

Original Article

Outbreak of Isoniazid-resistant Tuberculosis in an Immigrant Community in Spain[☆]



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ABSTRACT

Background: Tuberculosis (TB) remains a major public health problem. In 2013, 9 million new cases of active TB were estimated globally and the proportion of reported new cases with multi-drug resistance (MDR) was 3.5%.

Methods: Contact tracing of a case of pulmonary tuberculosis was performed in a Bolivian patient. Diagnostic tests were performed according to national and local protocols.

Results: An outbreak of tuberculosis in an immigrant community was detected, with 5 cases originating from one index case. Genotyping and drug susceptibility testing of the sputum samples determined *Mycobacterium tuberculosis* resistant to isoniazid (KatG-*msp* unmutated/*inhA* 5 RBS CT). Active case finding revealed a total of 39 contacts with an incidence of latent infection of 71.43%.

Conclusions: The present study confirms the importance of active case finding through contact tracing as well as rapid laboratory diagnosis to achieve improvements in early detection of TB. Early diagnosis of the patient, compliance with appropriate treatment protocols and monitoring of drug resistance are considered essential for the prevention and control of TB.

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Brote de tuberculosis resistente a isoniácida en una comunidad de inmigrantes en España

RESUMEN

Introducción: La tuberculosis (TB) continúa siendo un importante problema de salud pública. En 2013 se declararon 9 millones de casos nuevos de TB activa a nivel mundial, siendo la proporción de nuevos casos de TB multirresistente del 3,5%.

Método: Se realizó un estudio de contactos de un caso de TB pulmonar en una paciente de nacionalidad boliviana. Las pruebas diagnósticas se realizaron según los protocolos establecidos a nivel nacional y local.

Resultados: Se detectaron 5 casos a partir del caso índice y se constató la existencia de un brote de TB en una comunidad inmigrante. El resultado del genotipado y del antibiograma ampliado de las muestras de esputo fue crecimiento de *Mycobacterium tuberculosis* (KatG-*msp* no mutado/*inhA* C-T 5 RBS) resistente a isoniácida. Se realizó la búsqueda activa de convivientes y contactos con un censo total de 39 personas. La incidencia de infección latente fue de 71,43%.

Palabras clave:

Tuberculosis resistente

Brote

Inmigración

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Estudio de contactos

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Discusión: El estudio de este brote como otros en la literatura constata la importancia de la búsqueda activa de la localización de contactos y su estudio, de la investigación de laboratorio para lograr la mejora en la detección precoz de la TB. Un diagnóstico precoz del enfermo, el cumplimiento de un tratamiento adecuado y la vigilancia de la farmacoresistencia se consideran pilares fundamentales para la prevención y el control de la TB.

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Introduction

Tuberculosis (TB) was once one of the major causes of morbidity and mortality in Spain, and it continues to be a serious worldwide health problem. It is a transmissible, notifiable disease, caused by bacteria from the *Mycobacterium tuberculosis* (*M. tuberculosis*) complex, and can affect any organ, although the most common presentation is pulmonary. It is most often transmitted from person to person by airborne mechanisms. The main risk factor for developing the disease among infected individuals is human immunodeficiency virus infection or autoimmune deficiency syndrome, but other risk factors have been reported, including diabetes, silicosis, immunosuppressive treatments, chronic renal disease, and malignant disease.

Worldwide, national and regional alliances, which have mobilized to create specific programs for the control of TB, have played a decisive role in the fight against the disease.¹ In 2012, 8.6 million new cases of active TB were reported globally, of which 450 000 were multi-drug resistant tuberculosis (MDR-TB). In 2013, the incidence of TB rose to 9 million affected individuals, of which 3.5% were new cases of MDR-TB; these figures have remained stable in recent years.¹

In the last 6 years in Spain, TB rates have remained above the average for the European Union, despite the downward trend perceived in the analysis of the latest published data. In 2013, the rate was 11.88 cases per 100 000 inhabitants. This figure is 8.3% lower than in 2012, when 12.95 cases/100 000 were reported, and in 2011, when 14.74 cases/100 000 inhabitants were reported.²

The percentage of cases of TB detected in Spain but originating in another country was 31.2% in 2012 and 15.97% in 2013, mainly in the 24–34 year age group. Cases originating in Spain were mainly distributed among the over-65s, and the 35–44 years age group.³

In Castile and Leon, 288 cases of TB were registered in 2013, representing a rate of 11.43 cases per 100 000 inhabitants (17% fewer cases than in 2012). Of these, 22 cases were associated with an outbreak (7.64%). The most common risk factor was immigrant status (7.76% of cases).⁴

An outbreak is defined as 1 or more of cases of TB occurring after the first case is detected.⁵ Several factors can boost an outbreak, such as exposure, and delay in obtaining a sputum smear and diagnosis, among others.^{6–9} In 2013, 61 outbreaks of pulmonary TB were reported to the National Epidemiological Surveillance Network. This number is lower than in previous years (135 in 2011 and 92 in 2012), although the figures may be underestimated due to delays in reporting.⁴

Tuberculous disease can only be controlled with the implementation of a program based on early diagnosis of the patient, compliance with the right treatment, follow-up of cases to ensure cure, and instigation of specific contact tracing.¹⁰

Drug-resistance testing is essential in the control of TB, particularly in the context of an outbreak.¹⁰

Material and Methods

This study was initiated after the index case was reported to the Department of Preventive Health and Public Health of the Hospital Clínico Universitario of Valladolid. The protocol for tracing,

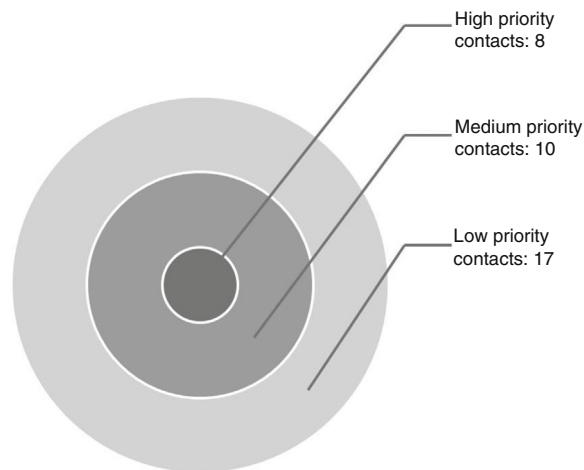


Fig. 1. Classification of contacts.

treatment, and follow-up of cohabitants and contacts for TB was implemented.

Exposed individuals were censored using the concentric circle approach.¹¹ Contacts were classified as high priority (individuals with contact >6 h/day, children younger than 5 years, immunocompromised individuals), medium priority (individuals with daily contact, but <6 h/day), and low priority (sporadic contact)⁵ (Fig. 1).

Mantoux tuberculin testing was performed on all exposed individuals. Results were interpreted after 48 h, by measuring the transversal induration.

Interferon gamma release assays (IGRA) diagnostics could not be performed in all patients as indicated¹¹ (Fig. 2),¹² since at that time the IGRA method was unavailable in our hospital laboratory. We were able to send only a selection of samples, designated according to patient risk and age, to the reference hospital (Hospital Universitario Río Hortega de Valladolid).

To complete the epidemiological study, sputum samples from the index case and 3 exposed individuals who had active disease were sent to the reference laboratory of the National Center of Microbiology in Majadahonda (Instituto de Salud Carlos III, Spain) for genotyping and expanded resistance studies.

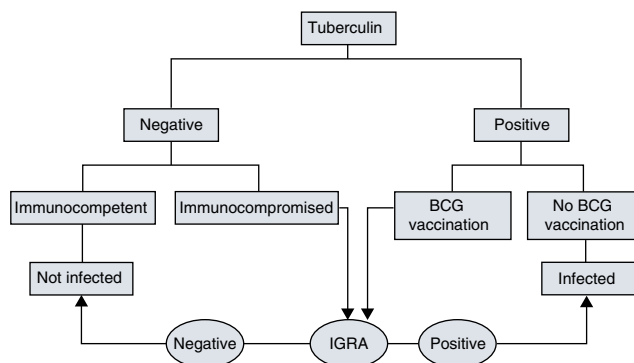


Fig. 2. Tuberculin and IGRA interpretation algorithm.¹²

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