

**Original article:**

## **Lipid profile variations before and after diethyl carbamazine citrate (DEC) treatment in filariasis**

**Dr.V.Sai Dilip<sup>1</sup>, Dr.G.Chandra Sekhar<sup>1</sup>, Dr.Gopala Krishna Murthy<sup>1</sup>, Dr.A.S.Kameswara Rao<sup>1</sup>,  
Dr.K.Sivaji<sup>1</sup>, Dr.G.V.Benerji<sup>1</sup>**

<sup>1</sup> Post Graduate in Anesthesiology in KIMS&RF, Amalapuram ,A.P

<sup>1</sup> Post Graduate in Anesthesiology in KIMS&RF, Amalapuram ,A.P

<sup>1</sup> Professor & Head, Department of Anesthesia,KIMS &RF,Amalapuram,A.P

<sup>1</sup> Dean & Professor, Department of Anesthesia,KIMS &RF,Amalapuram,A.P

<sup>1</sup> Associate Professor,Department of Pharmacology,G.S.L Medical Colege, Rajahmundry,A.P

<sup>1</sup> Professor & Head , Department of Biochemistry ,KIMS &RF,Amalapuram,A.P

Corresponding author : Dr.G.V.Benerji

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### **Abstract:**

Lymphatic Filariasis is a disabling and Disfiguring disease affecting mankind since antiquity. It is a debilitating disease attaching social stigma to afflicted people living in most of the tropical countries in the world. This infection is prevalent in both urban and rural areas. Lymphoedema is a common clinical problem in India. This is endemic in many parts of our country. As lymphoedema is the commonest clinical manifestation of filariasis, there exists a vast number of patients afflicted by this crippling disease. Repeated attacks of fever, lymphangitis and lymphadenitis are accompanied by progressive oedema of the limbs. This is associated with fibrosis and thickening of the skin resulting in the hideous looking limbs often called Elephantiasis 1.

There are no reports on the status of lipids in filariasis. Hence the present study is under taken to estimate the levels of lipid fractions interfiarncé in the disease process, and the variations in these parameters before and after DEC treatment.

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### **Introduction:**

Lymphoedema is a common clinical problem in India. This is endemic in many parts of our country. As lymphoedema is the commonst clinical manifestation of filariasis, there exists a vast number of patients afflicted by this crippling disease. Repeated attacks of fever, lymphangitis and lymphadenitis are accompanied by progressive oedema of the limbs. This is associated with fibrosis and thickening of the skin resulting in the hideous looking limbs often called Elephantiasis<sup>1,2,3</sup>.

Globally about 120 million people are affected with the disease of which one third live in India alone. This disease is caused by any one of the parasites Wuchereria bancrofti,

Brugia malayi, or Brugia timori. It is a disease of the poor and is prevalent in urban, peri urban and rural areas. The transmission is from man to man by mosquitoes of the genus Culex. In human beings the adult parasite live in the lymphatic system, producing millions of microfilaria which propagate the infection. The infection is usually acquired in childhood. Infection by B.timori does not occur in India<sup>4</sup>.

The disease casused by Wuchreria bancrofti is often called bancroftian failariasis. Brugia malayi caues Malayan filariasis. The similar infection caused by Brugia malayi and brugia timori are grouped together as brugia filariasis. Bancroftian filariasis occurs around the world in the

latitude between 41°N and 30°S, especially in Srilanka, India, Bangladesh, Burma, Thailand, Malaysia, China, The Philippines, Indonesia and less in the middle East, North and Central Africa, the Caribbean, central and south America, the Pacific islands. Malayan filariasis occurs in Burma, Thailand, Vietnam Korea Japan, Borneo, New Guinea. *Brugia timori* causes disease only in Indonesia.

In India, infection of filariasis has been recorded as early as 6<sup>th</sup> century B.C., by the famous Hindu Physician “Susruta” in his treatise “Susruta Samhitha”. Madhavakar(700 A.D) Described the signs and symptoms of the disease in his treatise “Madhava Nidhana” which holds good even today. As early as 500 BC, the laws of Manu stated that a priest should not marry a woman with a family history of tuberculosis, epilepsy, leprosy or elephantiasis. The famous sun temple Konark near Puri in Orissa (1300 AD) depicts a couple with hydrocele and elephantiasis. Thus this disease has been with us through the centuries

Filariasis is the first disease proved to be transmitted by insects<sup>5,2</sup>. Although lymphatic Filariasis has been identified as eradicable or potentially eradicable among the six infectious diseases by the international Task force for disease eradication, it is still a major health problem in many parts of the world including India<sup>6</sup>.

According to the estimates made in 1995, globally, there are 1,100 million people are living in areas endemic for lymphatic filariasis and exposed to the risk of infection: and there are 120 million cases of filariasis, either having potent microfilaraemia or chronic filarial disease. LF is endemic in atleast 80 countries. Recent estimates have shown that out of the 25 states/union territories in India (before bifurcation of states of Bihar, Madya Pradesh and Uttar Pradesh), for which surveys were carried out, 22 were found endemic for filariasis, and nine states (Andhra pradesh, Bihar, Gujarat, Kerala, Maharastra, Orissa, Tamilnadu, Uttar Pradesh and West Bengal) contributed to

about 95% of total burden of filariasis. A total of 289 districts in India were surveyed for filariasis until 1995; out of which 257 were found to be endemic. In India a total of 553 million people are at risk of infection and there are approximately 30 million people are estimated to be harboring *Wuchereria bancrofti* microfilariae. 21 million people with symptomatic filariasis and about 20 million suffer with chronic manifestations such as hydrocele (13 million) and lymphoedema (7 million). *W. bancrofti* is the predominant species accounting for about 98% of the national burden, widely distributed in 17 states and 6 union territories. *B.malayi* is restricted in distribution, with decreased trend. An overview of the traditional endemic foci shows concentration of infection mainly around river basins, and eastern and western coastal parts of India<sup>7,3</sup>.

#### **Aims and Objectives:**

Filariasis is a chronic and debilitating disease caused by nematode parasite of the order “filaridea” commonly called filariasis. Different types of filarial infections including lymphatic filariasis are caused by *Wuchereria bancrofti* and *Brugia malayi*. Poor sector of the community are the predominant effected group. Although never directly fatal but chronic infestation can lead to disability, disfigurement causing untold pain and misery. In East Godavari District especially Kakinada and surrounding areas are highly endemic for filariasis. The aim of the present study is to compare the lipid changes due to filarial infestation with the endemic normal group. There was no proper review in this aspect of the study. So the present study may give some facts about the lipid influence in the prognostic aspect of the disease

1. To study the lipid levels in the clinical filarial cases.
2. To study lipid levels in micro filaraemia cases.
3. To compare the changes in lipid of endemic normals with the above Conditions of filariasis.

4. To study the influence of DEC treatment on the lipid metabolism of the Filarial cases.

**Materials And Methods:**

For this study 48 patients of MF, 50 Patients of CF and 52 age & sex matched endemic controls(52 were selected. Blood samples were collected. All the patients were informed for consent. Plasma samples were collected and used for the estimation of Lipid

**In estimation of lipid profile**

Serum cholesterol by CHOD-POD method ( End point)

HDL-cholesterol by Phosphotungstic acid precipitation method ( End point)

Triglycerides by Dynimic extended stability in the lipidclering agent GPO-Trinder method (End point)

LDL & VLDL Cholestrol are calculated by Friedewald formula

**Observation and Results:**

1. In the present study a total number of 150 individuals are included and they are placed into three different groups as summarized in Table-1. Among them 98 were filarial infected groups constituting of 48 microfilaraemics (32%) and 50 clinical filarial patients (33.3%). The patients were mianly from the o.p .of Regional Filarial Control Unit-Kakinada of East Godavari District in Andhrapradesh.

**Table-1** Distribution of study cases in to different groups of filariasis

Study Group	Number	Percent (%)
Microfillarial carrier (MF)	48	32.0
Clinical filarial patients(CL)	50	33.3
Endemic Normals(EN)	52	34.7
TOTAL	150	100

2. Age and sex wise distribution of all the study cases are shown in Table-2 & 3. Maximum number of individuals representing 58.3% of the total 48 cases of microfilaraemic cases were in the age group of 11-30 years. where as maximum number of individuals representing 50% of the total 50 cases of clinical filarial cases were in the age group of 31-50 years (Table-2).

**Table-2 Distribution of study cases according to age**

AGE GROUP	TOTAL EXAMINED No.(%)	MICROFILARIAL CARRIERS No.(%)	CLINICAL FILARIAL CARRIERS No.(%)	ENDEMIC NORMALS No.(%)
10 Yrs	01(0.6)	01 (2.1)	---	---
11-30 Yrs	49(32.7)	28(58.3)	06(12)	15(28.8)
31-50Yrs	63(42)	11(22.9)	25(50)	23(44.2)
≥50 Yrs	37(24.7)	08(16.7)	19(38)	14(27)
<b>TOTAL</b>	<b>150(100)</b>	<b>48(100)</b>	<b>50(100)</b>	<b>52(100)</b>

While male and female ratio was almost 1:2 in all the filarial cases, there were more females (32) than males (20) in the endemic normal group.(Table-3)

**Table-3 Distribution of study cases according to sex**

Study Group	MALE( %)	FEMALE(%)	TOTAL (%)
Microfilaraemics (MF)	16(33.3%)	32(66.7%)	48(100%)
Clinical filariasis(CL)	12(24%)	38(76%)	50(100%)
Endemic Normals(EN)	20(38.5%)	32(61.5%)	52(100%)
<b>TOTAL</b>	<b>48(32%)</b>	<b>102(68%)</b>	<b>150(100%)</b>

**Table-4 Serum parameters in endemic normal and total filarial cases**

S.No	Parameter	Endemicnormal n=52 mean + SD	Total Filarial cases N=98 mean+SD	'Z' value	P Value
1	Total Cholesterol mg/dl	196+24	171+38.2	49	<0.001
2	HDL Cholesterol mg/dl	50+9.4	40.4+12.3	29	<0.002
3	LDL Cholesterol mg/dl	120+21.3	106+40.5	2774	<0.005
4	VLDL Cholesterol mg/dl	26+6.6	26+15.3	0	NS
5	Triglycerides mg/dl	128.4+33	128+77.5	0.044	NS

Parameters of endemic normal and total filarial cases were compared and summarized in above table .Lipid fractions except VLDL cholesterol and triglycerides in total filarial cases were significantly low.

**Table-5 Serum parameters in endemic normal and clinical filariasis**

S.No	Parameters	Endemicnormal N=52 mean±SD	Clinical Filariasis Cases N=50 mean±SD	'Z' Value	'P' Value
1.	Total Cholesterol mg/dl	196±24	182±417	2.06	NS
2.	HDL Cholesterol mg/dl	50±9.4	41.7±11.6	3.96	<0.001
3.	LDL Cholesterol mg/dl	120±21.3	126±38	0.978	NS
4.	VLDL Cholesterol mg/dl	26±6.6	23.7±12.8	1.134	NS
5.	Triglycerides mg/dl	128.4±33	117±62.6	1.44	NS

**TABLE-6 Serum parameters in endemic normal and microfilaraemic cases**

Parameters of Endemic normal and Micro filarial cases were compared and summarized in above table. It is observed that cholesterol fractions were significantly lowered, whereas no significant difference was seen in VLDL and Triglycerides

S.No	Parameters	Endemic normal N=52, mean±SD	Micro Filaraemic Cases N=48, mean±SD	'Z' Value	'P' Value
1.	Total Cholesterol mg/dl	196±24	158±30.8	6.84	<0.001
2.	HDL Cholesterol mg/dl	50±9.4	42.8±12.0	3.32	<0.001
3.	LDL Cholesterol mg/dl	120±21.3	87±27.5	6.67	<0.001
4.	VLDL Cholesterol mg/dl	26±6.6	27.8±12.8	0.873	NS
5.	Triglycerides mg/dl	128.4±33	138±64.3	0.927	NS

**TABLE-7 Statistical data of the filarial cases before and after treatment with DEC**

S.No.	Parameter	BEFORE TREATMENT n=8 mean ± SD	AFTER TREATMENT n=8 mean ± SD	'T' value	P value
1	Total Cholesterol mg/dl	143 ± 40.0	144 ± 34.0	0.054	NS
2	HDL Cholesterol mg/dl	42 ± 16.2	46 ± 11.7	0.57	NS
3	LDL Cholesterol mg/dl	65 ± 33.9	51.1 ± 25.4	0.93	NS

4	VLDL Cholesterol mg/dl	41.4 ± 15.7	37 ± 15.5	0.56	NS
5	Triglycerides mg/dl	205.6 ± 73.6	185.5 ± 77.9	0.53	NS

There were no significant changes in plasma lipid levels before and after treatment with DEC in filarial cases.

### Discussion:

The normal function of lymphatics is to return proteins, lipids and water from the interstitium to the intravascular space. In a diseased state, the lymphatic transport capacity is reduced. This causes the normal volume of interstitial fluid formation to exceed the rate of lymphatic return, resulting in the stagnation of high molecular weight proteins in the interstitium. It usually occurs after flow has been reduced by 80% or more. The result, when compared to other forms of edema that have much lower concentrations of protein, is high protein edema, or lymphedema with protein concentrations of 1.0 – 5.5 gm/ml.

There are no reports on the status of serum lipids in filariasis. Hence the present study is undertaken to estimate the levels of serum lipids in the disease process, and the variations in these parameters before and after Diethyl carbamazine citrate (DEC) treatment.

In the present study the influence of Diethyl carbamazine citrate was tested in a small group of patients. Chemotherapy with DEC is one of the main strategies used in the control of lymphatic filariasis aiming at reduction in morbidity and filarial infection. Treatment with DEC resulted in clearing microfilariae for all the study samples. The sample group is mainly from microfilaraemic patients, all were under the DEC

treatment as per NATIONAL FILARIAL CONTROL PROGRAMME GUIDELINES. There was no significant change in serum lipids after DEC treatment in the present study. As the sample group was small it may not be useful to come to a reasonable conclusion in this group. However further studies are required with large number of samples to evaluate the influence of DEC in lipid metabolism.

### Conclusion:

- Out of 150 study group 102 (68%) were females. According to many studies the female group were more prone to the infection.
- According to the age the microfilaraemic group were more predominant in the age between 11-30 years (58.3%), whereas in clinical filarial cases 31-50 years age group was predominant (50%)
- All the patients were from low socioeconomic group with rural or urban slum dwellers, mixed diet pattern was observed
- Lipoproteins like HDL, LDL, VLDL Cholesterol, Total Cholesterol, Triglycerides were estimated in a total of 150 patients belonging to different groups namely microfilaraemia, clinical filariasis and endemic normals.
- Serum triglyceride levels were not elevated in turn there was no change in VLDL cholesterol.

- There were no statistically significant changes in all parameters studied in filarial cases after the treatment with Diethyl carbamazepine citrate (DEC). As the study group was small, it requires further study to know the influence of DEC on lipid metabolism.
- Only cholesterol fraction was decreased in the total filarial cases in the total filarial cases except VLDL cholesterol fraction. The decrease may be due to urinary loss. All are in the normal range of the serum cholesterol. The decrease was observed only in Microfilaraemic cases but not in clinical filariasis.

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