Scholars Journal of Applied Medical Sciences (SJAMS) **ISSN 2320-6691 (Online)**
Sch. J. App. Med. Sci., 2017; 5(7D):2767-2770 **ISSN 2347-954X (Print)**

(An International Publisher for Academic and Scientific Resources)
www.saspublishers.com DOI: 10.36347/sjams.2017.v05i07.053

Original Research Article

Study of Prevalence of Atypical mycobacteria

Shubhra Sengupta
Associate professor, Dept. of Microbiology, Ulhas patil Medical college, Jalgaon.

***Corresponding author**
Shubhra Sengupta
Email: shubhrasengupta9@gmail.com

Abstract: Specific diseases caused by mycobacteria are leprosy and tuberculosis. The other members are commonly saprophytes which can be opportunistic and deadly pathogens. These other mycobacteria are referred to as atypical mycobacteria, mycobacteria other than tubercle bacilli (MOTT) or non-tuberculous mycobacteria (NTM). These atypical mycobacteria can produce localized disease condition in the lungs, skin, lymph glands, wounds or bone and sometimes produces disseminated disease. The present study was done to study the prevalence of Atypical mycobacteria . The samples of sputum, pus, CSF, urine, pleural fluid, ascietic fluid, gastric aspirates, pericardial effusion & endometrial biopsy from clinically suspected cases of tuberculosis were received in sterile containers in the dept. of Microbiology at Ulhas patil medical college, Jalgaon from april 2016 to march 2017. The samples were the concentrated and the cultures were checked daily for one week and then weekly once for eight weeks for growth. A total of 22 strains of Atypical Mycobacteria were isolated from the various clinical samples. This study revealed the incidence of M.tuberculosis and atypical Mycobacteria as 93.02% to 6.98% respectively. Out of the 313 mycobacterial isolates 22 were atypical Mycobacteria which included M. kansassii, MAIC, M. asiaticum, M. szulgai, M. terrae and M scrofulaceum. The increase in the number of Atypical Mycobacteria infections is a serious public health burden. Research efforts should be directed in the regional reference laboratories that will lead to strategies for prevention, predicting progression and improved treatment of disease.
Keywords: Atypical mycobacteria, Tuberculosis, Nontuberculous Mycobacteria.

INTRODUCTION

Nontuberculous mycobacteria are usually present in the environment and have been isolated worldwide. They are commonly recognized as pathogens in humans. Pulmonary disease is the most common manifestation and is thought to result from aerosol inhalation [1].

The genera Mycobacteriae not only contains obligate pathogens like the tuberculosis complex (M. tuberculosis, M. bovis and M. africanum) and leprosy bacilli (M. leprae), but also species that normally inhabit the environment yet occasionally cause human diseases [2]. The importance of these environmental Mycobacteriae has increased due to the epidemic of HIV infection. During the last two decades atypical Mycobacteria which are also known as anonymous or Mycobacteria other than additional attention as they are capable of producing disease resembling tuberculosis causing pulmonary, localized and disseminated lesions. The infection caused by thesed organisms are indistinguishable clinically and radiologically from those caused by M. tuberculosis and are usually resistant to multiple antitubercular drugs, hence it is essential to speciate these organism [3,4].

The pulmonary disease triggered by nontuberculous mycobacteria appears to be growing in the world, but accurate data to support this assumption is not present. Patients were described as middle-aged men with presence of underlying chronic lung disease, like chronic obstructive pulmonary disease having upper lobe cavity formation and also presence of nodules of various sizes. A number of patients can have nodules, bronchiolitis, and bronchiectasis in the middle lobe and lingula. These patients are more usually female non-smokers with no preexisting lung disease [5].

MATERIALS AND METHODS

A total of 1144 samples i.e. sputum, pus, CSF, urine, pleural fluid, ascietic fluid, gastric aspirates, pericardial effusion & endometrial biopsy from clinically suspected cases of tuberculosis were received in sterile containers in the dept. of Microbiology at Ulhas patil medical college, Jalgaon from april 2016 to march 2017. Approval of the ethical committee was taken before start of the study and informed consent was taken from all the participants. All the samples were processed after centrifuging at 3000 rpm for 15 min. and the sediments were used for processing. The samples were the concentrated and decontaminated by the NaCl – NAOH method [6] and inoculated on L-J media. The cultures were checked daily for one week and then weekly once for eight weeks for growth. If the slants showed Mycobacterial growth they were speciated using the following parameters -

1. Rate of growth
2. Catalase test at 68^0C
3. Niacin test
4. Tween-80 hydrolysis test
5. Arylsulphatase test
6. Nitrate reduction test
7. Urease test
8. Pigment production
9. Pyrazinamide test
10. Para-nitobenzoic acid

RESULTS

Three hundred and thirteen isolates of Mycobacteria were isolated from the 1144 clinical samples. Out of these, 313 twenty-two were identified as atypical Mycobacterial strains which included fourteen hotochromogens [Runyon group I] commencing 11 of M. kansassii, 2 of M. asiaticum and 1 of M sulgai. Of the remaining eight strains one was a Scotochromogen [Runyons group II] while remaining seven included 6 of MAIC and 1 of M. terrae. (Table 1 and 2)

Table−1: Distribution pattern of the 22 Atypical Mycobacterial isolates:-

S.No	Specimens	Total Nos.	Mycobacterial isolates Nos.	%
1	Sputum	565	11	(1.94)
2	Pleural Fluid	226	05	(2.21)
3	C.S.F	151	01	(0.66)
4	Pus	89	02	(2.24)
5	Ascietic fluid	85	02	(2.25)
6	Urine	16	01	(6.25)
7	Others	12		
	Total	1144	22	

Table−2: Sample-wise distribution of the 22 Atypical Mycobacterial isolates:-

S.N	Species	Sputum	Pus	CSF	Urine	Pleural fluid	Ascietic fluid	Total
1	M. kanssassii	04	01	01	01	03	01	11
2	M.A.I.C	04	-	-	-	01	01	06
3	M.asiaticum	01	-	-	-	01	-	02
4	M.terrae	01	-	-	-	-	-	01
5	M.szulgai	01	-	-	-	-	-	01
6	M.scrofulaceum	01	01	-	-	-	-	02
	Total	12	02	01	01	04	04	22

DISCUSSION

Atypical mycobacteria are opportunistic pathogens universally found in soil, water, milk, dust and various animals and birds. While extensive guidelines exist for the management of Mycobacterium tuberculosis complex (MTB) infections (M. tuberculosis, M. africanum, M. bovis) there is a relative paucity of recommendations for the management of

NTM infections. Also known as mycobacteria-other-than-tuberculosis (MOTT), opportunist, atypical or environmental mycobacteria [7].

Atypical Mycobacteria disease is not a condition reported in most countries as no evidence of human-to-human transmission exists and thus it is not considered a public health concern. However, the organisms are ubiquitous in the environment, and substantial evidence shows that the environmental niche for Mycobacterium intracellulare (the most common pulmonary pathogen) is in biofilms lining suburban water pipes. Many atypical Mycobacteria pathogens have been isolated from drinking water. Some clinicians also believe this condition should be categorized as an environmental health concern, comparable to that caused by Legionella spp [5].

Atypical Mycobacteria includes all members of the genus Mycobacterium, other than the M. tuberculosis complex and M. leprae, the causative agents of human tuberculosis and leprosy. There are two major dissimilarities between these two diseases and Atypical Mycobacteria disease that have implications for epidemiological studies. The first difference is the mode of spread. Atypical Mycobacteria are environmental bacteria and the environment is the source of human infections. The second difference is that Atypical Mycobacteria are opportunistic agents that cause disease mainly in patients with local or systemic impairment of immunity. Exposure to Atypical Mycobacteria from the environment does not commonly lead to infection and disease [8].

In the developing countries, tuberculosis caused by M. tuberculosis is still a major cause of mortality and atypical Mycobacteria are considered comparatively of minor importance as human pathogens. These Mycobacteria cause lesions indistinguishable from those produced by the typical Mycobacteria and diagnosis has to be made by bacteriology. It is important to know the disease causing bacteria as the course of therapy changes for the atypical mycobacteriosis. Review of research on the prevalence of the type of atypical mycobacteria in India indicated that strains belonging to Runyon group III were isolated more [9-12] However Shrinivas[13] has reported isolation of Runyon group II as dominating. The relative distribution of atypical mycobacteria in our country reported by various workers varies from 0.7% to 34% and in the present study, 6.98% of atypical mycobacteria were isolated. Study by Daniel O *et al* [14] found 9.1% Atypical Mycobacteria among 102 samples studied. Also the study by Nasiri MJ *et al* [15] showed that the prevalence of NTM infections was 10.2% among culture-positive cases of tuberculosis (TB) in Iran. Additionally, M. simiae (43.3%), M. intracellucar (27.3%) and M. fortuitum (22.7%) were the most prevalent Atypical Mycobacteria species, respectively.

Treatment of Atypical Mycobacteria can be difficult, prolonged and often requires multiple agents. Differentiation between contamination and infection is usually crucial. To meet the ATS guidelines for diagnosis of Atypical Mycobacteria pulmonary disease, there must be radiological (chest radiograph or high resolution computed tomography [CT]) and microbiological (positive culture results from at least two expectorated sputum samples or positive culture results from at least one bronchial wash or transbronchial or other lung biopsy with granulomatous inflammation or acid-fast bacilli and positive culture from bronchoscopy or sputum) evidence of infection, combined with exclusion of other disorders such as tuberculosis. This must be correlated with the clinical picture [7].

CONCLUSION

The increase in the number of Atypical Mycobacteria infections is a serious public health burden. Establishment of suitable diagnostic criteria and management strategies for this disease are important. Further work is needed to understand the frequency of disease among all patients with pulmonary tuberculosis. Also, research efforts should be directed in the regional reference laboratories that will lead to strategies for prevention, predicting progression and improved treatment of disease.

REFERENCES

1. Simons S, Van Ingen J, Hsueh PR, Van Hung N, Dekhuijzen PR, Boeree MJ, Van Soolingen D. Nontuberculous mycobacteria in respiratory tract infections, eastern Asia. Emerging infectious diseases. 2011 Mar; 17(3):343.
2. Grange JM, Yates DM. Infections caused by the opportunistic Mycobacteria. A Review. J. Roy Soc. Med. 1986; 79, 226 -229

3. TImple A & Runyon E H The relationship of "Atypical acidfast bacteria to human disease. J. Lab. Clin. Med. 1954; 44, 202
4. Runyon EH. Anonymous mycobacteria in pulmonary disease. Medical Clinics of North America. 1959 Jan 31; 43(1):273-90.
5. Thomson RM. Changing Epidemiology of Pulmonary Nontuberculous Mycobacteria Infections. Emerging Infectious Diseases 2010; 16(10):1576-83.
6. Kubica GP, Dye WE, Cohn ML, Middlebrooke G. Sputum digestion and decontamination with NaCl – NaOH method for culture of Mycobacteriae. Am. Rev. Resp. dis. 1987; 87, 775.
7. McCallum AD, Watkin SW, Faccenda JF. Non-tuberculous mycobacterial infections in the Scottish Borders: identification, management and treatment outcomes – a retrospective review. J R Coll Physicians Edinb 2011; 41:294–303.
8. Ingen JV, Wagner D. Epidemiology of nontuberculous mycobacterial disease in Germany and worldwide. Der Pneumologe 2011; 6:1-5.
9. Kaur H & Chitkara NL. A study of Mycobacteriaed including atypical acid fast bacilli (culture & biochemical characteristic) Ind. J. Tuber. 1964; 12, 16
10. Patel U, d'sousa T & Sayed B A. A bacteriological study of Mycobacterium tuberculosis in Baroda. Ind. J. Med. Sci. 1966; 20, 924.
11. Madhavan NH & Sharma KB. Studies of Mycobacteria isolated in Pondicheri. Ind. J. Chest dis. 1969; 11, 196
12. Rajvanshi VS. & Tiagi GK. Atypical Mycobacteria In human disease with respect to five strains isolated fromcases of pulmonary tuberculosis. Ind. J. Path. Bact.（1970）; 13, 21
13. Shrinivas, Characterisation of Anonymous mycobacteria from clinical material. J. All India Institute of Medical Sciences. 1975; 1. 11
14. Daniel O, Osman E, Adebiye P, Mourad G, Declarcq E, Bakare R. Non tuberculosis mycobacteria isolates among new and previously treated pulmonary tuberculosis patients in Nigeria. Asian Pacific Journal of Tropical Disease. 2011;113-115.
15. Nasiri MJ, Dabiri H, Darban-Sarokhalil D, Shahraki AH. Prevalence of non-tuberculosis mycobacterial infections among tuberculosis suspects in Iran: systematic review and meta-analysis. PloS one. 2015 Jun 8; 10(6):e0129073.