fluids).

Results: Out of these eight cases, one case each from breast and thyroid swelling, three cases were diagnosed in cytology smears from subcutaneous swellings, one from axillary lymph node and two cases were diagnosed in fluid cytology. All these cases had incidental findings of microfilariasis varying from one-to-many parasites per slide on cytological examination. In none of these cases, filariasis was suspected by the clinicians.

Conclusion: Cytology plays a crucial role in diagnosing filariasis in endemic areas, especially in those with atypical presentations. Therefore, meticulous screening of all cytology smears is strongly indicated.

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Introduction

Filariasis is a neglected tropical disease. The history of disease in India dates back to 6th century B.C when it was mentioned in Susruta Samhita' by the famous Indian physician Susruta [1].]. The disease is widespread in India, and highly endemic zones are present in several states mainly Chhattisgarh, Uttar Pradesh, Bihar, Orissa, Jharkhand Andhra Pradesh [2]. India accounts for nearly 40% of the global burden of lymphatic filariasis, making accurate and early diagnosis essential for elimination efforts [3]. It remains a significant public health problem, particularly in endemic states such as Chhattisgarh Multiple districts in Chhattisgarh are endemic for lymphatic filariasis with Bilaspur, Raipur , Durg, Dhamtari, Mahasamund, Janjgir Champa and Jashpur are in common[4]. Thousands of cases of lymphadema and hydrocele across these endemic districts detected. In Chhattisgarh, studies have confirmed endemicity in Arang township of Raipur district, where W. bancrofti is the predominant parasite [5]. In Bilapur district where our institution is located in night blood surveys detected microfilaria rates about 1.8 % and endemicity shown in Ratanpur area [6]. Lymphatic filariasis is the second most common vector-borne disease in India, and transmission dynamics are complex for this disease, involving two genera of parasites (Wuchereria & Brugia) and four main genera of mosquitos (Anopheles, Culex, Aedes, Mansonia)

[7]. Wuchereria bancrofti alone is responsible for 99.4% of the total disease burden in India. However, the transmission of lymphatic filariasis is inefficient, and many bites from infectious mosquitoes are required to initiate new infection with microfilaremia.

Therefore, in general, the greater the number of infectious hosts available in a community with moderate to the high density of microfilaremia and the higher the biting rate by mosquito vectors, the higher the chances of transmission [8]. Therefore, to control filarial transmission in a community, the intensity of microfilariae or vector density should be brought below a threshold to stop any new infection. Government of India data show that clinically documented LF cases in Chhattisgarh numbered 13,921 in 2014–2015 and 15,429 in 2016–2017.[9] The clinical spectrum of lymphatic filariasis ranges from asymptomatic filariasis to acute and chronic manifestations such as lymphangitis, lymphadenitis, filarial fever, hydrocele and chyluria to severe deformities, like elephantiasis [10]. The conventional method of diagnosis in suspected filariasis cases is a demonstration of microfilaria in the peripheral blood smears [11].

However, filariasis can rarely present as asymptomatic swellings involving various unusual sites in the body and very uncommonly as a sole finding in effusion cytology. Cytology plays a crucial role in the incidental diagnosis of these clinically unsuspected cases [12]. Many of the previous literatures on incidental diagnosis of microfilariae in cytology smear different locations, including subcutaneous tissue, breast, thyroid, lymph nodes, salivary glands, epididymis, cervicovaginal smear, and effusion fluids have been reported [9,10,11,12,13]. Cytology can incidentally detect microfilariae, adult worms, or eggs in aspirates from lymph nodes, soft tissue swellings, breast lumps, or even thyroid lesions. Similarly, national case series have demonstrated that cytology can uncover filarial parasites in atypical sites where conventional methods fail [13]. This study aims to assess the role of cytology in diagnosis of filariasis, especially in clinically unsuspected cases, and to study the cytological findings associated with filariasis in these cases.

Materials and Method

The present retrospective study was conducted in Chhattisgarh Institute of Medical Sciences, Bilaspur. We collected the cases for this study from our routine cytology cases (FNAC/Fluid cytology) for over four years, from January 2022 to December 2025. This study included all the diagnosed cases of filariasis in cytology smears (FNAC/Fluid). Those cases where morphological details are severely compromised are excluded from the study. Two pathologists evaluated these reported filariasis cases for the presence of microfilaria, adult worms, eggs and embryoid bodies. The presence or absence of sheath and arrangement of nuclei at the tail end are the main features used for species identification.

Any other associated pathology and inflammatory response were recorded separately. Clinical records were analysed in all cytologically diagnosed cases of filariasis. FNAC was done using a 23 G needle attached with a 10/20 cc syringe. Air-dried smears were stained with May-Grunwald-Giemsa and alcohol fixed smears were stained with Papanicolaou stain and Haematoxylin & Eosin stain. The fluid body specimens were centrifuged & smears were prepared from centrifuged deposits. Descriptive statistical analysis was done using SPSS software and an Excel worksheet.

Results

We diagnosed eight filariasis cases in cytology smears (FNAC/Body fluid) from various body sites during our four year study period. Out of these eight cases, one case each from breast, thyroid and axillary lymph node swellings, three cases from subcutaneous swellings and two cases were diagnosed in fluid cytology.

All these cases had incidental findings of microfilariasis varying from one to many parasites per slide on cytological examination. In none of these cases, filariasis was suspected by the clinicians. Most of these patients had presented with complaints of asymptomatic swellings with associated or not associated with pain.

One case of filariasis in effusion cytology had presented with cough, breathlessness and right-sided chest pain and gross pleural effusion, and another case had presented with abdominal pain and distension with associated fever in both these cases. The duration of symptoms in these cases varied from days to a few years.

The age range of patients included in this study varied from 20-60 years. In all these cases, the morphology of the parasite was consistent with Wuchereria bancrofti, showing coiled to uncoiled sheathed microfilariae with smooth curves and clear space at the cephalic and caudal end (Fig).

The central axis of the parasite contained nuclei resembling coarse granules, which were absent at the tip of the tail. Dead and fragmented microfilariae were also seen. One of the case also show adult filarial worms in cytology smears. Peripheral blood examination had demonstrated microfilaria in one case. The details of each case are shown in (Table.1)

Table 1: Case details of atypically presenting filariasis in the study

Case no	Age	Sex	Site	Clinical presenation	Duration	Clinical diagnosis	Filarial morphology	Associated cells	Background
1	20	M	Ascitic Fluid	Abdominal Distention		Ascitis under evaluation	Microfilaria	Reactive mesothelial cells	Hemorrhagic
2	60	M	Pleural fluid	Gross pleural effusion		COPD	Microfilaria	Reactive mesothelial cells	Hemorrhagic
3	37	M	Swelling over left cheek	Sweling over left cheek and behind left ear	3 days	Lipoma/Lymphatic malformation	Degenerated worms	Lymohocytes, eosionophils, neutrophils	Hemorrhagic
4	55	M	left neck swelling	Pain in jaw	6-7 years	AFI under evaluation	Degenerated worms and gravid microfilariae	Clusters of epithelial cells	Necrotic and hemorrhagic background
5	65	M	Swelling in parotid region	Left neck swelling		Thyroid Adenoma	Microfilariae	Group of oxyphilic cells and lymphocytes	Chewing gum colloid
6	56	F	Right breast lump	breast lump	4-5 Days	Acute inflammatory lesion	Microfilariae		Karryorrhectic debris
7	21	M	Left axilla	Fever with cough	15 Days	Tubercular Lymphadenitis	Microfilaria and adult filarie	Neutrophils, eosinophils, macrophages	Hemorrhagic background
8	34	F	Medial aspects of right arm	Single, non-tender, soft	15 days	Lipoma/Lymphatic malformation	Microfilaria e, filaria adult worm, embroynated eggs	Fragmented granuloma,	Fatty background

Discussion

Filariasis classically involves the lymphatic system, presenting as lymphangitis, lymphadenitis, hydrocele, and chronic lymphedema. However, extranodal and extralymphatic involvement is uncommon and often detected incidentally on cytological examination, as demonstrated in our study [14,16].

In this study, patients ranged from 20 to 65 years of age with a marked male predominance, a finding consistent with previous studies that attribute higher infection rates in males to greater outdoor exposure to mosquito vectors [14,15]. The duration of symptoms varied from a few days to several years, reflecting both acute inflammatory and chronic indolent presentations. Clinically, cases were misdiagnosed as lipoma, lymphatic malformation, thyroid adenoma, tubercular lymphadenitis, acute inflammatory lesions, or were under evaluation for ascites or pleural effusion, highlighting the nonspecific clinical manifestations of filariasis at unusual sites [16,17]. In both cases of filarial effusion in our study, smears prepared from centrifuged deposits revealed sheathed microfilariae along with reactive mesothelial cells in a hemorrhagic background (Fig 3). No atypical or malignant cells were seen in these cases. Pal S et al. [19] and Gaikwad et al. [20] had also reported microfilaria in effusion fluid with no associated malignant cells. Effusion of filarial aetiology can be chylous or nonchylous in nature. Chylous effusion of filarial aetiology is because of chyle leakage from obstructed thoracic duct [21], nonchylous filarial effusion can be due to incomplete lymphatic obstruction, lymphangitis, or an immunological re action against filarial antigen [19,20]. Non chylous effusion is considered a

coincidental finding in the presence of microfilaria in effusion fluid. In the present study, effusion fluids were nonchylous type, and microfilariae of W. Bancrofti were present; this is similar to other studies were also they had reported W. Bancrofti in effusion cytology [19,20]. Three cases in this series presented as subcutaneous or soft tissue swellings involving uncommon sites such as the cheek, parotid region, and arm. Cytological evaluation revealed a broad spectrum of filarial morphology, including microfilariae, adult worms, gravid filaria, embryonated eggs, and degenerated fragments, accompanied by inflammatory cells. Similar incidental detection of filarial parasites in FNAC samples from clinically unsuspected sites has been reported in earlier studies [12,15,16, 17].

We found microfilaria in one case of thyroid swelling, presented swelling in right side of the neck, which moved with deglutition. Cytology smears from this case revealed microfilaria in the background of Hashimoto thyroiditois and also group of oxyphilic cells seen suggesting may be of follicular neoplasm (Fig 5). A Hakeem [18] and others [11] have also reported microfilariae in thyroid aspirates in a background of colloid goitre. We found a case of microfilarae in breast lump of a female of 56 years of age (Fig 1&2). Finding microfilariae in the fine-needle aspiration (FNA) of a breast lump in a 56-year-old woman is unusual and clinically significant. While filariasis is endemic in many parts of India, breast involvement is rare and often incidental on cytology, leading to diagnostic confusion with common benign or malignant breast lesions.

Age adds another layer of rarity: most reported breast filariasis cases involve younger women, whereas detection in the sixth decade underscores chronicity of infection, cumulative exposure, and the possibility of asymptomatic parasitemia manifesting at extranodal sites late in life.

Kumar et al. (2024) described a case from Uttar Pradesh where microfilariae were identified in a breast lump of a middle-aged woman, again highlighting FNAC as a sensitive tool for unexpected parasitic detection [22]. Gulati et al. (2023) presented a striking case of a 68-year-old woman in whom breast filariasis misdiagnosed as carcinoma, underscoring the potential for misdiagnosis in older patients [23]. Compared with these reports, our case aligns with the pattern of incidental detection but also demonstrates that breast filariasis can occur in late adulthood, broadening the age spectrum of reported cases. Lymphadenopathy is a frequent clinical presentation in tropical countries, with tubercular lymphadenitis often considered the leading diagnosis due to its high prevalence. However, parasitic infections such as lymphatic filariasis can occasionally mimic tuberculosis, leading to diagnostic confusion. Our case of axillary swelling of a 21-year-old male illustrates this diagnostic dilemma, where axillary lymphadenitis with constitutional symptoms initially suggested tuberculosis, but cytology revealed Wuchereria bancrofti infection (Fig 6). Filariasis is endemic in many parts of Asia and Africa and is classically associated with inguinal or femoral lymph node involvement, hydrocele, or elephantiasis. Isolated axillary lymphadenitis due to filarial infection is distinctly uncommon, making this case noteworthy. The detection of both adult worm fragments and microfilariae in fine needle aspiration cytology (FNAC) smears provided definitive evidence of filarial etiology. Granulomatous inflammation is typically associated with tuberculosis, sarcoidosis, or fungal infections, but can also occur in parasitic infestations due to chronic antigenic stimulation. This overlap underscores the importance of direct parasite identification in cytological smears. Several reports have documented incidental detection of microfilariae in cytology specimens from various sites, including thyroid, breast, and lymph nodes. There are also reports of worms found in aspirates of the axillary lymph node as seen by us in this case[24].

An interesting cytological feature consistently observed in our series was the hemorrhagic background of cytological smears containing microfilariae (Fig 3). The hemorrhagic nature is attributed to parasite induced vascular damage, local inflammatory response, and increased vascularity of the aspirated tissue.

Pal and Bose (2015) reported microfilariae in breast lump FNAC smears with a blood rich background, emphasizing the incidental detection of parasites amidst hemorrhage [19]. Krishna and Dayal (2016), in their series of eight cases at rare sites, noted that aspirates were frequently hemorrhagic, with parasites seen against a bloody smear background [25].

Our observation that five out of eight cases aligns with these published reports, strengthening the evidence that hemorrhage is a typical cytological feature of filarial aspirates. Recognition of this pattern can aid cytologists in endemic regions to maintain vigilance for parasites when evaluating hemorrhagic smears, even when the clinical suspicion is low.

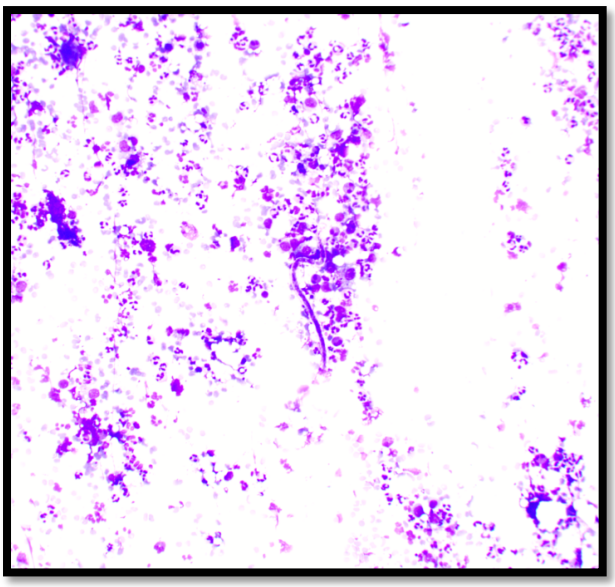

Figure 1: (4x) Microfilaria in Breast lesion

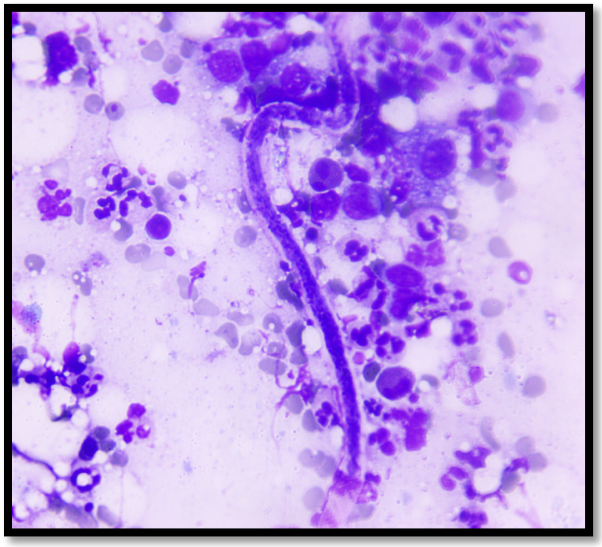

Figure 2: (40x) Microfilaria surrounded by eosinophils in breast lesion

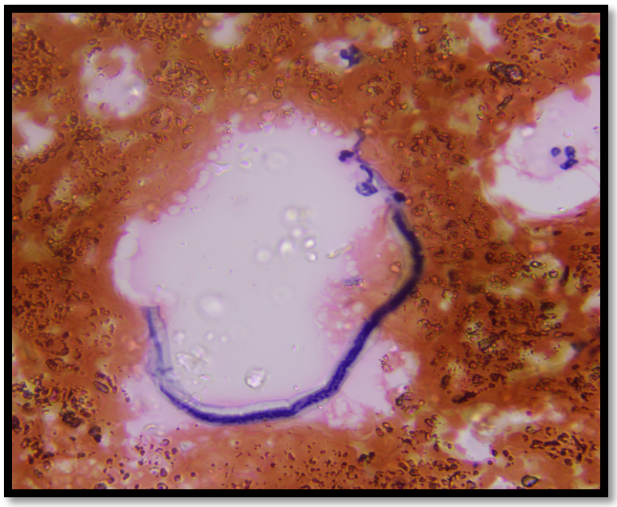

Figure 3: Microfilaria with hemorrhagic background in pleural effusion

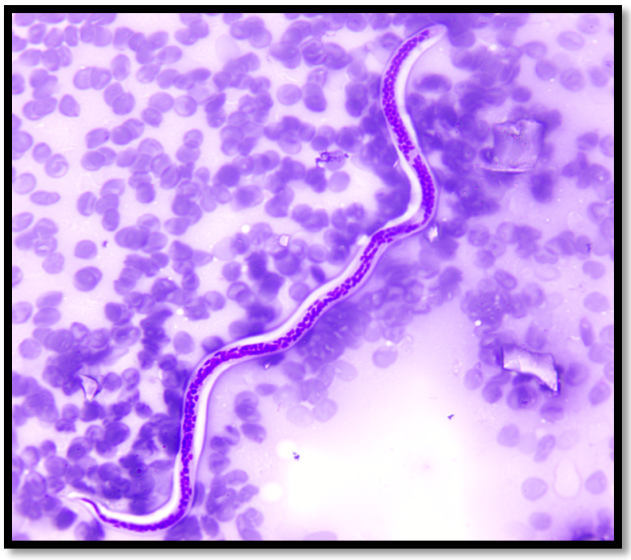

Figure 4: Microfilaria in parotid lesion

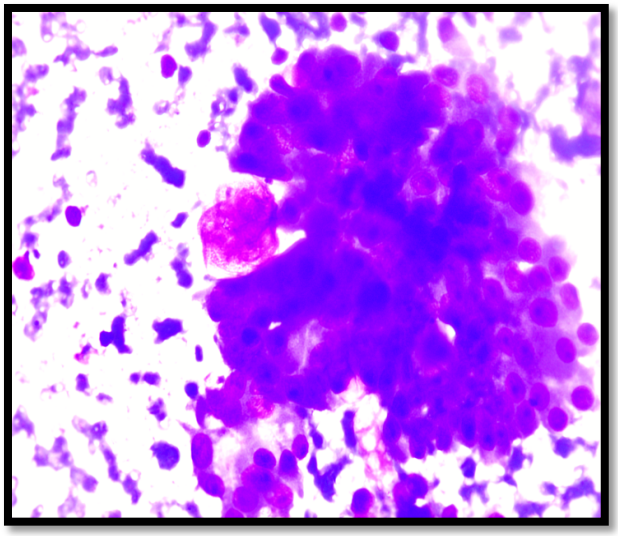

Figure 5: Coiled microfilaria in thyroid lesion along with oxyphilic cells

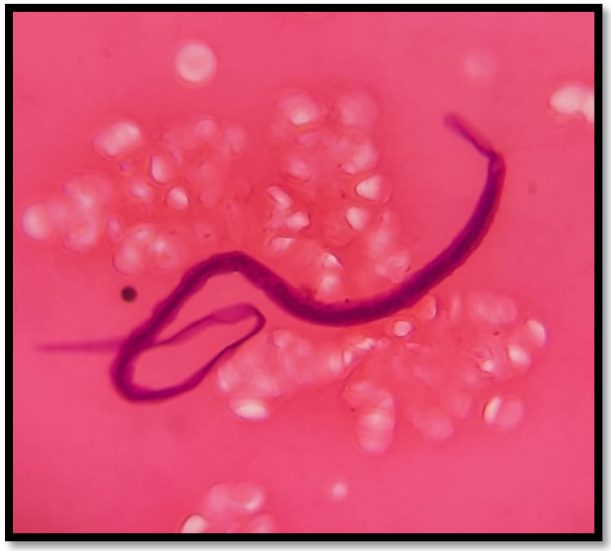

Figure 6: Microfilaria in axillary swelling

Conclusion

Our study highlights that despite being an endemic area for filariasis, patients may not present with typical manifestations of lymphatic filariasis, and even the peripheral blood examination may not show microfilaraemia in all cases.

Cytology plays a crucial role in diagnosing filariasis, especially in those with atypical presentations in endemic areas. Therefore careful screening of all cytology smears is strongly indicated, especially in cases with dual pathology and asymptomatic patients.

As there is no cure for severe chronic filariasis, a timely cytological diagnosis is the best option for screening of parasite for furthure management and improving the outcome for the patient. Clinicians, radiologists and pathologists working in endemic areas should always consider filariasis as a differential diagnosis in all cases of superficial swellings and effusion cytology cases.

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