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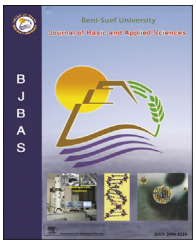

Full Length Article

Limited transmission of multidrug-resistant tuberculosis in East Azarbaijan, Iran

Mohammad Asgharzadeh [a], *Hossein Samadi Kafil* [b,*], *Mahya Pourostadi* [c]

[a] *Biotechnology Research Center, Faculty of Paramedicine, Tabriz University of Medical Sciences, Tabriz, Iran*
[b] *Drug Applied Research Center, Faculty of Medical Sciences, Tabriz University of Medical Sciences, 5166614766 Tabriz, Iran*
[c] *Tuberculosis and Lung Disease Research Center, Tabriz University of Medical Sciences, Tabriz, Iran*

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ABSTRACT

Tuberculosis is the leading cause of death in adults from a single infectious agent, killing about 3 million people every year. One-third of the human population is thought to be infected by the causative agent *Mycobacterium tuberculosis*. Multidrug resistance isolates are one of the most important concerns in tuberculosis control. In this study, we used MIRU-VNTR to determine MDR-TB transmission in Tabriz. A hundred and twenty *M. tuberculosis* isolates were collected from patients who referred to TB center of Tabriz and characterized for drug resistance and typing by MIRU-VNTR method. Thirty percent of the isolates were resistant to at least one drug. Among Iranian isolates only two isolates (1.9%) were MDR and in patients from the Republic of Azerbaijan four isolates (28.6%) were MDR. By MIRU-VNTR typing eighty eight distinct profiles were identified, including 20 clustered profiles and 68 unique patterns and fifty two isolates (43.3%) included in clusters. The minimum estimate of the proportion of tuberculosis transmission in East Azerbaijan with MIRU-VNTR was 26.7% and 14% of MDR isolates acquired infections recently. Results of the present study showed that high percent of TB cases are sensitive to antibiotics. MIRU-VNTR typing showed a limited number of MDR-TB transmission in our isolates set. Because of the increasing number of patients referred from Rep. of Azerbaijan with MDR-TB, we need more stewardship and controlling programs for these patients for preventing the outbreak of MDR-TB in our region.

1. Introduction

The importance of the tuberculosis (TB) a major infectious disease and a cause of high morbidity and mortality has been completely recognized (Asgharzadeh et al., 2011). Countless millions of people have died from tuberculosis, a chronic infectious disease caused by the tubercle bacillus (Cole et al., 1998). The World Health Organization (WHO) estimated that there were about 450,000 new multidrug-resistance (MDR)-TB

* *Corresponding author*. Tel.: +98 9127184735.
E-mail address: Kafilhs@tbzmed.ac.ir (H.S. Kafil).
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cases in the world in 2012. About 170,000 MDR-TB deaths were estimated to have occurred in 2012 (WHO, 2013). About 10% of MDR-TB cases were XDR-TB (Extensively drug-resistant-TB). By September 2013, 92 countries had reported at least one XDR-TB cases [3]. MDR-TB is caused by resistance to isoniazid (INH) and rifampin (RF) (Mokrousov et al., 2003) and extensively drug-resistant (XDR)-TB is caused by *Mycobacterium tuberculosis* isolates resistant to rifampin and isoniasid and fluoroquinolone, and one of the three injectable drugs, capreomycin, kanamycin and amikacin (Gandhi et al., 2010a). MDR-TB is a problem both in the developed as well as in the developing countries. The problem is even more serious among the human immunodeficiency virus (HIV) infected population (Gandhi et al., 2010b; Wells et al., 2007). Although treatment of MDR is possible with currently available diagnostic techniques and drugs, the treatment course is substantially more close and laborious than from drug susceptible tuberculosis, with higher rates of treatment failure and mortality (Gandhi et al., 2010a).

Mycobacterial interspersed repetitive unit-variable number tandem repeat (MIRU-VNTR) is an invaluable tool for genotyping MIRU-VNTR revealed more transmission and clusters (Asgharzadeh et al., 2008; Mazars et al., 2001).

The province of East Azarbaijan is located in North West of Iran and neighbor with republic of Azarbaijan (Fig. 1). The estimated population of the province is approximately 3,730,000 of which about 40% are inhabitants of Tabriz, the capital city of the province.

Based on the report of WHO, the Republic of Azerbaijan is one of high TB and MDR-TB burden countries (WHO, 2013), and Azeri patients travel to Tabriz for treatment of TB. In Tabriz, the TB surveillance is based on conventional methods which can't identify the source of infection and discriminate between new and old infections. Thereby, in this study, we used MIRU-VNTR to determine MDR-TB transmission in Tabriz.

2. Material and methods

2.1. *Patients population and bacterial isolates*

All isolates of *M. tuberculosis* were collected from patients who referred to TB center of Tabriz. The study population comprised all patients from whom at least one sample was positive for *M. tuberculosis* by culture. 120 isolates of *M.*

Fig. 1 – East Azarbaijan province of Iran in neighborhood of Rep. Azerbaijan, Armenia, Turkey and Iraq.