International Journal of Research in Medical Sciences
Andrianarivelo AM et al. Int J Res Med Sci. 2015 Dec;3(12):3576-3580
www.msjonline.org
pISSN 2320-6071 | eISSN 2320-6012

DOI: http://dx.doi.org/10.18203/2320-6012.ijrms20151402

Research Article

Acid fast bacillus pulmonary and extra pulmonary in a laboratory of university hospital center in Antananarivo, Madagascar since 2003-2014

Andry M. Andrianarivelo*, Lalaina M. Rakotondraoelina, Solofo S. Rafaramalala, Tojoniaina H. Andriamandimbisoa, Rado L. Randriamboavonjy, C. Rafalimanana, A. Rasamindrakotroka

Department of Biology, Faculty of Medicine Antananarivo, Madagascar

Received: 02 October 2015
Accepted: 19 November 2015

***Correspondence:**
Dr. Andry M. Andrianarivelo,
E-mail: andrimaharo@yahoo.fr

ABSTRACT

Background: Tuberculosis has even been a grave public health problem in Madagascar, one of the main causes responsible for death at the hospital for active and productive people.
Methods: It was a descriptive and analytical retrospective study of patient records admitted for the research of acid-fast bacillus (AFB) pulmonary and extra pulmonary from January 2003 to December 2014 at the microbiology laboratory of the University Hospital Joseph Ravoahangy Andrianavalona (HU-JRA) Antananarivo, Madagascar. We did this study in order to describe the epidemiology of pulmonary and extra pulmonary tuberculosis at the laboratory. All of the requests about researching AFB for bacterial analysis have been received. Incomplete folders have been rejected. Age, sex, clinic information and the results of AFB research have been analyzed.
Results: During 12 years, 1060 requests have been received to research AFB with 89 cases (8.39%) of positivity. Patients were between 9 months and 93 years old. The middle patient age was 41.7 years. Sex-ratio of infected patients was 1.36. There was a significant difference between gender and positive cases (p=0,001). 82 positive cases (93.77%) were pulmonary localization and 7 cases of extra pulmonary (6.23%).
Conclusions: Despite the lack of screening, the high rate of bacillary pulmonary tuberculosis found was one of the great epidemiological importances because of their contagiousness. It is obvious that only health actions cannot solve the problem of tuberculosis.

Keywords: Epidemiology, AFB, Pulmonary, Extra pulmonary, HU-JRA, Antananarivo

INTRODUCTION

Tuberculosis (TB) is an infectious disease caused in most cases by a microorganism named Mycobacterium Tuberculosis. This bacillus usually enters the human body by inhalation into the lungs.[1]

The prevalence of TB estimated by WHO (World Health Organization) is 489 per 100 000 and the incidence is 266 per 100 000 for all forms. In 2011, 26.296 cases were detected with 17927 new cases of smear positive pulmonary tuberculosis.[2]

Therefore, TB is one of the leading causes of mortality and morbidity for many people. Despite the existence of drug therapeutics for the treatment of tuberculosis for 50 years ago, it still remains the second leading cause of

death due to an infectious agent, after malaria in the world.[3,4]

Among these new cases annually, 90% are in the developing world, including Madagascar. In fact, this disease is especially favored and aggravated by malnutrition. This malnutrition is evident in Madagascar, where the annual risk of TB rate remains close to 1.5%.[3,5]

The impact differs from one region to another and from one district to another, due to socio-economic, cultural, environmental, climatic, and geographical variation. Tuberculosis is rather fueled by structural poverty than HIV infection.[6]

Tuberculosis is still a serious public health problem in Madagascar, one of the main causes of hospital mortality for individuals aged 15-50 years, that means the most active and productive class of the population.[7]

To update knowledge on the epidemiology of pulmonary tuberculosis with positive microscopy and extra pulmonary identified in hospitalized patients or not, we conducted a study spanning 12 years at the laboratory of microbiology University Hospital Joseph Ravoahangy Andrianavalona (HU-JRA) Antananarivo, Madagascar.

The aim of this work was to describe the epidemiology of pulmonary and extra pulmonary tuberculosis found at HU-JRA, Antananarivo, Madagascar.

METHODS

It was a descriptive and analytical retrospective study of patient records admitted for the research of acid-fast bacillus (AFB) pulmonary and extra pulmonary from January 2003 to December 2014.

All requests for bacteriological analysis in research of AFB patients received at the laboratory during this period were included. Incomplete applications were excluded.

Concerning the processing of samples, collection of sputum was in the morning upon waking, after oral rinsing with sterile distilled water, during coughing, and the patient spat into a bottle, screwed it and transported the sample to the laboratory.

We also dealt with extra-pulmonary samples. After registration and labeling, we performed the spreading of sputum. The coloring was done by Ziehl-Neelsen method.

Microscopic examination was done by immersion with x100 objective and we counted the number of bacilli by fields and note the number on the form. AFB appeared as red rod end slightly curved, less grainy, isolated, in pairs or in clusters, clearly detached from the blue background of the preparation.

All results were stored in the bench book. Validation and transmission of the results was provided by the Biologist. The results contained the interpretations and comments of anomaly case.

We analyzed age, gender, clinical information and results of AFB research.

Patient confidentiality was respected and no information revealing their identity is present in this study.

The analysis and the management of the data have been made with the software Epi info 6.04 with a doorstep of significance of 0.05. For the comparison of the percentages, the test Chi- square of Fisher has been used.

RESULTS

During 12 years, the laboratory has received 1060 requests for review to the AFB. We have found 89 cases (8.39%) positive pulmonary TB and extra pulmonary origin.

It was in 2005 and 2006 where we have seen more cases of positive AFB with 20 and 18, followed by the year 2008 and 2013 respectively 14 and 10 (Figure 1).

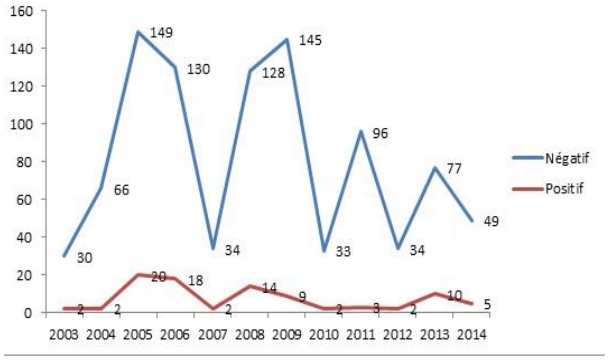

Figure 1: Distribution of cases of positive AFB by year.

During this period, we received patients aged from 9 months to 93 years. The age group of 25-54 years is more than the number of samples received with a total of 555.

The average age of patients infected with AFB was 41.7 years. There was no significant difference between age and patients infected with AFB ($p>0.05$).

617 (58.20%) were male gender and 443 (41.80%) of female gender. For individuals of masculine gender who have run screening, 65 cases were positive and the female gender, 24 cases were positive. The sex ratio of infected patients was 1.36. There was a significant difference between gender and positive cases ($p = 0.001$).

Only in the age group of 55-64 years had the most positive outcome for the female gender as male with respectively 10 and 7 (Table 1).

The clinical information of patients who requested AFB are dominated by pulmonary signs (692 cases), 168 cases for testing, a drawling fever in 60 cases, and the remains were other signs with varied clinical information.

About positive cases, chronic cough represents the majority of cases monitoring and screening of hemoptysis with respectively 34, 20 and 10 cases.

Extra pulmonary samples were constituted by the pus, joint fluids, urine, surgical specimens, the ascites fluids and gastric lavage fluids. 82 positive cases (93.77%) are pulmonary origins and 7 extra-pulmonary (6.23%) (Table1).

Among the 7 positive extra-pulmonary samples, we found 4 positive cases of pus, a case of surgical specimen and two gastric lavage fluids.

Regarding bacterial loads AFB positive patients, we found an average of 2.600 AFB/fields.

Table 1: Distribution of cases by age, sex and origin of the samples.

			All		Pulmonary		Extrapulmonary	
Years	Total	AFB Positive	Male	Female	Male	Female	Male	Female
0 – 14	111	8	6/71	2/40	6/64	1/35	0/7	1/5
15 – 24	165	8	6/81	2/84	5/75	1/77	1/6	1/7
25 – 34	199	19	19/156	0/43	19/148	0/39	0/8	0/4
35 – 44	180	14	9/113	5/67	8/105	5/64	1/8	0/3
45 – 54	175	15	10/78	5/97	10/72	5/86	0/6	0/11
55 – 64	135	17	7/58	10/77	7/52	9/70	0/6	1/7
>_65	95	8	8/60	0/35	6/49	0/28	2/11	0/7
Total	1060	89	65/617	24/443	61/565	21/399	4/52	3/44

DISCUSSION

The first priority for TB control is to detect and cure infectious cases: patients with pulmonary TB and extra pulmonary smear positive. Therefore, all patients (regardless of their status in relation to HIV) with a suggestive clinical picture of pulmonary and extra pulmonary tuberculosis must provide sputum or other samples which will be examined under a microscope.

During 12 years, the laboratory of Microbiology of the HU-JRA Antananarivo scored 1060 requests for review to the AFB. We found 89 positive cases of pulmonary TB and extra-pulmonary origin representing 8.39% of the results.

AFB is found in sputum or other sites which are normally sterile, and then show an infectious process that is to say, infection with Mycobacterium tuberculosis. These results imply that TB is still a very common disease in Madagascar. In western Madagascar means (Tsiroanomandidy), Rakotondramarina D, et al have found the 2000 to nearly 80% of the populations are BAAR positive and were diagnosed at a stage enough, otherwise very advanced disease. The percentage of AFB positive exceeds the national average of 70%.[5]

In our study, the positive rate of 8.39% (89 cases) is lower than results study in different regions of Madagascar.[5] While in Gabon, the incidence rate of the disease is estimated at 250 cases per 100 000 population in 2000, rose 300 per 100 000 in 2004 and 450 in 2008, with a mortality rate of 65 patients per 100 000.[8]

During these years of study, we found that there was no significant increase in tuberculosis cases diagnosed in our service.

Regarding age, our samples come from patients aged 9 months to 93 years. According to Table 1, TB mainly affects people 25 to 64 years. The average age of patients infected with AFB is 41.7 years. There is no significant difference between age and patients infected with AFB ($p>0.05$). Other authors have found similar age means patients infected with tuberculosis. In his studies, Che D et al, regained a median age of 36 years while Ouedraogo et al , have found a median age of 34.4 years.[9,10] Youth tubercular population in Africa was also recognized by Houngbe P in Cotonou which found an average age of 40 years.[11]

In industrialized countries, the most affected by pulmonary tuberculosis age group is over 55 years. And young people now have less risk of being infected except for patients with tuberculosis and AIDS (Acquired Immune Deficiency Syndrome). In Europe, the majority of infected more than 55 years in Africa, 80% of those infected are under 50 years. According to WHO, most cases occur in the age group of 20-41 years.[12]

The overall distribution of TB cases by gender, in our study, shows a predominance of the male gender with a

sex ratio of 1.36. Our study joins TB profiles described in the international literature. Male dominance is almost always seen in previously conducted extensive research including Benin with a sex ratio 1.8 but also in countries such as Abidjan, Cote d'Ivoire and Gabon with a sex ratio (H/F) of 3.2.[8,13]

This is also the case in the study by the communicable disease surveillance unit in Algeria, and the study by Che D et al,There is a significant difference between gender and positive cases (p = 0.001).[9,14] Male individuals adopt certain harmful health behaviors that promote the installation of tuberculosis. Factors that affect the general condition of the patients are: fatigue, work forces, stress, malnutrition, smoking, alcoholism and the spread of the disease. These factors mainly predispose the subject male.

About positive cases, chronic cough represents the majority of cases followed screenings and hemoptysis. While in a study by Rakotondramarina D, the most frequent clinical information motivating a request for review are hemoptysis (62%) then come the deterioration in general health (24%) and chronic cough and sputum only 14% of the reasons.[15]

Among the positive cases, 82 (93.77%) samples are of pulmonary origin and 7 (6.23%) for extra pulmonary. Extra pulmonary tuberculosis essentially consist pus, a case of resected gastric intubation and two liquids. A study by Rakotondramarina D et al in 2000 in the western Malagasy average showed a prevalence of 3% of cases of pulmonary tuberculosis extra.[15] In other studies conducted in Madagascar, pleural localizations predominated.[16,17]

Modesty screening means available in our laboratory diagnostic likely result inadequate extra pulmonary forms which are summarized here the most accessible forms. The contribution of new techniques of investigation should lead to better understanding of the extra pulmonary forms. Other authors have found more substantial figures for extra pulmonary tuberculosis rate.[18,19] This difference implies ignorance of non-pulmonary forms whose diagnosis requires methods that are not always within reach of high-prevalence countries.

Bacterial loads are on average 2.600 AFB/fields. Bacterial load refers to the relative early or on the contrary the screening delay of the disease. Direct examination is essential to affirm the infectiousness of patients with respiratory TB or not. Microscopic examination is not very sensitive because it is necessary that pathological product contains at least 10 000 organisms per ml so that we can see at least one AFB on smear with a greater than 95% probability. Despite its limitations, the microscopic examination is an essential step in the diagnosis of TB because it allows to quickly detect (in practice less than an hour), the most bacilliferous sick, so the more contagious to those around them. It is based on that examination that the diagnostic strategy and treatment recommended by WHO.[8] Such richness in bacilli is reached only in the lesions of affected patients cavitary pulmonary tuberculosis.[20]

The result of microscopic examination is quantitatively expressed and highlights AFB, that is to say Mycobacteria but does not distinguish between tuberculosis and atypical Mycobacterium.

In France, the traditional tests remain the standard for diagnosis of tuberculosis. It is recommended to perform a microscopic examination and a culture on all samples in search of Mycobacterium tuberculosis.[21]

Despite the lack of screening, the high rate of bacillary pulmonary tuberculosis found is of great epidemiological importance because of their contagiousness. Thus, the main objective of the national struggle against TB program in Madagascar started in 2012, is to reduce the morbidity associated with tuberculosis by reducing the movement of tubercle bacilli contagion sources in the community, and consequently reduce the incidence of the disease, now considered a major public health problem.[22]

CONCLUSIONS

In spite of the certain efforts opened out by the sanitary authorities to Antananarivo in the setting of the tuberculosis struggle, the tuberculosis remains an aggravated social curse by the diagnostic insufficiency. It is obvious that only health actions cannot solve the problem of tuberculosis. The management of other determinants proves to be just as important. This is a multi-sectoral fight and is the responsibility of all in everyone

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Union Internationale contre la tuberculose et les maladies respiratoires. Prise en charge de la tuberculose. Guide pour les pays à faible revenue. 5ème édition. 2000
2. Global Tuberculosis Control. 2012. WHO/HTM/TB/2010.7. ISBN: 978 92 4 156406 9. Available at http://whqlibdoc.who.int/publications/2010/9789241564069_eng.pdf WHO.
3. Organisation mondiale de la santé, Manuel du programme national Tuberculose à Madagascar. 4ème édition. 2006
4. Williame D, Savedoff, Smith AM. Social Insight, projet sur les priorités en matière de lutte contre les maladies. 1996

5. Ministère de la Santé Publique, Madagascar. Rapport statistique du Programme National de Lutte contre la Tuberculose. 2010.
6. AIDS INFO/UNGAS. 2009 .Available at http://www.unaids.org/fr/regionscountries/countries/Madagascar.
7. OMS. Rapport OMS 2011 sur la lutte contre la tuberculose dans le monde. 2012. Available at http://www.who.int/tb/publications/global_report/2011/fr/index.html.
8. Toung MVE, Bisvigou, Coura Diop B. Les causes d'abandon et les motivations d'une reprise de traitement au centre antituberculeux de Libreville (Gabon). Santé. 2010;91:911-4.
9. Che D, Bitar D, Decludt B. Institut de veille sanitaire : Les cas de tuberculose déclarés en France en 2003. Surveillance nationale des maladies infectieuses. 2003
10. Ouedraogo M, Ouedraogo G, Ouedraogo SM, Zigani A, Bambara M, Some L, Tiendrebeogo H. A propos de la tuberculose, étude rétrospective à propos de 2.202 cas. Médecine d'Afrique Noire. 1999;46:8-9.
11. Houngbe P. Tuberculose pulmonaire bacillifère à Cotonou : à propos de 1256 cas observés au Centre National Hospitalier de Pneumo-phtisiologie de Cotonou. TB & VIH. 1995;5:17-8.
12. Truffot-Pernot C, Cambau E, Trystram D, Jarlier V. Mycobacterium tuberculosis. EMC Biologie clinique. 2007.
13. Gninafon M, Trébucq A, Rieder HL. Epidemiology of tuberculosis in Benin. Int J Tuberc Lung Dis. 2011;15(1):61–6.
14. Benhabyles N, Boughoufalah A, Hannoun D. Situation épidémiologique de la tuberculose en Algérie année 2005.Unité de surveillance des maladies transmissibles. 2006
15. Rakotondramarina D, Razafimalala F, Andrianaivo P, Rabeson D, Andriatsiva R, Andrianavalomahefa. Aspects épidémiologiques de la tuberculose dans le Moyen-ouest malgache. Bull Soc Pathol Exot. 2000;93(4):337-9.
16. Raharimanana RN, Ravololonarisoa ZJ, Ralison F, et al. Evolution de la prise en charge de la tuberculose à l'unité de Pneumo-phtisiologie du CHU Mahajanga. e-Santé. 2010;1:10.
17. Auregan G, Rakotondramarina D, Razafinimanana J, et al. Le Programme National de Lutte Anti Tuberculeuse (PNLAT) à Madagascar. Arch Inst Pasteur Madagascar. 1995;62:4-12.
18. Aubry P, Capdevielle P, Durand G. Les tuberculoses extra-pulmonaires de l'Africain. Med Trop. 1979; 39(2):157-62
19. Rieder HL, Snider DE, Cauthen GM. Extrapulmonary tuberculosis in the United States. Am Rev Resp Dis. 1990;141:347-5.
20. Ait-khaled N, Enarson D. Tuberculose, Manuel pour les étudiants en Médecine. Organisation mondiale de la santé. 1999
21. La presse médicale. Recommandations de la Société de pneumologie de langue française sur la prise en charge de la tuberculose en France : conférence d'experts. 2006;35:1751-7.
22. Ministère de la santé publique, Direction générale de la santé. Plan stratégique national de lutte contre la tuberculose à Madagascar 2012 - 2016. 2012;1-42.

Cite this article as: Andrianarivelo AM, Rakotondraoelina LM, Rafaramalala SS, Andriamandimbisoa TH, Randriamboavonjy RL, Rafalimanana C, et al. Acid fast bacillus pulmonary and extra pulmonary in a laboratory of university hospital center in Antananarivo, Madagascar since 2003-2014. Int J Res Med Sci 2015;3:3576-80.