Clinical Article

Bancroftian Filariasis Causes Male Sterility.

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ABSTRACT

Filariasis is an infectious parasitic disease. Lymphatic filariasis is caused by the worms Wuchereria bancrofti, Brugia malayi, and Brugia trimori. They affect the lymphatic system of the body. These worms lead to the disease elephantiasis. Occult filariasis is diagnosed in amicrofilaraemic cases by finding an adult circulating antigen in the blood. Filarial parasites have symbiotic bacteria which live inside the worm and play a major role in the development of the disease. In filariasis 120 million people are infected and one billion people at risk for infection globally. Repeated infection and inflammation of testis, epididymis and spermatic cord causes low sperm count and quality resulting in male sterility.

Key words *W.bancrofti;* Male sterility; Epididymo-Orchitis; Funiculitis; ADL

INTRODUCTION

Lymphatic filariasis is caused by *Wuchereria bancrofti*. It constitutes about 99.4% of all infections. It is the commonest cause of lymphoedema and hydrocele in India. It is the second most common cause of physical disability next to malaria among the debilitating vector- borne tropical diseases (WHO). Among the endemic countries, the highest incidence of LF is in India, which harbours 40 % of the world disease burden (Michael *et.al*., 1996). It is reported that 40.65 million episodes of acute adenolymphangitis (ADL) occurs annually in the affected population in India. It is estimated to cause a wage loss of US $ 811 million annually (Ramaiah *et al*.,2000).The acute ADL attacks cause genito-urinary problems such as hydrocele, lymphoedema of the genital region or chylocele associated with sexual dysfunction (Dreyer *et. al*, 1997).

It is well known that the initial damage to the lymph vessels is caused by the adult filarial worms. .The acute ADL attacks and the consequent progression of the disease are caused mostly by bacterial infections in the affected parts.The damaged lymphatics promote development of lymphoedema involving genitalia. It is the rupture of damaged lymph vessels that cause hydrocele, chylocele, chyluria, lymph scrotum or lymphorrhoea. Death of adult worms in the vicinity of testes is known to result in acute

onset of of hydrocele and funiculitis. Filarial worms live in the lymphatic and lymph nodes causing dilation and incompetence of their valves resulting in lymph stasis and oedema. This can affect hydrocele and genitals more commonly than lower limbs (80-85%). The plasma proteins in the interstitial fluid cannot pass through venous capillaries due to their high molecular weight. These are cleared through lymphatics which have larger caliber. Inadequate clearance of proteins by lymphatics causes high protein oedema called lymphoedema. By the time it is clinically manifest, the damage to the lymphatics is already advanced and the lymphatic structure is not reversible.So lymphedema is not curable by available methods of treatment.

Wolbachia species are rickettsia-like bacteria found intracellularly within filarial nematodes of *Wuchereria*.*Wolbachia* release endotoxin like molecules that are thought to play a role in the pathogenesis of *Wuchereri*a infections. Evidence for this includes the use of doxycycline, which kills the *Wolbachia* resulting in a reduction of the inflammatory response to the nematode infection.(Levinson,2008).

Cytokines influence the nature of the immune response. These are small molecules that signal between cells inducing regulation of immunity. They are referred to as interleukins (IL) if produced primarily by leukocytes. IL-1 produced by macrophages and epithelial cells activates vascular endothelium, causes tissue destruction, fever, mobilization of polymorphonuclear leukocytes and induction of acute phase proteins(CRP). IL-4 produced by mast cells activates IgE response (Allergy). In lymphatic filariasis, the stagnation of lymph promotes bacterial growth which results in acute ADL attacks, observed frequently in the affected limbs and genital region. Many recent studies have demonstrated the role of microorganisms, mostly streptococci to be causative organisms for ADL attacks (Suma *et al*,1997; Vincent *et al*.,1998). The liberation of intermittent interleukins by the inflamed and infected tissues cause episodic fever, pain and fibrosis. So in repeated ADL attacks the long term antibiotic therapy, long acting parenteral benzathine penicillin is indicated. (Goodman & Gilman.)

Fig.1: Epididymo-orchitis & funiculitis

Case study-1.

Parents brought a young man of 25 years complaining of pain in the right testis and right inguinal area since several months. The pain is referred to the right side of

lower abdomen. The size of the right testis is smaller in comparison to the left. Few years back both sides were normal. The size is gradually decreasing. There is a swelling on the middle of the right inguinal ligament and slightly above. The photograph and ultrasound picture is enclosed for reference. The person is married since 2 years without any issue. No contraceptive measures taken.

The ultrasound report reveals that the right testis is small and rudimentary. No color flow could be appreciated. Rt. Epididymis and right cord also appears thinner. Left testis, Epididymis and cord appears normal except the head and tail of the epididymis is mildly swollen.

The seminal fluid analysis reveals oligospermia. The sperm count is 16.2 million/ml. The viscosity is low.The circulating adult filarial antigen test (Og4C3) is positive (512 Antigen Unit) Case study-2.

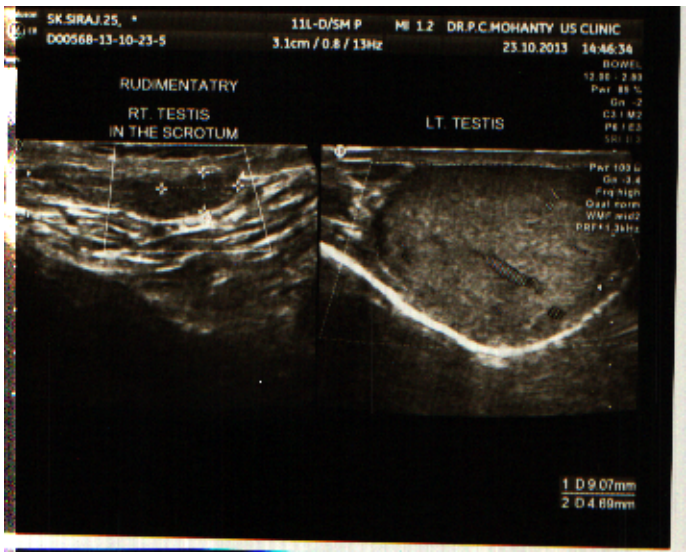

Fig.2 Ultra sound picture
Case study-2.

A person aged about 33 years is married since more than 5 years without having any issue. His testis of both sides are gradually shrinking. He complains of recurrent pain and swelling in the inguinal region. He has lost sex drive. He is getting fever from time to time along with swelling and tenderness in the scrotum. The ultrasound report and photograph reveals swelling of both epididymis. The outer area appears irregularly echogenic due to fibrosis. Right cord appears swollen and measures 8.75 mms, normal being below 5 mms. The diagnosis is right Funiculitis with bilateral chronic Epididymitis. Seminal fluid analysis was done. The total sperm count was 9.4 million/ml, low viscosity with non-motile dead spermatozoa about 10%and non-progressive 50%. The circulating

adult filarial antigen test (Og4C3) is positive (512 Antigen Units). **Og4C3 Test;**- It is a highly sensitive and specific quantitative monoclonal antibody based ELISA test for the diagnosis of filariasis.

DISCUSSION

The clinical findings, laboratory diagnosis,ultrasound report and photograph confirms the diagnosis of Bancroftian filariasis. Repeated inflammation of the epididymis and the testis caused atrophy of the male reproductive organ. Inflammation raised the temperature of the testis. The optimum temperature of the testis should be below 3 degree centigrade of normal body temperature of 37 degree centigrade. More than 250 million sperm are produced daily inside coiled tubes called seminiferous tubules. Immature sperm are moved to the epididymis, where they mature and start to swim. Mature sperm are stored both in the epididymis and in the first section of the vas deferens. Constant high temperature in the testis by course of inflammation caused atrophy of the testis leading to loss of spermatozoa. Bancroftian filariasis is an important cause of inflammation of the testis, epididymis and vas deferens. It causes male sterility in an endemic zone of filariasis.

CONCLUSION

Odisha is an endemic home of bancroftian filariasis. The incidence of the disease in this state accounts one-fifth of total filaria cases of India. Recurrent infection and inflammation of testis, epididymis and spermatic cord leads to low sperm quality and count. This results in increase of male sterility among the youths of the state.

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