

Original Research Article

Incidence of filariasis in clinically diagnosed primary vaginal hydrocele

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ABSTRACT

Background: Lymphatic filariasis is caused by a mosquito-borne parasite affecting roughly 100 million people round the world. There is consensus that hydrocele is the most frequent clinical manifestation of bancroftian filariasis. In endemic areas, about 40% of men are suffering from testicular hydrocele. With this background, the present study was aimed to find the incidence of filariasis in clinically diagnosed primary vaginal hydrocele.

Methods: A hospital based prospective, cross-sectional study was conducted with 60 patients diagnosed clinically as primary vaginal hydrocele coming to the department of surgery, Dr. D. Y. Patil Medical College, Hospital and Research Centre, Pimpri, Pune, to assess the incidence of filariasis.

Results: Anti-filarial antibody and circulating filarial antigen in serum were detected in 5 (8.3%). Out of 60 patients and anti-filarial antibody was detected in hydrocele fluid of 2 (3.3%) patients. 2 patients out of these 5 showed microfilaria in peripheral blood smear and eosinophilic infiltrates in histopathological examination of sac.

Conclusions: In 5 out of 60 cases both anti-filarial antibody and circulating filarial antigen in serum are positive thus proving that incidence of filarial hydrocele is 8% in clinically diagnosed primary vaginal hydrocele which is supposed to be idiopathic. Even though these cases have presented as clinically primary vaginal hydrocele, they are found to be filarial hydrocele after analysis of serum and hydrocele fluid. So, it is advised that all cases of clinically diagnosed primary vaginal hydroceles should be investigated for filariasis and if not, may lead to recurrence in these cases.

Keywords: Anti-filarial antibody, Circulating filarial antigen, Filariasis, Hydrocele

INTRODUCTION

Lymphatic filariasis is caused by a mosquito-borne parasite affecting roughly 100 million people round the world. About 40 million people suffer from the chronic disfiguring manifestations of this disease, which includes 28 million men suffering from genital filariasis most commonly hydrocele. The genital pathology caused by bancroftosis is impressively debilitating and economically punishing for a large number of men in endemic countries.¹

There is consensus that hydrocele the most frequent clinical manifestation of bancroftian filariasis.² A very few studies are available on the incidence and prevalence

of hydrocele in temperate countries. Hydrocele is a very common condition in the tropics.³ In endemic areas of filariasis, about 40% of men are suffering from testicular hydrocele.^{4,5}

There is involvement of intra-scrotal lymphatic vessels in the hosts by the *Wuchereria bancrofti* adult worms; thus, the most frequent manifestation of bancroftian filariasis is hydrocele. In men, vaginal hydrocele is the most common morbidity is due to *Wuchereria bancrofti*.^{6,7}

About one-third population of India lives at risk of developing lymphatic filariasis. Out of 289 (62%) district surveyed up to 1995, 257 districts were found to be endemic.⁸ About 489.1 million people were exposed to the risk of infection and required massive drug

administration. Bihar has the highest endemicity followed by Kerala, Uttar Pradesh, Andhra Pradesh, and Tamil Nadu with endemicity over 17%, 15.7%, 14.6%, 10%, and 10%, respectively. Goa has the least endemicity of approximately 1% of all the states followed by Lakshadweep and Madhya Pradesh with more than 1.5% and 3% endemicity, respectively.⁹ The national average prevalence of microfilaria showed a declining trend from 1.24% in 2004 to 0.63% in 2008.¹⁰

Although there is a report from India suggesting that diethyl carbamazine (DEC) therapy could reduce the size of hydroceles, a recent double-blind study in Tanzania showed that DEC has no effect on the size of hydroceles.^{11,12} Hence, surgery remains the treatment of choice for management of filarial hydrocele. Although there are several publications on surgery of hydrocele and the complications of surgery, consensus has been obtained in various studies in a global meeting called under the auspices of the WHO.¹³⁻¹⁵

In lymphatic filariasis, repeated episodes of inflammation and lymphedema lead to lymphatic damage, chronic swelling, and elephantiasis of the legs, arms, scrotum, vulva, and breasts.¹⁶⁻¹⁸

The diagnosis of bancroftian filariasis till recently relied on the demonstration of microfilariae in blood specimens collected during night.¹⁹ In cases of low microfilariae density, concentration techniques, such as diethyl-carbamazine provocation test, which induce the release of microfilaria in peripheral blood even during day time showed a comparable specificity and positive predictive value to that of night blood samples.²⁰ With the development of recombinant DNA technology, a recombinant antigen WbSXP-1 has been evaluated and is highly sensitive for detection of specific circulating filarial antibody against *W. bancrofti* and *Brugia malayi*.²¹⁻²³ Use of specific circulating filarial antigens (CFAs) such as Og4C3 allows detection of *W. bancrofti* antigens in serum, plasma, and hydrocele fluid and has no cross reactivity with any other helminthic infections. The advantage of detection of CFA is that its level remains constant during the whole day, and thus, there is no need to take the blood sample during night.²⁴

Thus, the present study was done at this hospital to assess the incidence of filariasis in clinically diagnosed cases of primary vaginal hydrocele, presence of anti-filarial antibody in clinically diagnosed primary vaginal hydrocele and detect microfilaremia by peripheral blood smear examination of hydrocele patients.

METHODS

Present study is a prospective, cross-sectional study conducted with 60 cases from July 2017 to July 2019 in Dr. D. Y. Patil Medical College, Hospital and Research Centre, Pimpri, Pune, Maharashtra, India.

Blood was collected 6 hours prior to operation in plain and ethylenediaminetetraacetic acid tubes. Hydrocele fluid was aspirated just prior to surgical incision of the sac. All material was analysed within 12 hours. Peripheral blood smear for microfilaria, serum CFA and anti-filarial antibody detection and hydrocele fluid anti-filarial antibody were performed in the hospital microbiology department. All patients underwent Jaboulay's procedure and a part of sac was sent for histopathological examination.

Inclusion criteria

All cases of clinically diagnosed primary vaginal hydrocele and patients suffering from hydrocele neither being diagnosed nor treated for filariasis earlier were included in the study.

Exclusion criteria

Patients with history of trauma, post-operative hydrocele, chronic illness such as diabetes, hypertension, leprosy, liver cirrhosis, renal pathology, retroviral disease and known malignancy were excluded from the study.

Sample size was calculated with 95% confidence in interval estimation and 10% absolute error of margin by using formula:

$$n = Z^2 \pi(1 - \pi)/d^2$$

Where,

Z = Table Value of alpha error from Standard Normal Distribution table (1.96 for 95% confidence interval)

π = anticipated range

d = the absolute precision required on either side of true value of the population proportion π

Population proportion = $\pi = 20\% = 0.2$

Level of significance (alpha error) = 5%

Margin of error = d = 0.1

Confidence interval = 95%

$$n = (1.96)^2 \times 0.2 \times 0.8 / (0.1)^2 = 60.4$$

Hence a sample size of 60 patients was considered adequate for this study.

Statistical analysis

Quantitative data is presented with the help of mean and standard deviation. Comparison among the study groups is done with the help of unpaired t test as per results of normality test. Qualitative data is presented with the help of frequency and percentage table. Association among the study groups is assessed with the help of Fisher test, student 't' test and Chi-Square test. P value less than 0.05 is taken as significant. Results were graphically represented where deemed necessary. Appropriate statistical software, including but not restricted to MS

Excel, SPSS ver. 20 will be used for statistical analysis. Graphical representation will be done in MS Excel 2010.

RESULTS

The duration of hydrocele in majority of the patients (35%) was up to 6 months followed by 6 months – 1 year (23.3%), 2-3 years (21.7%), >10 years (8.3%), 4-5 years (6.7%) and 6-10 years (5%).

Table 1: Distribution of patients according to duration of hydrocele.

Duration	N	%
Up to 6 months	21	35
6 months - 1 year	14	23.3
2 - 3 years	13	21.7
4 - 5 years	4	6.7
6 - 10 years	3	5
>10 years	5	8.3
Total	60	100

Table 2: Distribution of patients according to detection of anti-filarial antibody.

Anti-filarial antibody	N	%
Serum	Present	5 8.3
	Absent	55 91.7
	Total	60 100
Hydrocele fluid	Present	2 3.3
	Absent	58 96.7
	Total	60 100

Anti-filarial antibody was detected in serum of 5 (8.3%) patients and out of these 5 patients, anti-filarial antibody was detected in hydrocele fluid of 2 (3.3%) patients.

Table 3: Distribution of patients according to prevalence of CFA in serum.

CFA (serum)	N	%
Present	5	8.3
Absent	55	91.7
Total	60	100

CFA in serum was detected in 5 (8.3%) patients of this study group.

Table 4: Distribution of patients according to histopathology findings of hydrocele sac.

HPE of hydrocele sac	N	%
Eosinophilic infiltrates absent	58	96.7
Eosinophilic infiltrates present	2	3.3
Total	60	100

The histopathology findings of hydrocele sac noted eosinophilic infiltrates in 2 (3.3%) patients and normal wall in remaining patients (96.7%).

Table 5: Distribution of patients according to prevalence of microfilaria in peripheral blood smear.

Microfilaremia	N	%
Present	2	3.3
Absent	58	96.7
Total	60	100

The peripheral blood smear for microfilaria was positive in 2 (3.3%) patients. The prevalence of microfilaremia was 3.3% in this study.

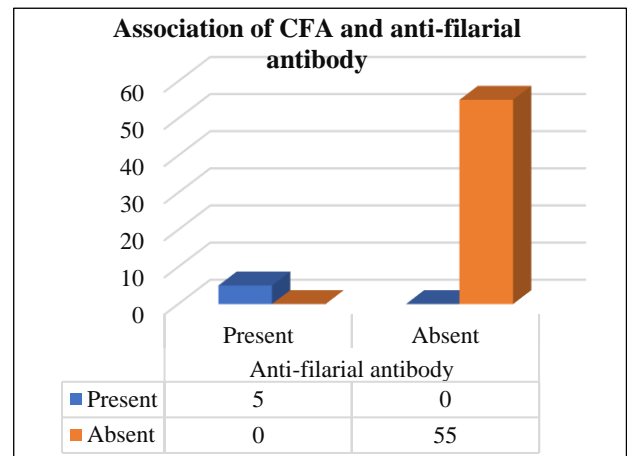


Figure 1: Association of CFA and anti-filarial antibody.

It was observed that anti-filarial antibody was present in the 5 (8.3%) patients detected CFA. There was significant association of CFA and anti-filarial antibody as per Chi-Square test (p<0.05).

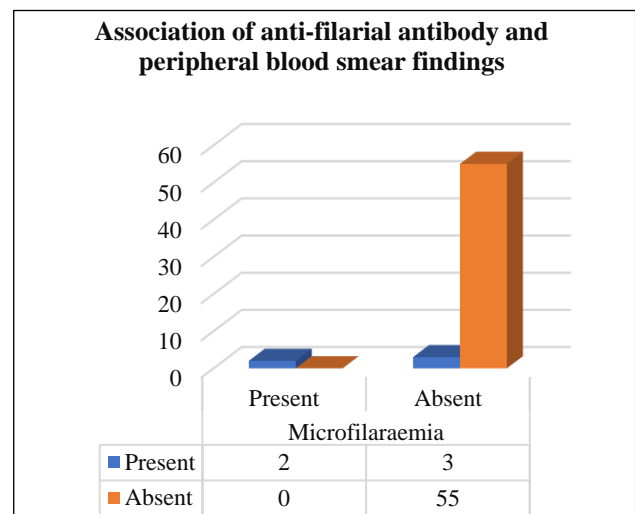


Figure 2: Association of anti-filarial antibody and peripheral blood smear findings.

The prevalence of microfilaremia was noted in 2 (3.3%) patients that were detected with CFA. There was significant association of CFA and peripheral blood smear findings ($p<0.05$). The prevalence of

microfilaremia was noted in 2 (3.3%) patients that were detected with Anti-filarial antibody. There was significant association of anti-filarial antibody and peripheral blood smear findings ($p<0.05$).

Table 6: Association of CFA and anti-filarial antibody in serum.

CFA	Anti-filarial antibody				Total		P value
	Present		Absent		N	%	
	N	%	N	%			
Present	5	8.3	0	-	5	8.3	<0.05
Absent	0	-	55	91.7	55	91.7	
Total	5	8.3	55	91.7	60	100	

Table 7: Association of CFA and peripheral blood smear findings.

CFA	Microfilaremia				Total		P value
	Present		Absent		N	%	
	N	%	N	%			
Present	2	3.3	3	5	5	8.3	<0.05
Absent	0	-	55	91.7	55	91.7	
Total	2	3.3	58	96.7	60	100	

Table 8: Association of anti-filarial antibody (serum) and peripheral blood smear findings.

Anti-filarial antibody	Microfilaremia				Total		P value
	Present		Absent		N	%	
	N	%	N	%			
Present	2	3.3	3	5	5	8.3	<0.05
Absent	0	-	55	91.7	55	91.7	
Total	2	3.3	58	96.7	60	100	

DISCUSSION

Duration of hydrocele

In this study, the duration of hydrocele in majority of the patients (35%) was 0-6 months followed by 6 months-1 year (23.3%), 2-3 years (21.7%), >10 years (8.3%), 4-5 years (6.7%) and 6-10 years (5%). This is comparable to the studies of Goel et al, Mahaboob et al and Khandelwal et al.²⁵⁻²⁷

Goel et al study to assess the association between isolated non-communicable hydrocele and filariasis found duration of symptoms ranged from 3 months to 15 years and median duration was 9 months. Fourteen patients the symptom duration was 3 months to 6 years, median duration 2.5 years.²⁵

Mahaboob retrospective study observed there was increase in duration of disease according to age group from 18-20 to more than 60 age group.²⁶

Khandelwal et al retrospective study of clinically unexpected filariasis observed patients presented predominantly as swelling at various sites with or without pain and fever. The duration of history ranged from weeks to years.²⁷

Anti-filarial Antibody in serum and hydrocele fluid

In this study, anti-filarial antibody was detected in serum of 5 (8.3%) patients and out of these 5 patients, anti-filarial antibody was detected in hydrocele fluid of 2 (3.3%) patients. This is similar to the studies of Goel et al, Singh et al, Shah et al, Rocha et al and Dandapat et al.^{25,28-31}

Goel et al study to assess the association between isolated non-communicable hydrocele and filariasis reported 14 patients, both filarial antigen and antibody was present in hydrocele fluid of three patients, and in only one of these was the fluid chylous.²⁵

Singh et al prospective, cross-sectional, observational study determining its prevalence among hydrocele patients in chronically infected cases found out of these 100 patients, 21 (21%) showed positive anti-filarial antibody test. Of these 100 patients, highest number of patients (72%) were in age group of 20-40 years. The anti-filarial IgG and IgM positivity were maximum (15% and 4%, respectively) in the age group of 20-40 years. IgG antibody were also found in all the patients tested positive for IgM antibody test.²⁸

Shah et al study detected infection in 11.40% of hydrocele patients.²⁹ Rocha et al study reported a higher prevalence of filariasis among hydrocele patients. (34.6%).³⁰ Dandapat et al study reported a very high prevalence with 43% patients having hydrocele definitely due to filariasis.³¹

CFA in serum

It was observed in this study that CFA was detected in 5 (8.3%) patients. Similar observations were noted in the study of Mishra et al.³²

Mishra et al study evaluating the usefulness of usage of hydrocele fluid for diagnosis of filarial origin of hydrocele found 11 (21%) cases were positive for CFA in serum and 5 (9.8%) in hydrocele fluid.³²

Microfilaria in peripheral blood smear

The peripheral blood smear for microfilaria was positive in 2 (3.3%) patients. The prevalence of microfilaria was 3.3% in this study. These findings were consistent with the studies of Khandelwal et al, Shah et al, Goel et al and Singh et al.^{25,27-29}

Khandelwal et al retrospective study of clinically unexpected filariasis observed smears revealed microfilaria in 15 out of the 16 cases. Fragments of adult worms in 3 cases; and embryoid bodies in two cases, both these cases were from lymph node swelling. The number of microfilariae was much more in lymph node and breast aspirates as compared to other sites. In one case with subcutaneous nodule at angle of mandible only adult worm was identified without any microfilaria. Empty sheaths were seen in only two cases. Nocturnal blood sample examination for presence of microfilaria was done in only ten cases; out of which only one case with scrotal swelling was reported as positive for microfilaria.²⁷

Shah et al study detected microfilaria in 4.4% of patients.²⁹ Goel et al study found microfilaria in only one out of 100 hydrocele patients. Since hydrocele is a manifestation of obstructive lymphangiopathy, the chances of detection of microfilaria in blood are quite less.²⁵

Singh et al prospective, cross-sectional, observational study determining its prevalence among hydrocele patients in chronically infected cases observed microfilaria detected by peripheral blood smear examination showed that out of 21 anti-filarial antibody positive patients, 5 (23.8%) patients showed microfilaria in their blood.²⁸

Association between CFA and anti-filarial antibody

It was observed in this study that anti-filarial antibody was present in the 5 (8.3%) patients detected with CFA.

There was significant association of CFA and anti-filarial antibody as per Chi-square test ($p < 0.05$). This is comparable to the study of Goel et al.²⁵

Goel et al study to assess the association between isolated non-communicable hydrocele and filariasis reported statistical significance of the association between serum positivity for filarial antigen and antibody and hydroceles.²⁵

Association between CFA and Microfilaria in peripheral blood

In this study, the prevalence of microfilaria was noted in 2 (3.3%) patients that were detected with CFA. There was significant association of CFA and peripheral blood smear findings as per Chi-square test ($p < 0.05$). This is concordant to the study of Goel et al.²⁵

Goel et al study to assess the association between isolated non-communicable hydrocele and filariasis showed that out of 14 cases who were positive for serum CFA, microfilaria was positive in peripheral smear of only one patient.²⁵

Association between anti-filarial antibody & microfilaria in peripheral blood smear

The prevalence of microfilaria was noted in 2 (3.3%) patients that were detected with anti-filarial antibody. There was significant association of anti-filarial antibody and peripheral blood smear findings as per Chi-square test ($p < 0.05$). This is in concordance to the studies of Goel et al and Singh et al.^{25,28}

Goel et al study to assess the association between isolated non-communicable hydrocele and filariasis showed that out of 14 cases who were positive for serum anti-filarial antibody, microfilaria was positive in peripheral smear of only one patient.²⁵

Singh et al prospective, cross-sectional, observational study determining its prevalence among hydrocele patients in chronically infected cases observed microfilaria detected by peripheral blood smear examination showed that out of 21 anti-filarial antibody positive patients, 5 (23.8%) patients showed microfilaria in their blood. All the five patients showing microfilaria in their blood were positive for IgM antibody. Only the samples collected during night hours showed microfilaria and none of the day samples showed microfilaria on examination.²⁸

CONCLUSION

This is a study in Indian population which has not been done till now to assess filarial hydrocele in cases presenting clinically as primary vaginal hydrocele as the incidence of filariasis is more in tropical countries like India. In 5 out of 60 cases both anti-filarial antibody and

CFA in serum are positive thus proving that incidence of filarial hydrocele is 8% in clinically diagnosed primary vaginal hydrocele which is supposed to be idiopathic.

In 2 of these 5 cases, hydrocele fluid was positive for anti-filarial antibody along with thickened sac and histopathology of sac suggestive of eosinophilic infiltrates. These cases are considered as established cases of filariasis. So, these findings are suggestive of filariasis as a cause of hydrocele in these patients.

Even though these cases have presented as clinically primary vaginal hydrocele, they are found to be filarial hydrocele after analysis of serum and hydrocele fluid. So, it is advised that all cases of clinically diagnosed primary vaginal hydroceles should be investigated for filariasis and if not, may lead to recurrence in these cases.

No such studies are available in literature at present, whereby a filarial hydrocele presented as clinically primary hydrocele. This study assumes a critical importance to establish filarial infection as one of the subclinical causes giving rise to clinically diagnosed primary hydrocele in a scenario like tropical countries just like in India.

Hence, while approaching a case of primary vaginal hydrocele diagnosed clinically, one should be aware of it being filarial (8%) in origin, thus subjecting all such cases to appropriate investigations to rule out filariasis.

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