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Incidence of Different Bacterial Pathogens Associated with Filaria Patients from Coastal Areas of Odisha

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Lymphatic filariasis is a major health problem in many tropical countries. Acute adenolymphangitis(ADL) is the important clinical manifestation of lymphatic filariasis which contributes significantly to the progress of lymphodema. It is increasingly being recognised that secondary bacterial infection plays an important role in the aetiology of ADL. The present study has been envisaged to identify the different bacterial pathogens and their sensitivity patterns isolated from skin, wound, lymph nodes and abscesses of filariasis patients using different combination of culture media i.e. blood agar, macConkey agar, mannitol salt agar from Balasore and Bhubaneswar area. Out of total 80 samples collected from different sites of filaria patients, 69(86.3%) were culture positive and 11(13.79%) were culture negative. Out of total culture positive samples *Staphylococcus aureus* were 38(55.1%), *Staphylococcus epidermidis* 13(8.9%), *Streptococcus pyogens* 12(17.4%) and *E.coli* 6 (8.7%). The common sensitivity pattern for *Staphylococcus aureus*, *Staphylococcus epidermidis*, *Streptococcus pyogens* and *E.coli* were kanamycin, rifampicin, streptomycin, ciprofloxacin, erythromycin, co-trimoxazole , gentamicin, tetracycline and they were resistant to ampicillin, bacitracin, chloramphenicol, neomycin, nalidixic acid, penicillin. Different authors have reported low prevalence of Streptococcus infection associated with elephantiasis cases. Low prevalence of *Staphylococcus epidermidis, Staphylococcus aureus* and *Bacillus subtilis*, etc have also been reported by other workers. In the present investigation we have isolated the similar type of bacterial infection associated with filarial patients. This type of study should be conducted by enrolling more number of filaria patients from different areas of Odisha.

Key words: Filariasis, Adenolymphangitis (ADL), Bacterial pathogens, Antibiotic sensitivity.

Filariasis caused by the nematodes species: *Wucheria bancroftr, Brugia malayi*, *B.tumori.* Generally it causes lymphatic filariasis in human being known as elephantiasis. *Wucheria bancrofti* is transmitted by Culex, Aedes and Anopheles species; whereas *Brugia malayi* is transmitted by Anopheles and Mansonia species. Lymphatic filariasis is a major public health problem in many tropical countries. Acute adenolymphangitis (ADL) is the important clinical manifestation of lymphatic filariasis. It is increasingly recognised that secondary bacterial infections play an important role in the etiology of ADL. A common route of entry of bacterial pathogens is through the broken skin[1]. There are four stages of lymphatic filariasis and these are 1.asymptomatic amicrofilariaemic 2. asymptomatic microfilaraemic stage 3.stages of acute

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manifestation 4.stages of obstructive (chronic lesions). In India, the bacterial pathogens which are most frequently associated with ADLA are Group-A *Streptococcus* species[2]. Clinical description of ADLA in filariasis endemic areas is similar to those of Erysipelas species and Bacterial cellulites about which has been written in the dermatologic literature[3]. *Staphylococcus epidermidis, Staphylococcus aureus, Staphylococcus xylosus, Acinetobacter, Bacillus suubtilis* and *Enterococcus* species are the most common bacterial pathogens found in case of filarial infection[4]. *Bacillus subtilis* and *Staphylococcus* are found in lymph node infection[5]. Lymphatic filariasis infects more than 120 million people all over the world, over 1 billion people living in areas endemic for filariasis. It is widespread in Asia, Africa and sub-tropical areas. About 107 million of people infected with *Wucheria Bancrofti* and 13 million with *Brugia malayi* and *Brugia tumori*. In Africa and India elephantiasis and lymphodema affects more than 44 million men and 78 million were women and children[6]. Lymphodema and elephantiasis of the limbs or genitals infection are associated with bacterial infection. Around 289 districts in India affected with lymphatic filariasis and many people are at risk of infection[6]. Brugian filariais is highly endemic in Bihar, Odisha, West Bengal, Gujarat and Kerala which contributes 95% of the disease burden[7]. Therefore, the present study has been envisaged to document the incidence of different bacterial pathogens isolated from wounds abscesses, tissue fluid etc from filaria patients with their antibiogram profile.

MATERIALS AND METHODS

Study area

The studies were conducted from the coastal districts of Bhubaneswar and Balasore between (Jan-June, 2009) and (Jan-June2013). The study population consists of 80 patients having different clinical symptoms like swelling of legs, skin cracks in elephantiasis patients, secretion of tissue fluid

Bacteriological analysis

Swabs were collected aseptically from lymph nodes, wounds of skin lesions, and tissue fluid and were transported to Microbiology division of Regional Medical Research Centre (ICMR), Bhubaneswar. The samples were immediately inoculated on MacConkey, blood agar, mannitol salt agar medium. The plates were inoculated at 37°C for 24 hours. Blood agar plates were inoculated in aerobic as well as in anaerobic conditions. Significant colonies were picked up for gram staining and finally biochemical tests were done for confirmation of bacterial species. Identification of isolates was done based on colony morphology, motility test, catalase, coagulase, triple sugar iron agar (TSI) test.

Antimicrobial Susceptibility

Antimicrobial susceptibility was performed by modified Kirby Bower Disk Diffusion technique (1966) with commercially available antibiotic disc. Antibiotics were purchased from Hi-Media, Mumbai, the interpretation was done as follows by our previous studies reported earlier[8]. Antibiotics used in this study were kanamycin (K,10µg), bacitracin (B,10µg), penicillin (P,10µg), cefuroxime (cu,30µg), piperacillin (Pc,100µg), rifampicin (R,30µg), fusidic acid (Fc,10µg), co-trimoxazole (Co,25µg), streptomycin (S,10µg), ciprofloxacin (cf,5µg), tetracycline (T,30µg), gentamicin (G,10µg), norfloxacin (Nx,10µg), erythromycin (E,15µg), neomycin (N,30µg), ampicillin (A,10µg), nalidixic acid (Na,30µg), chloramphenicol (C,30µg), furazolidone (Fr,50µg).

RESULTS

A total of 80 samples were collected from filaria patients from different areas of Balasore and Bhubaneswar . Out of the total samples tested 86% were culture positive and rest 14% were culture negative. Out of culture positive samples; *Staphylococcus aureus* (55%) *S. epidermidis*

Table 1. Bacteriological analysis of pathogens isolated from filaria patients

	Balasore	Bhubaneswar	Total
Total samples	40	40	80
Culture positive%	83	90	86
Culture negative%	17	10	14
S.aureus%	57	53	55
S.epidermidis %	24	14	18
S.pyogenes %	9	8	9
E.coli %	9	25	17

Table 2. Resistance patterns of different isolated pathogens to different antibiotics

Antibiotics	*S.aureus* %	*S.epidermidis*%	*S.pyogenes* %	*E.coli* %
Ampicillin	78.9%	100%	33.6%	100%
Bacitracin	100%	75%	66.6%	100%
Chloramphenicol	0%	0%	0%	0%
Cefuroxime	Not done	Not done	0%	100%
Co-trimoxazole	73.5%	37.5%	33.3%	100%
Norfloxacin	0%	Not done	0%	0%
Nalidixic acid	89.4%	Not done	100%	0%
Neomycin	100%	75%	100%	100%
Piperacillin	21.0%	Not done	Not done	Not done
Streptomycin	63.1%	37.5%	Not done	Not done
Tetracycline	0%	0%	Not done	Not done
Erythromycin	57.8%	100%	100%	33.3%
Fusidic acid	Not done	Not done	Not done	100%
Ciprofloxacin	0%	0%	0%	Not done

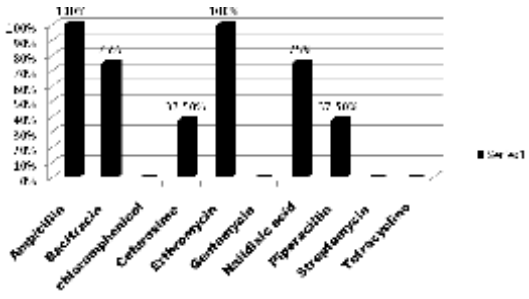

Fig. 1(a). Resistance patterns of *Staphylococcus aureus* to different antibiotics

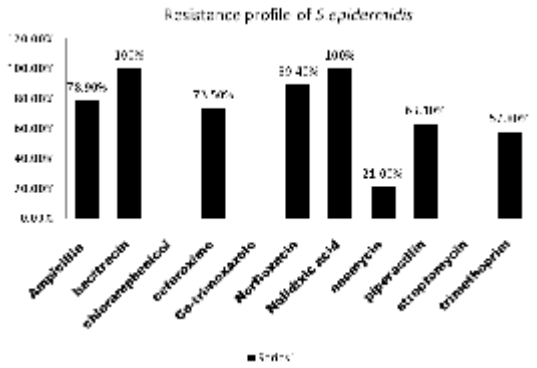

Fig. 1(b). Resistance patterns of *Staphylococcus epidermidis* to different antibiotics

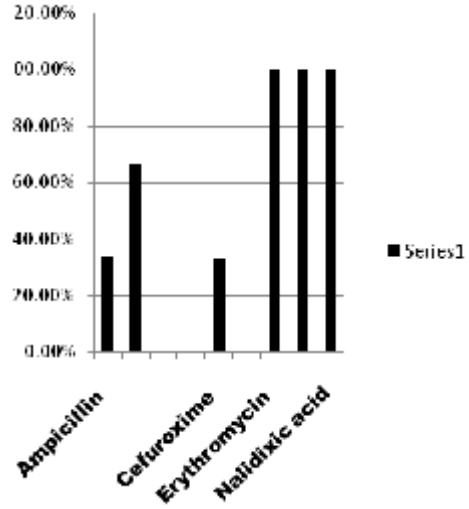

Fig. 1(c). Resistance patterns of *Streptococcus pyogenes* to different antibiotics

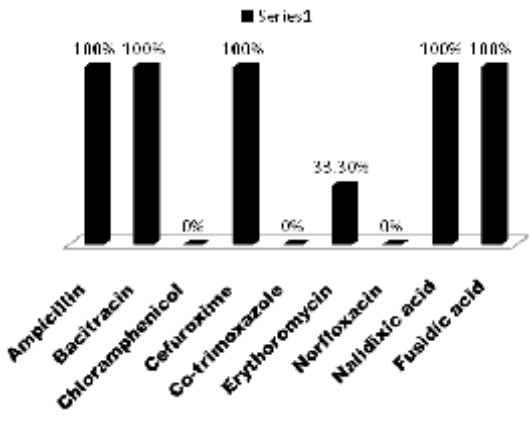

Fig. 1(d). Resistance patterns of *E.coli* to different antibiotics

(18%), *Streptococcus* (9%) and *E.coli* (17%) were isolated from different sites of infection.(Table 1). Increasing prevalence of bacterial isolates in tissue fluid, lymph and lymph nodes was observed in the advanced stages of lymphedema.

The resistance patterns of *Staphylococcus aureus*, *Staphylococcus epidermidis*, *Streptococcus pyogens* and *E.coli* have been described in the table (2). *Staphylococcus aureus* were 100% resistant to bacitracin, 89.4% resistant to norfloxacin, 100% to nalidixic acid, 78.9% to ampicillin, 73.5% to cefuroxime and 21%to neomycin, 63.1% to piperacillin, 57.8% to co-trimoxazole but were sensitive to penicillin, chloramphenicol, co-trimoxazole and streptomycin. The *Staphylococcus epidermidis* were resistant to ampicillin (100%), bacitracin (78%), erythromycin (100%), nalidixic acid (75%), piperacillin (37.5%) but were sensitive to gentamicin, streptomycin, penicillin. *Streptococcus pyogenes* were resistant to bacitracin (66.6%), ampicillin (33.6%), cefuroxime (33.6%), erytromycin (100%), nalidixic acid (100%) but were sensitive to ciprofloxacin, cotrimoxazole etc. The *E.coli* Strains isolated were resistant to ampicillin-100%, bacitracin-100%, cefuroxime-100%, and erytromycin-100% but were sensitive to co-trimoxazole, nalidixic acid, penicillin. Table-5 [Fig1(a,b,c,d)].

DISCUSSION

The etiology of Adenolymphangitis (ADL) in the case of lymphatic filariasis is unknown. Filarial lymphedema is complicated by frequency episodes of dermatolymphangioadentis(DLA) patients with lymphatic damage caused by the filarial parasite and are prone to secondary bacterial infections especially with *Streptococci*, which plays an important role in the aetiology of ADL attacks[9,10].The local lesions that facilitate entry of these bacteria which can affect the limb during most acute attacks. Usually they are minor injuries, *candiasis*, *pyoderma*, *eczema* or fissures in the sole of the foot. The ADL attacks in lymphatic filariasis have been extensively studied. It has been observed that injuries, fungal infection and loss of epithelium due to similar causes predispose to bacterial infections, especially by Streptococci resulting in ADL. Local dissemination of *Streptococcal* infection is through lymphatic producing rapidly lymphangitis and lymph node. *Streptococci* are known to produce different exoenzymes, one of which is streptolysin. Antibiotics to these exoenzymes (AS0) are positive in 80-85% of patients infected with *Streptococci*[11]. A severe systematic symptom during attack of DLA resembles those of septicemia. In a study out of 100 patients referred with filarial lymphedema, blood bacteria were isolated in 9 cases, four to *cocci* and one was *sarcina*. Swabs were taken from the tissue fluid and lymph node out of 10 patients,4 contained *bacilli*(40%),*Staphylococci* in three (30%),lymph was drained in 4 patients and many isolates in all samples[12]. In the present study an attempt was made to find out the incidence of different bacterial pathogens isolated from filaria patients. During one year study period 80 patients were involved suffering from filariasis and bacteriological analysis was done. Out of total samples tested *Staphylococcus aureus* (55%), *S.epidermidis* (18%), *S.pyogenes* (17%), *E.coli* (9%). It has been observed that in many studies bacterial infections plays an important role in the filariasis. People with low socio-economic status and poor knowledge of hygiene were infected with secondary bacterial infection. The mainstay in the management and prevention of ADL attacks is local care of the affected limbs[13],proper foot care should be done, infected areas should be washed properly, patients should not be bare footed , the legs are to be kept raised when the patient is recumbent. Care should be taken to prevent injuries and infection in the affected limbs and antibiotics is used in a case where there is an injury. Disability control is an important aspect of the lymphatic filariasis elimination programme, achieved by preventing or reducing the number of ADL attacks. As this disease infects the poorer sections of the population, measures should be taken to prevent ADL attacks have to be simple, easy to adopt and cheap. So this type of study should be continued enrolling more number of filaria patients from different areas of Odisha. High clinical suspicion and appropriate microbiological tests is also essential for early diagnosis and proper administration of antibiotics which will lead to prevention and elimination of the filariasis.

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