

# Incidental detection of microfilaria in various autopsy specimens: A study at tertiary care hospital

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## ABSTRACT

**Background:** Autopsy examinations are necessary to rule out cause of death, and simultaneously, it also detects incidental pathologies which might not be a leading cause of death. Till date, no one has reported autopsy examination utility for the detection of microfilaria burden. In this retrospective study, we analyzed cases with incidental finding of asymptomatic cases of microfilaria. **Objectives:** Our main aim was to highlight its burden within the region of South Gujarat where filariasis is endemic despite various government programs to control and eradicate it. **Materials and Methods:** We have analyzed the autopsy reporting data during the period of January 2013–December 2013 from a tertiary care hospital of South Gujarat. Along with tissue section, we also processed blood clot from heart chambers for microscopic examination to confirm diagnosis. **Results:** A total of 19 cases of 607 autopsy cases showed the presence of microfilaria in various organs such as heart, lung, liver, spleen, kidney, and brain without any tissue reaction. All sections from blood clot showed the presence of circulating microfilaria in positive cases. Among all organ sections, we were able to get it most commonly in the heart interstitial spaces in majority of the cases. **Conclusion:** This study showed 3.1% prevalence of asymptomatic circulating microfilaria cases. This can be one of the ways to measure the prevalence of microfilaria in endemic regions as routine screening and diagnostic procedure has their known limitations. The technique to find microfilaria can be also strengthened by microscopic examination of blood clot from heart chamber or heart auricles.


**KEY WORDS:** Microfilaria; Autopsy; Filariasis

## INTRODUCTION

Autopsy is absolutely necessary for the progress of modern clinical medicine and for solving many problems such as diagnostic, treatment quality, detection of infectious,

hereditary and systemic diseases, establishing causes and mechanisms of sudden death, qualification of unclear diseases and syndromes, classification and nomenclature of nosological entities, and detection and study of spontaneous and induced pathomorphosis.<sup>[1]</sup>

There are lots of benefits of performing autopsy to the understanding of medicine or we can also say that modern understanding of medicine is originated due to the practice of autopsy. It also guides us to understand the connections of patient's clinical symptoms with that of changes found in various organs after death. It can help us to find the cause of death in cases where clinical diagnosis could not be made out. Autopsy

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examination findings can also be used for the checking of various health program effectiveness like that of in our study cases like mass drug therapy for the eradication of microfilariasis.

Our study shows the hidden and silent case prevalence data of microfilaria detected on autopsy cases in the area where the national program of mass drug administration is going on in the community.

In medical literature, Sushruta recognized clinical findings of elephantiasis and referred it as elephantiasis arabicum.<sup>[2]</sup> Thin elongated thread-like nematodes from superfamily Filarioidea is causing filariasis which is a major public health problem in many tropical countries such as India, Indonesia, Africa, China, and the Far East. In Southeast Asia, around 600 million people are living in endemic areas for lymphatic filariasis. In India, it is endemic and a major public health problem which is increasing every year. Around 553.7 million people from 243 districts are at risk of microfilaria infection in India.<sup>[3,4]</sup>

It is difficult to find microfilaria in asymptomatic individuals in endemic areas where people are at risk of getting infection with it. Persons with circulating microfilaria in blood are seemed healthy, but they can transmit the infection through mosquito bites. Those individuals with chronic infection usually do not transmit the infection even they have symptoms. In endemic areas, diagnosis of filarial infection can be made on clinical and physical findings, but the presence of microfilaria in peripheral blood smear is required for the diagnosis.<sup>[3,5]</sup>

Filariasis is caused by various species of filarial parasites. It is prevalent, worldwide, bancroftian filariasis is caused by *Wuchereria bancrofti* which blocks lymphatic vessels.<sup>[6]</sup> *W. bancrofti* is found worldwide in various tropical and subtropical areas and contributes up to 90% of filarial cases. In endemic areas, filariasis may remain asymptomatic or can cause acute or chronic clinical manifestations. However, typical clinical findings like elephantiasis may not be seen in all the cases of filariasis. In various tissues, the pathological findings are mainly chronic inflammatory cells such as lymphocytes, plasma cells, histiocytes, and eosinophils infiltrate. In few cases, epithelioid cell granuloma, necrosis, and acute inflammatory infiltrate are seen.<sup>[6]</sup> Various methods for the diagnosis of filariasis are available such as demonstration of microfilaria in unstained or stained blood smears, circulating microfilarial antigen, and finding of microfilaria in histopathological tissue sections.

The standard method for the diagnosis of filariasis is the detection of microfilariae in peripheral blood smear. However, sometimes, incidental detection of filarial worm in different autopsy organs can lead to the diagnosis in

unsuspected case. The detection of microfilaria worm in autopsy examination finding is uncommon. There are some literature reports of finding microfilariae by cytological examinations in various organs such as thyroid, soft tissue lesions, breast biopsy specimens, cutaneous lesions, epididymis, lymph nodes, salivary glands, ovarian cysts fluids, liver, urine cytology, endoscopic brush cytology, and fluids cytological examination.<sup>[8]</sup> As per our literature search, until today, no one has reported microfilaria in autopsy organs as an incidental finding and one other unique thing is we processed clot from the heart chamber cavity as a tissue block and examined it in all autopsy cases where clot available for the ease of the detection of parasitic disease like microfilaria.

## MATERIALS AND METHODS

In this retrospective study, we have collected data from the autopsy reporting cases in our hospital of tertiary care level, in South Gujarat, during the period of January 2013–December 2013. While conducting this study standard protocol as per institutional ethics has been followed and privacy of patients are maintained and not disclosed.

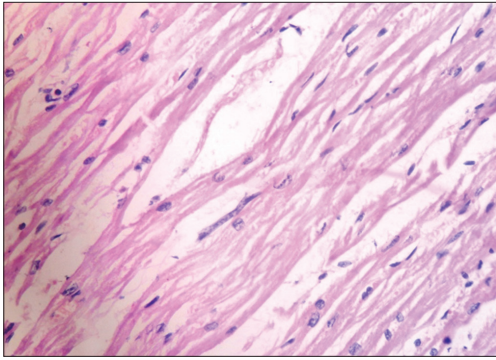
We have reported a total of 607 autopsy cases. As a routine, we have received pieces of all major organs such as heart, liver, both lungs, spleen, both kidneys, and parts of brain. We processed all organ sections with routine tissue processing after fixation in formalin. Along with that, we have processed a clot from heart cavity and auricles as a tissue block and stained with hematoxylin and eosin stain. We have tried to collect and processed clot block in majority of cases, in which it was available.

## RESULTS

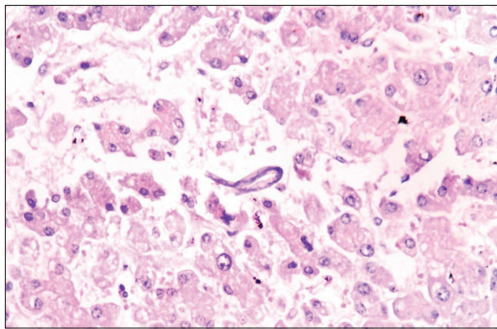
The study includes 607 cases of autopsy, of which 19 cases were positive for microfilaria as an incidental finding so approximately 3.1% (prevalence) of cases are positive with circulating microfilaria.

Microfilaria was seen in interstitial space of various organs such as heart [Figure 1], lung, liver [Figure 2], spleen [Figure 3], kidney, and brain [Figure 4]. Out of this, we were able to get it most commonly in the heart interstitial spaces in majority of the cases.

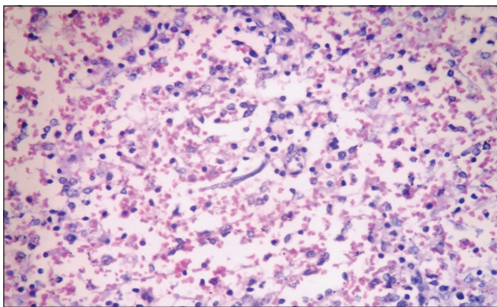
Of total 19 cases, 17 cases were male and only two females. The age ranges from 18 years to 75 years. Not a single case was with clinical suspicion of filariasis. Along with microfilaria, three cases also showed foci of healed myocardial infarction, one case showed foci of acute myocardial infarction, one case was of cirrhosis of liver, and one case was of sickle cell anemia patient.



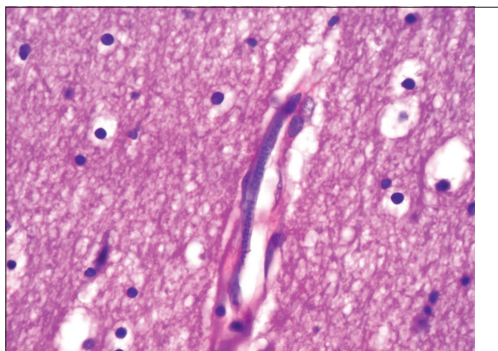
**Figure 1:** Section of heart showing microfilaria entrapped in heart ( $\times 100$ )



**Figure 2:** Microfilarial fragment in liver (hematoxylin and eosin,  $\times 40$ )



**Figure 3:** Spleen hematoxylin and eosin stained section showing fragment of microfilaria ( $\times 40$ )



**Figure 4:** Section from brain showing microfilarial fragment (hematoxylin and eosin,  $\times 100$ )

in any organ sections after extensive search. In majority of cases, we could suspect the presence of microfilaria from clot section. We have not seen any tissue reaction in any organs surrounding microfilaria.

## DISCUSSION

A total of 19 cases (3.1%) of 607 autopsy cases showed the presence of microfilaria in various organs such as heart, lung, liver, spleen, kidney, and brain without any tissue reaction. Of total 19 cases, 17 cases were male and only two females. The age ranges from 18 years to 75 years. Filariasis is a major health problem in some tropical countries such as India, Indonesia, China, and few regions of Africa.<sup>[9]</sup> There are around 6 million cases of acute filariasis per year according to the current estimate with chronic filarial symptomatic lesions in more than 20 million people.<sup>[3]</sup> Filariasis is caused by *W. bancrofti*, *Brugia malayi*, *Brugia timori*, *Onchocerca volvulus*, *Mansonella perstans*, *Mansonella streptocerca*, *Mansonella ozzardi*, *Dirofilaria conjunctivae*, *Dirofilaria magalhaesi*, *Dirofilaria immitis*, and *Loa loa*, of which most common species in India are *W. bancrofti* and *B. malayi*. They can be transmitted by the bite of *Culex* mosquito.<sup>[9]</sup> Lymphatic filariasis has been identified as one of the six potentially eradicable or eradicable diseases by the International Task Force for disease eradication.<sup>[10]</sup>

Filariasis can be of skin and subcutaneous tissue or lymphatic filariasis, of which in *O. volvulus* and *L. loa* are most commonly involve the first one while *W. bancrofti* and *B. malayi* are the species commonly involve lymphatics.<sup>[11]</sup> *W. bancrofti* life cycle involves two hosts. Man is the definitive host and mosquito is an intermediate host.<sup>[12]</sup> In lymph node, usually, adult worm resides and its gravid female releases microfilariae in large numbers. Microfilarial larvae cross through thoracic duct and pulmonary capillaries and reach to the peripheral circulating blood.<sup>[13]</sup>

Patients with *W. bancrofti* infection present with wide spectrum of clinical manifestations. The acute phase is mainly presented with fever, lymphadenitis, lymphangitis, epididymo-orchitis, funiculitis, headache, and muscle pain. Others symptoms include insomnia, backache, anorexia, nausea, malaise, urticarial rash, and fatigue. Eosinophilia and circulating microfilariae are seen on microscopic examination of blood in acute phase. Chronic stage is characterized by lymphedema, lymphadenopathy, hydrocele, and elephantiasis. In endemic areas, a large number of infected persons may remain asymptomatic throughout their life.<sup>[6]</sup> These individuals are called endemic normals.<sup>[7]</sup>

*W. bancrofti* and *B. malayi* parasite larval forms may remain in circulation in the body until their removal by an

In all cases with processed blood clot as a block, we got positive result. Only one case showed only blood clot positive for microfilaria and we could not get microfilaria

intermediate host.<sup>[14]</sup> These parasites circulate continuously in the vascular and lymphatic channels. Lymphatic or vascular obstruction due to parasites leads to extravasation of blood and release of microfilariae at this stage their detection in tissue fluid or any exfoliated surface material can be possible.<sup>[15,8,14]</sup> In endemic areas, person become infected early in age and develop microfilaremia peak at around 15–20 years of age.<sup>[16]</sup> Most infected persons in the endemic areas are usually asymptomatic, but they are an important source of infection for others.<sup>[17,15]</sup> It is possible that filariasis can also exist without the presence of microfilaremia. Infection and disease manifestation not necessarily present together.<sup>[15]</sup> In endemic area, large number of people do not show any symptoms or microfilaria on blood smears.

In all 19 cases of the present study, *W. bancrofti* microfilariae were diagnosed from their typical morphology. Subsequent blood clot examination shows the presence of microfilariae in all cases with organ positive for microfilaria. *W. bancrofti* is sheathed microfilaria, measuring 230–300 × 7–10 μ. The cephalic space is 5–7 μ long at the anterior end with side by side placed anterior nuclei. The caudal space is 5–15 μ long at the pointed posterior end with elongated terminal nuclei.<sup>[7]</sup>

Although the incidence of filariasis is high on the Indian subcontinent, the finding of microfilaria on autopsy samples is unusual. Area of study is an endemic area for microfilaria and various efforts from the local health-care provider are being undertaken for the eradication of this disease under national vector-borne disease control program in the form of regular mass drug administration. In this scenario, the detection of approximately 3.1% prevalence of cases as an autopsy finding suggests that there may be many more asymptomatic cases are there in the community with circulating microfilaria and these cases could have been an important source of infection.

The limitation of this study is low sample size as the autopsy is performed in the medicolegal cases and in the case where causes of death could not be established on clinical ground so it cannot represent the whole community. Large-scale study is required to arrive at any conclusion.

## CONCLUSION

The main aim of this article is to raise the awareness that in tropical countries like India which is an endemic zone for filariasis, simple autopsy examination with added one blood clot section for tissue processing may help in diagnosing many hidden potentially infectious cases of filariasis, which can be just the tip of iceberg? The data can

be utilized for the changes in the implementation policy or for checking the effectiveness of national programs for this eradicable disease.

The application of autopsy findings in association with other clinical findings and laboratory data is as valuable tool for postmortem diagnosis. The microscopic findings obtained from autopsy study in diseased persons are important, but the uses of the autopsy study are very limited mainly by our lack of awareness or our unwillingness to find the truth. It is our ethical responsibility to accept and utilize the autopsy study at its optimum level for a better understanding of modern medicine.

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