

Tuberculosis with malaria or HIV co-infection in a large hospital in Luanda, Angola

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Abstract

Introduction: Three major public health problems, tuberculosis, malaria and HIV/AIDS, are widespread in Angola, often as co-infections in the same individual. In 2009, it was assumed that 44,151 new cases of TB occurred in Angola. Interestingly, interventions such as treatment/prevention of malaria appear to reduce mortality in HIV-infected and possibly TB co-infected patients. However, despite the seriousness of the situation, current data on TB and co-infection rates are scarce.

This study aimed to characterize all TB cases seen at the Hospital Sanatório de Luanda, and to determine the co-infection rate with HIV and/or malaria.

Methodology: This retrospective study collected demographic, diagnostic and clinical data from all patients admitted during 2007.

Results: A total of 4,666 patients were admitted, of whom 1,906 (40.8%) were diagnosed with TB. Overall, 1,111 patients (58.3%) were male and most patients (n=1302, 68.3%) were adults (≥ 14 years). The rate of HIV co-infection was 37.4% (n=712). Malaria was diagnosed during admission and hospital stay in 714 patients (37.5%), with *Plasmodium falciparum* the predominant species. Overall mortality was 15.2% (n=290).

Conclusions: Because Luanda does not have the infrastructure to perform culture-based diagnosis of TB, confirmation of TB is problematic. The HIV-co-infection rate is high, with 37.4% of patients requiring integrated approaches to address this problem. With more than 1/3 of the TB patients co-infected with malaria, even during the hospital stay, the prevention of malaria in TB patients appears to be an effective way to reduce overall mortality.

Key words: tuberculosis; HIV; malaria; co-infection; Angola

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Introduction

Angola is Africa's seventh largest country. Approximately a quarter of the population, 4.8 million, live in the capital, Luanda [1]. Two thirds of Luanda's inhabitants live in crowded neighborhoods, often in so-called "musseques", and large parts of the population have difficulty in accessing basic health care, clean water, or electricity [2]. Almost half of the population (41.5%) lives below the poverty level, and life expectancy is low (40 and 43 years for men and women, respectively) [1].

According to the Angolan authorities, the tuberculosis (TB) situation is alarming and constitutes a major public health problem. The official number of new TB cases grew from 38,317 in 2005 to 44,151 in 2009 [3]. However, as direct observational therapy,

short-course (DOTS) coverage increased from 43.0% to 64.0% between 2002 and 2008, treatment success also increased from 68.0% in 2002 to 73.1% in 2008, albeit below the WHO target of 85.0% [4]. Official data on HIV-TB co-infection rates show large geographic variation from 2.8% in the northern province of Cabinda, to 6.0% in Luanda, and up to 15.6% in the province of Benguela [5]. However, in a country where culture confirmation of TB is almost unavailable, little is known about many aspects of TB.

In the capital, individuals with suspected TB are sent to Hospital Sanatório de Luanda (HSL), a reference hospital near Luanda. The aim of this study was to obtain better knowledge of the TB situation in Luanda by characterizing the clinical presentation and methods most often used to diagnose TB, HIV and

malaria co-infection, as well as alternative ways to diagnose this problem in our population.

Methodology

Clinical files from all patients admitted during 2007 to the HSL were analyzed retrospectively. Demographic data, methods used for the diagnosis of TB, treatment and in-hospital mortality, as well as HIV status and malaria diagnosis, were collected. TB diagnosis was based on clinical and radiological findings, Mantoux test, and sputum microscopy. HIV serology was performed for all patients, using rapid diagnostic tests (Determine, Abbott Laboratories, Abbott Park, Illinois, USA) and malaria was diagnosed by standard thick and thin film microscopy.

This study was authorized by the Direcção Geral from the HSL, Angola, and the Ethics Committee of the Faculdade de Medicina da Universidade de Lisboa, Portugal.

Results

During the 12-month period of the study, a total of 4,666 patients were admitted to HSL, of whom 1,906 (40.8%) were diagnosed with TB. Overall, 1,111 patients (58.3%) were male and most patients (n = 1,302, 68.3%) were adults (≥ 14 years, mean: 32 years;

range: 14-75) (Figure). Diagnosis in adults was based on clinical evaluation and changes on the chest X-ray only in 492 (37.7%) in contrast to 810 patients (62.2%) with a positive Ziehl-Neelsen (ZN) stain. Of those with a positive ZN stain, only 441 (54.4%) were considered new cases, while 220 (27.2%) were classified as relapse, 29 (3.6%) as failure, and 120 (14.8%) as reappeared.

TB was diagnosed in 604 of 606 (99.7%) children (< 14 years old) (Figure). Diagnosis was based on clinical evaluation, chest X-ray, and Mantoux test with a diameter of induration of at least 10 mm. Nineteen children (3.1%) had lymph node TB while all others were diagnosed with pulmonary or disseminated TB.

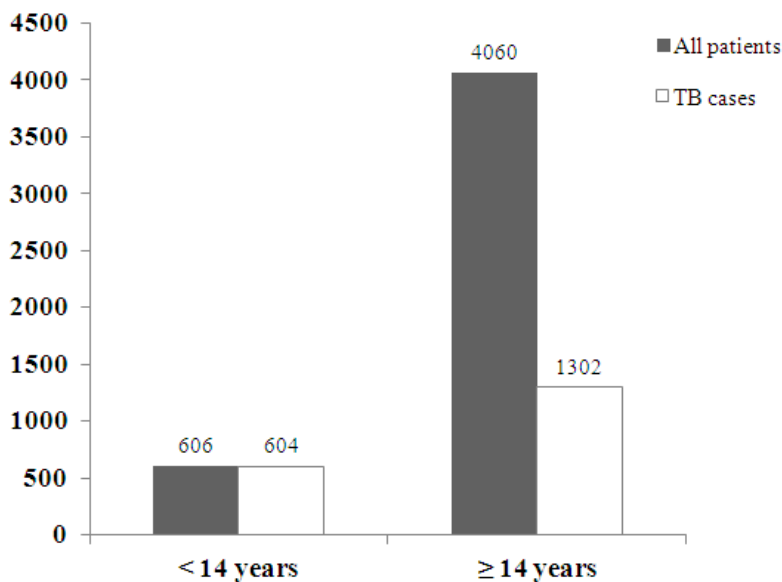
HIV infection was diagnosed in 712 TB patients (37.4%). Of note, *Plasmodium falciparum* malaria was diagnosed in 714 of the 1,906 patients with TB (37.5%).

Overall, 290 patients with TB (15.2%) died in hospital. Twenty-seven of these patients were HIV infected and three had malaria.

Discussion

This brief report highlights several important issues concerning TB in Angola. Only 62.2% of adult TB patients and only 54.4% of new cases had a

Figure. Rate of TB diagnosis in children (<14 years old) and adults (≥14 years old) at the HSL



Grey bars represent the total number of patients admitted to the Hospital Sanatório de Luanda and white bars represent patients with a TB diagnosis.

positive ZN smear [6,7]. Furthermore, only a third of adults referred to the central TB hospital were diagnosed with TB. Contrary to this, children may have been over-diagnosed, with a rate of nearly 100%, which can be explained by the fact that the diagnosis was primarily based on Mantoux testing, clinical signs, and X-ray changes, and not on microscopy results [8,9].

Of particular concern is that only half of the adult patients were considered as new cases, and almost one third as relapses or failures. Certainly, this may point to low adhesion to treatment or problems in DOTS implementation. In fact, while the National Program for the Control of TB in Angola began in 1981, it was implemented in only 8.6% of the health-care institutions in 2007 [5]. Moreover, distribution of anti-TB drugs in the country seems to be irregular; even if drugs are available in Luanda, this is not necessarily true for the rest of the country [5].

However, and more worryingly, the high rate of relapses and failures may also reflect existing but unknown drug- or multidrug-resistance. This situation might explain why 15.0% of all patients died in hospital, despite a rather low HIV-co-infection rate of 37.4%. Furthermore, the overall HIV-co-infection rate was lower than the rates seen in other southern African countries such as Mozambique (66.0%), Gabon (59%), or South Africa (58.0%) [5].

Interestingly, 37.5% of the TB patients also had malaria, a finding which may be of importance in the light of recent data, showing that malaria infection may exacerbate TB [10].

The results confirm the importance of improving TB diagnosis in Angola. Better microscopy results and implementation of the GeneXpert test, culture to increase detection rates and drug sensitivity testing are highly desirable [11]. Concerning microscopy, the use of auramine O and low-cost Light-Emitting-Diode (LED) fluorescent microscopes [12] are an inexpensive way to increase sensitivity [13,14]. Possibly, the novel GeneXpert test might have provided valuable information about many patients. Additionally, mycobacterial culture should be more widely available to increase case detection and allow sensitivity testing of all drugs. However, work with resistant *Mycobacterium tuberculosis* cultures requires biosafety level 3 facilities, which are expensive to build and maintain [15]. On the other hand, novel methods, such as the Microscopic Observation Drug Sensitivity (MODS) assay, are also fast and efficient, inexpensive, and already in use in some resource-poor

countries, because they require only a biosafety level 2 facility [16].

This study provides much needed data with which to plan TB control efforts in Luanda, and underscores the urgency in improving laboratory diagnostic capacity.

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