

Study on Pulmonary Tuberculosis

Evangelia Kartsoni

Abstract

The Tuberculosis is a bacterial disease caused by *Mycobacterium tuberculosis* and sometimes *Mycobacterium bovis*. About one-third of the world's population (2 billion people) is infected with the tuberculosis virus and is at risk of contracting tuberculosis, and each year about 9 million people become infected with active tuberculosis (1 to 2 million people) and die from the disease. It is the leading cause of death from single-agent infectious diseases (even more so than AIDS, malaria, and measles) and ranks tenth in the global burden of disease, and is projected to maintain its current status by 2020 and even reaches to rank seventh.

Introduction

The basis of the diagnosis of pulmonary tuberculosis is a direct and simple test of patients' sputum is suspected. In the best case, the sensitivity of the sputum test in the diagnosis of pulmonary tuberculosis is fifty to sixty percent. In pulmonary form, children often get sputum or gastric juice test results are usually negative even in culture, so the diagnosis is mainly based on clinical history, history of contact of a child with pulmonary tuberculosis with a positive sputum smear (especially in the family), chest radiography and tuberculin test.

According to standard definitions of a patient, who has at least two positive sputum smear tests for fast acid bacilli? Or a patient who has only one sputum test positive for fast acid bacilli with radiographic changes in the chest confirming pulmonary tuberculosis. Or a case of positive smear in terms of acid-fast bacilli accompanied by sputum culture is considered positive smear tuberculosis.

The degree of positive smear is determined based on the number of bacilli in each microscopic field. Some studies have considered the degree of positivity of the primary smear to be effective in determining the outcome of treatment and have named it as a predictor that if the degree of positivity is more, the probability of treatment failure and death is higher.

Mycobacterium tuberculosis complex continues to significantly impact public health and is associated with one million deaths of tuberculosis cases annually worldwide. Ability of tuberculosis to establish disease is entirely depends on macrophage deaths during infection.

Pulmonary macrophages are critical component of the primary innate immune response that has various functions in immune surveillances, removal of cellular debris, microbial clearance, and in resolution of inflammation. There are two pathways of macrophage deaths, apoptosis and necroptosis, which are developed as host antimicrobial defenses in the early TB infection; both of them are programmed cell death. These mechanisms are triggered by tumor necrosis factor alpha, oxidative stress, lipopolysaccharide, and other factors.

Apoptosis is characterized by signaling cell through Fas-associated protein with death domain, a crucial protein that is associated with death receptors. Necroptosis can be induced if apoptotic signaling is inhibited through formation of receptor interacting protein. *Mycobacterium bovis* lacks of trehalose-containing glycolipids on its cell walls that could affect the virulence and adaptability within the host cells. The genetic analysis showed that the loss of trehalose-containing glycolipids was related to disturbance surface-exposed acyltrehaloses such sulfatides, diacyltrehaloses, triacyltrehaloses, pentacyltrehaloses and the phoPR component signaling system. Reduced this signaling system in *Mycobacterium bovis* has been linked to less virulence in humans. Another study showed that MTBC species with dominant PhoP gene expression are hyper virulent and resistant to tuberculosis drugs. The role of MTBC (m) 2] Species have been proven in various animal models, but still is questioned in human. Although some species have 99.9% similarity of nucleotide sequences, they have different abilities to induce macrophages death. Apoptosis and necroptosis play the important roles in innate immune responses against pathogens and are crucial in TB infection. In vitro studies showed that the apoptosis of BCG- infected monocytes by the exogenous drug was associated with a reduction of bacillary viability while necrosis was not associated with reduction of BCG viability. Another study found that if apoptosis was predominated during a TB infection the bacteria were potentially to be cleared. The aim of this study was to assess the role *Mycobacterium bovis* on the state of apoptotic and necroptosis of macrophages isolated from TB patients. Chest radiography is also a suitable and sensitive tool for diagnosing lung lesions, including tuberculosis, so that if the chest picture is normal, the diagnosis of tuberculosis is partially removed. On the other hand, in cases where we are actively looking for this disease and when it is diagnosed in its early stages, pulmonary involvement can indicate our success in early detection of these patients, which is achieved by radiographic findings.

*Evangelia Kartsoni, Department of Nursing,
Hellenic Mediterranean University, Greece*

*Corresponding author: Evangelia Kartsoni,
e-mail: evikartsoni@gmail.com*