Med Clin (Barc). 2015;145(1):7–13

MEDICINA CLINICA

www.elsevier.es/medicinaclinica

Original article

Tuberculosis screening programme for undocumented immigrant teenagers using the QuantiFERON®-TB Gold In-Tube test☆

Carlos Salinas[a,*], Aitor Ballaz[a], Rosa Díez[a], Urko Aguirre[b], Ane Antón[b], Lander Altube[a]

[a] Servicio de Neumología, Hospital de Galdakao-Usansolo, Usansolo, Bizkaia, Spain
[b] Unidad de Investigación, Hospital de Galdakao-Usansolo, Usansolo, Bizkaia, Spain

ARTICLE INFO

Article history:
Received 19 July 2013
Accepted 18 December 2013
Available online 25 January 2016

Keywords:
Tuberculin skin test
QuantiFERON® Gold In-Tube
Immigrants
Teenagers

ABSTRACT

Background and objective: The aim of this study was to determine the prevalence of tuberculosis infection in undocumented immigrant teenagers using a tuberculin skin test (TST) for initial screening and QuantiFERON®-TB Gold In-Tube (QFT-GIT) as a confirmatory test.
Patient and method: From 2007 to 2012, under 19-year-old immigrant teenagers from 2 accommodation centres of the Basque Country (Spain) were included in the study. The TST was done in all of them and the QFT-GIT was done in selected patients with a TST ≥ 5 mm.
Results: Eight hundred and forty-five immigrants were included, most of them from Africa (99.5%). Fifty-one percent of immigrants with TST ≥ 5 mm has a positive QFT-GIT. We found 2 cases of active tuberculosis (2/845: 0.24%). The concordance between TST (≥10 mm) and QFT-GIT was 63%, with 57% of positive concordance cases and 96% of negative concordances. There were 246 cases with TST ≥ 10 mm (29%), with significant differences between Magrebis (21.5%) and Subsaharians (67%) ($p < 0.001$). Vaccination with Calmette-Guéin bacille was an independent predictor for having a TST ≥ 10 mm (OR: 2.11; $p < 0.001$) and for the discordance TST+/QFT-GIT−, both for a TST ≥ 5 and a TST ≥ 10 mm (OR 2.16, 95% confidence interval [95% CI] 1.46–3.20, and OR 1.91 95% CI 1.23–2.97, respectively). The positive value of QFT-GIT increased significantly as the TST increased, with a positive association in all the cut-off points analysed: 10–14 mm (OR 7.95, 95% CI 1.79–35.33), 15–19 mm (OR 35, 95% CI 7.93–154.52) and ≥20 mm (OR 91.3, 95% CI 18.20–458.11).
Conclusion: Due to the high prevalence of latent tuberculosis infection in Subsaharian immigrants, we recommend implementing screening programmes in this population. Using QFT-GIT, the number of candidates for chemoprophylaxis was reduced to 43% compared with TST alone (≥10 mm).

Cribado de la tuberculosis en inmigrantes adolescentes indocumentados usando el QuantiFERON®-TB Gold In-Tube

Palabras clave:
Prueba de la tuberculina
QuantiFERON® Gold In-Tube
Inmigrantes
Adolescentes

RESUMEN

Fundamento y objetivo: El objetivo de este estudio fue conocer la prevalencia de la infección tuberculosa en inmigrantes adolescentes indocumentados utilizando una estrategia con la prueba de la tuberculina (PT) para el cribado inicial y el QuantiFERON®-TB Gold In-Tube (QFT-GIT) como prueba confirmativa.
Pacientes y método: Se incluyeron inmigrantes adolescentes recién llegados a 2 centros de alojamiento del País Vasco (España) entre los años 2007 y 2012. La PT se aplicó en todos los participantes, y el QFT-GIT, selectivamente en los reactores con una PT ≥ 5 mm.

☆ Please cite this article as: Salinas C, Ballaz A, Díez R, Aguirre U, Antón A, Altube L. Cribado de la tuberculosis en inmigrantes adolescentes indocumentados usando el QuantiFERON®-TB Gold In-Tube. Med Clin (Barc). 2015;145:7–13.

* Corresponding author.
E-mail address: carlos.salinassolano@osakidetza.net (C. Salinas).

2387-0206/

Resultados: Completaron el estudio 845 inmigrantes, mayoritariamente africanos (99,5%). Un 51% de los inmigrantes con una PT ≥ 5 mm fue QFT-GIT positivo, que corresponde el 17% de toda la muestra. Se encontraron 2 casos con tuberculosis activa (2/845: 0,24%). La concordancia entre la PT (≥ 10 mm) y el QFT-GIT fue del 63%, con un 57% de resultados concordantes positivos y un 96% de concordantes negativos. Hubo 246 casos con PT ≥ 10 mm (29%), con diferencias significativas entre magrebíes (21,5%) y subsaharianos (67%) ($p < 0{,}001$). La vacunación con el bacilo Calmette-Guérin fue un predictor independiente de tener una PT ≥ 10 mm (odds ratio [OR] 2,11, $p < 0{,}001$) y de la discordancia PT+/QFT-GIT−, tanto para una PT ≥ 5 como para una PT ≥ 10 mm (OR 2,16, intervalo de confianza del 95% [IC 95%] 1,46–3,20, y OR 1,91, IC 95% 1,23–2,97, respectivamente). La proporción de QFT-GIT positivo aumentó significativamente con el incremento de la positividad de la PT, con asociación positiva en todos los tramos analizados: 10–14 mm (OR 7,95, IC 95% 1,79–35,33), 15–19 mm (OR 35, IC 95% 7,93–154,52) y ≥ 20 mm (OR 91,3, IC 95% 18,20–458,11).

Conclusión: La alta prevalencia de infección tuberculosa latente en los inmigrantes de origen subsahariano hace recomendable la implementación de programas de cribado en esta población. Utilizando el QFT-GIT se redujo en un 43% el número de candidatos a la quimioprofilaxis con arreglo a la PT (≥ 10 mm).

Introduction

For several years now, a high percentage of tuberculosis cases diagnosed in some European countries have occurred in immigrants.[1] Spain has also seen an increase in tuberculosis cases in immigrants in recent years, proportionally much higher than that found in the Spanish population.[2,3]

A considerable number of tuberculosis cases among immigrants are attributed to reactivation of a latent tuberculosis infection (LTBI) acquired in their country of origin, and is more common in people with less than 5 years of residence.[4] In some cases, however, the disease is the result of a new infection acquired after entering the host country.[5]

Several European countries have implemented tuberculosis screening programmes for recently arrived immigrants in an attempt to deal with this situation. However, the benefit of these programmes has not been clearly demonstrated,[6] and screening strategies vary within Europe.[7] The results of various studies show that actively screening for tuberculosis is of relatively little benefit, particularly compared to other types of active case finding, such as contact studies.[8] Results improve when screening is focussed on immigrant groups in specific situations, such as illegal immigrants and refugees.[9]

LTBI detection could potentially be the most cost-effective screening method, but only if accompanied by comprehensive preventive treatment.[6] Unfortunately, treatment adherence is too low in many cases, especially among illegal immigrants.[10]

In recent years, Spain has become a host country for immigrants from resource-poor countries, where tuberculosis is highly endemic. Within the complex migratory phenomenon, illegal immigration, mainly from Africa, is rising. This often includes children and adolescents who, due to their young age, background and the precarious living conditions they endure during displacements, are a population at high risk of tuberculosis.

Until now, the tuberculin skin test (TST) has been used for the diagnosis of LTBI. The introduction of tests based on interferon γ (IFN-γ) release, which have greater specificity than the TST,[11] is a potentially major contribution to tuberculosis screening. There is a relatively large amount of experience with these tests in contact studies and in tuberculosis screening among healthcare workers, but information on immigrants is very limited, especially in recently arrived young immigrants.[12]

In 2007, we began systematic tuberculosis screening in undocumented minor immigrants who had recently arrived at 2 ad hoc accommodation centres set up in Biscay. The implementation of screening programmes in this type of centre is an excellent opportunity to maximise diagnostic procedures and the relevant treatment.

For screening, we used the same strategy as for the contact studies in our population, using the QuantiFERON®-TB Gold In-Tube (QFT-GIT) selectively in individuals with a positive TST (≥5 mm).[13]

The aims of this study were firstly, to determine the prevalence of active tuberculosis and LTBI in a cohort of undocumented minor immigrants, and secondly, to compare the performance of the TST and QFT-GIT in the same cohort.

Study population and method

This was a prospective, cross-sectional study in undocumented minor immigrants from countries with a tuberculosis incidence of ≥50/100,000 inhabitants, who were housed in 2 shelters in a health district in the Basque Country. The study included all individuals who came to these centres between February 2007 and December 2012, all of whom had entered Spain in irregular circumstances less than one year previously.

Our district has a population of 300,000 inhabitants, with a tuberculosis incidence of 11/100,000 (2012) and an LTBI prevalence of 6% in 7-year-old children.[14] Foreign residents make up 5% of the population, and account for 33% of total tuberculosis cases.

The medical examination and blood tests were carried out in the respiratory medicine and microbiology departments of a tertiary hospital (Hospital de Galdakao-Usansolo). Demographic data, tuberculosis vaccination history (based on the presence of a characteristic scar) and tuberculosis history were recorded. TST and QFT-GIT were used sequentially to detect tuberculosis cases and infections: TST was performed first, followed by QFT-GIT 48–72 h later in cases with a TST induration ≥5 mm. Chest X-ray was performed in cases with a positive QFT-GIT result. A TST reaction ≥5 mm with a positive QFT-GIT was required for LTBI treatment, and patients with tuberculosis were excluded. The TST was performed by intradermal injection of 0.1 ml of purified protein derivative (PPD), containing 2 tuberculin units (TU) of PPD RT 23 with Tween 80. The test was read after 48–72 h by experienced staff, measuring the transverse diameter of the induration. A TST induration ≥10 mm was considered positive. A 1-ml blood sample was obtained for the QFT-GIT test, divided between 2 specialised blood collection tubes: one containing the specific peptides ESAT-6, CFP-10 and TB7.7, and another without antigen as a negative control. Tubes were incubated for 24 h at 37 °C, and following centrifugation were kept cold. The plasma IFN-γ concentration was measured using an enzyme-linked immunosorbent assay (ELISA) technique. The result was interpreted as positive when IFN-γ was ≥0.35 IU/ml after subtracting the negative control. Indeterminate results were evaluated by a second test for definitive classification. When the QFT-GIT result was positive, secondary chemoprophylaxis was prescribed after ruling out the presence of active tuberculosis through a