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Medicine

Frequency of Culture Positive Tuberculosis in Exudative Pericardial Effusion

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ABSTRACT

Objective: To evaluate the frequency of culture positive tuberculosis and to determine the sensitivity of drugs in exudative pericardial fluid.

Study Design: Descriptive observational study

Place and Duration of Study: This study was conducted on patients admitted in cardiology and Medical wards of Civil Hospital Karachi from 1st November 2010 to 30th April 2011.

Materials and Methods: In this study 50 patients of pericardial effusion diagnosed on the basis of history, physical examination, electrocardiography, chest x-ray PA view and echocardiography underwent pericardiocentesis under fluoroscopy. Pericardial fluid D/R was done and all the patients having exudative pericardial fluid (protein) 3 gm% and LDH > 200 IU) were selected. All the exudative pericardial effusion were sent for AFB culture and sensitivity on L.J. medium. Inclusion criteria were all patients with the diagnosis of exudative pericardial effusion above 12 years of age of either sex. Exclusion criteria were all patients with transudative pericardial effusion and below 12 years of age.

Results: 3(6%) patients had culture positive for mycobacterium tuberculosis on L.J medium. 5(10%) had culture positive of other bacteria of which 2(4%) had culture positive for resistant Staphylococcus aureus, 2(4%) had culture positive for Streptococcus pneumonia and 1(2%) had culture positive for Streptococcus viridans and 42 (84%)"patients had culture negative for AFB and other bacteria. Out of 50 patients, 16(32%) were in age group between 20-40 years, 22(44%) were in age group between 41-60 years and 12(24%) were in age group> 60 years. Out of 16 patients having age between 20-40 years, 1(6.25%) had culture positive for AFB, 3(18.75%) had culture positive for other bacteria and 12(75%) had culture -ve for all organism. Out of 22 patient having age between 41-60 years, 2(9.09%) had culture +ve for AFB, 2(9.09%) had culture for other bacteria and 18(81.81%) had culture negative for all organisms. Out of 12 patients having age >60 years, none (0%) had culture +ve for AFB, none (0%) had culture +ve for other bacteria and all 12 (100%) had culture negative for all organisms. All 3 patients having culture positive for AFB were found to be sensitive to all antituberculous drugs.

Conclusion: The concluded that frequency of culture positivity is only 6% for Mycobacterium Tuberculosis, so this should not be the investigation of choice to confirm tuberculous pericardial effusion. However, other parameters should also be looked for in establishing the diagnosis of pericardial effusion like clinical parameters, the prevalence of tuberculosis in relative area , ESR, MT, Mycobacterium tuberculosis DNA PCR and Mycobacterium tuberculosis culture on BACTEC.

Key Words: Pericardial Effusion, Tuberculosis, L J medium

INTRODUCTION

Pericardial effusion is an abnormal accumulation of fluid in the pericardial cavity. The pericardial space in humans normally contains between 15-50 ml of clear fluid which is an ultrafiltrate of blood plasma [1]. The common causes of pericardial effusion include viral, bacterial, fungal, mycobacterial infection, acute myocardial infarction, uremia, connective tissue disorder, myxedema and neoplastic diseases[2]. Tuberculosis is one of the commonest causes of exudative pericardial effusion in developing countries[3]. Tuberculous pericarditis usually develops by retrograde spread from peribronchial, peritracheal or mediastinal lymph nodes or by hematogenous spread from the primary tuberculous infection. Tuberculous pericardial effusion may be serous but more often contains some blood with a protein content exceeding 2.5 gm/dl [4]. Tuberculous pericardial effusion usually develops slowly, with non-specific systemic symptoms, such as fever, night sweats, fatigue and dyspnea. Right upper abdominal pain due to liver congestion is also common. Heavy sputum production, cough and hemoptysis that clues to the presence of cavitary pulmonary tuberculosis are usually absent[5].

Diagnosis or pericardial effusion is made on history, physical examination, cardiomegaly on chest x-ray, ECG and echocardiography [6]. A definitive diagnosis of tuberculous origin can only be made by isolation of the bacillus from the pericardial fluid on Ziehl-Neelsen stain or by culture of fluid or pericardial biopsy on tuberculous specific culture (e.g. L. J. medium). The

sensitivity of AFB stain and culture of mycobacterium tuberculosis is low in pericardial fluid but still is the gold standard for definitive diagnosis of tuberculous pericardial effusion[7,8].

The main purpose of this study is to know the frequency of culture positive tuberculosis in exudative pericardial effusion in our country, so that we can estimate the sensitivity of this test for our community where tuberculosis is the leading cause of exudative pericardial effusion.

MATERIALS AND METHODS

This was a descriptive observational study of 50 patients conducted on patients with exudative pericardial effusion admitted in Department of Medicine and Cardiology, Civil Hospital Karachi, Liaquat National Hospital and NICVD , from January 2011 to July 2012. All patients admitted with pericardial effusion diagnosed on the basis of history, physical examination, electrocardiography, chest x-ray PA view and echocardiography underwent pericardiocentesis under fluoroscopy. Pericardial fluid D/R was done and all the patients having exudative pericardial fluid (protein) 3 gm% and LDH > 200 IU) were selected. All the exudative pericardial effusion were sent for AFB culture and sensitivity on L.J. medium. Inclusion criteria were all patients with the diagnosis of exudative pericardial effusion above 12 years of age of either sex. Exclusion criteria were all patients with transudative pericardial effusion and below 12 years of age.

RESULTS

3 (6%) patients had culture positive for mycobacterium tuberculosis on L.J. medium. 5(10%) had culture positive of other bacteria of which 2(4%) had culture positive for resistant Staphylococcus aureus, 2(4%) had culture positive for Streptococcus pneumonia and 1(2%) had culture positive for Streptococcus viridans and 42 (84%)"patients had culture negative for AFB and other bacteria.

Out of these 50 patients, 32(64%) were male and 18(36%) were female. Out of these 32 male patients, 2(6.25%) had culture +ve for AFB, 4(12.5%) had culture +ve for other bacteria and 26(81.25%) had culture -ve for all organisms. Out of 18 female patients 1(5.55%) had culture +ve for AFB. 1(5.55%) had culture +ve for other bacteria and 16 (88.88%) had culture -ve for all organisms(Table No.1).

All patients with exudative pericardial effusion were divided into three age groups i.e. between 20-40 years, between 41-60 years and >60 years. Out of 50 patients, 16(32%) were in age group between 20-40 years, 22(44%) were in age group between 41-60 years and 12(24%) were in age group> 60 years. Out of 16 patients having age between 20-40 years, 1(6.25%) had culture positive for AFB, 3(18.75%) had culture positive for other bacteria and 12(75%) had culture -ve for all organism. Out of 22 patient having age between 41-60 years, 2(9.09%) had culture +ve for AFB, 2(9.09%) had culture for other bacteria and 18(81.81%) had culture negative for all organisms. Out of 12 patients having age >60 years, none (0%) had culture +ve for AFB, none (0%) had culture +ve for other bacteria and all 12 (100%) had culture negative for all organisms. All 3 patients having culture positive for AFB were found to be sensitive to all antituberculous drugs (Chart No.1).

Table No.1 Variable

Variable	AFB +VE	Other Bacteria	Culture –ve	Total
Exudative Pericardial Effusion	3(6%)	5(10%)	42(84%)	50
AGE				
• 20-40 years	1(2%)	2(4%)	12(24%)	50
• 41- 50 years	2(4%)	2(4%)	18(36%)	
• 60 – 80 years	0(0%)	0(0%)	12(24%)	
Sex				
• Male	2(4%)	4(8%)	26(52%)	50
• Female	1(2%)	1(2%)	18(36%)	

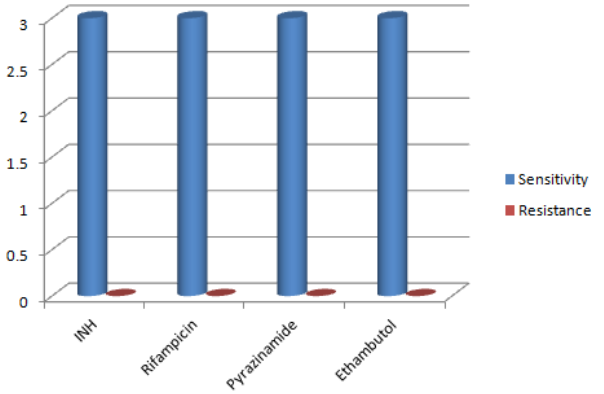

Chart No.1: Pattern of sensitivity of antituberculosis drugs to AFB culture positive exudative pericardial effusion

DISCUSSION

Tuberculosis is a chronic infectious disease caused by mycobacterium tuberculosis. During the industrial revolution of the 18th and 19th centuries, the disease was known as the "white plague". It was the leading cause of death in young people all over the world. Today, despite great progress in its treatment and

control, it remains an important medical problem in many developing countries[9,10].

In the developed countries, within the past three decades, the incidence of tuberculosis has decreased, as a result of effective chemotherapy and public health surveillance. However due to emergence of HIV & AIDS, the incidence of tuberculosis has increased in the developed countries in the last 15 years [9,11].

Tuberculosis can have both pulmonary and extrapulmonary involvement. In heart, pericardium is the commonest site involved as a result of tuberculosis. Tuberculous pericardial effusion may be serous but more often contains some blood with a protein content exceeding 2.5 gm/dl. It develops slowly with non-specific systemic symptoms. such as fever, night sweats, fatigue and dyspnea. Rapid accumulation even with small effusion produce cardiac tamponade [12].

The yield for AFB in exudative pericardial effusion till so far is 30% [13]. In 70% cases of tuberculous pericardial effusion culture of bacilli does not show positive result. In my study on 50 patients with exudative pericardial effusion only 3 patients i.e. in 6%, the culture for mycobacterium tuberculosis was found positive. The low yield of culture positivity max be due to the technique of getting pericardial fluid, or originally scarcity of organism in the pericardial fluid of suspected tuberculosis.

In this study, the frequency of culture positivity is only 6% for mycobacterium tuberculosis, so this should not be the investigation of choice to confirm tuberculous pericardial effusion, However, other parameters should also be looked for in establishing the diagnosis of tuberculous pericardial effusion like clinical parameters, prevalence of tuberculosis in relative area, ESR, MT, mycobacterium tuberculosis DNA PCR and mycobacterium tuberculosis culture on BACTEC.

In abroad, clue to HIV, most of the tuberculosis is now seen in HIV positive subjects. The incidence of pericardial effusion in patient with already having pulmonary TB was 20% as noted in study conducted by S.K. Sharma & A. Mohan[14]. In another study [15], mycobacterium tuberculosis was identified by culture in 30 of 43 specimens (70%) from patients with tuberculous pericarditis and by PCR in 14 of 28 specimens (50%) from patients with tuberculous pericarditis (P>O.IS). The sensitivity of PCR was higher with tissue specimen (12 out of 15, 80%) than with fluid (2 of 13, 15%, P = 0.002). Much higher results of culture positivity can be expected if AFB is cultured on highly sensitive media i.e. BACTEC radiometric broth and Middle book solid media[16].

In my study all culture positive patients turned out to be HIV negative tested on hemagglutination method, indicating that the prevalence of tuberculosis in our country is not due to HIV / AIDS but the other factors such as malnourishment, overcrowding, poverty, chronic debilitating states and endemicity of this disease. As this study is one thing found through culture and sensitivity is the sensitivity of mycobacterium to first line drugs i.e. Rifampicin, INH, Streptomycin, Ethambutol and Pyrazinamide as well. Large-scale studies are needed to statistically signify the yield of culture positivity of tuberculous pericardial effusion and to find out its prevalence among various age groups as well as in different racial population and also its distribution among male and female subjects. My study although was carried out on small number of patients but it is first ever locally conducted study to initiate other researchers to evaluate and collect larger data on a country basis and compare with the results of studies conducted so far in developed countries after the emergency of HIV/ AIDS.

CONCLUSION

In this study, the frequency of culture positivity is only 6% for Mycobacterium Tuberculosis, so this should not be the investigation of choice to confirm tuberculous pericardial effusion. However, other parameters should also be looked for in establishing the diagnosis of pericardial effusion like clinical parameters, the prevalence of tuberculosis in relative area , ESR, MT, Mycobacterium tuberculosis DNA PCR and Mycobacterium tuberculosis culture on BACTEC.

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