

Tuberculosis from the middle ages to the emergence of modern microbiology: beliefs, therapeutic practices and scientific advances

Abstract

Tuberculosis has been one of the most historically significant infectious diseases due to its high mortality rate and the multiple cultural and medical interpretations surrounding it. The aim of this work is to analyze the historical evolution of the conceptions, treatments, and scientific discoveries related to tuberculosis from the Middle Ages to the emergence of modern microbiology. A historical and documentary review of sources related to the disease was conducted, considering the contributions of classical, medieval, and modern medicine. The findings show that for centuries tuberculosis was interpreted from hereditary, humoral, and supernatural perspectives, which fostered the development of empirical therapeutic practices and religious rituals such as the “King’s Touch.” Subsequently, the development of the microscope, the germ theory of disease, and the research of scientists such as Louis Pasteur and Robert Koch made it possible to identify the role of microorganisms in infectious diseases and laid the foundations of medical microbiology. Likewise, early inoculation and vaccination practices contributed to the establishment of new preventive strategies. It is concluded that the scientific understanding of tuberculosis was the result of a long historical process influenced by social, cultural, and technological factors that transformed modern medicine.

Keywords: tuberculosis, microbiology, history of medicine, vaccination, infectious diseases

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Introduction

Tuberculosis is one of the oldest infectious diseases known to humankind and has represented a significant health and social problem throughout history. Various historical records suggest the existence of this disease since approximately 3000 BCE; however, it was during the Classical period that the first systematic medical descriptions of its clinical manifestations began (Piñeiro, 2019). The high mortality rate, the lack of knowledge about its etiology, and the absence of effective treatments fostered the development of multiple cultural, religious, and medical interpretations regarding its origin and spread.

For centuries, explanations for tuberculosis ranged from hereditary theories and humoral imbalances to supernatural beliefs. These conceptions influenced both the social perception of the disease and the therapeutic practices implemented for its treatment. In this context, the Middle Ages were characterized by the predominance of magical-religious explanations and healing rituals, while the Renaissance and the Enlightenment fostered the emergence of anatomical and scientific approaches aimed at understanding the disease from a biological perspective.

The technological development of the microscope and the establishment of germ theory during the 18th and 19th centuries profoundly transformed the study of infectious diseases. The research of scientists such as Louis Pasteur and Robert Koch made it possible to identify the relationship between microorganisms and disease, laying the foundations of modern medical microbiology.

The aim of this article is to analyze the historical evolution of beliefs, treatments, and scientific advances related to tuberculosis from the Middle Ages to the emergence of modern microbiology.

Development

Classical and medieval conceptions of tuberculosis

The first medical descriptions of tuberculosis were developed by Hippocrates, who used the term “phthisis” to describe a condition characterized by fever, wasting, and pulmonary ulceration.¹ From this perspective, the disease was associated with hereditary processes due to its frequent occurrence among members of the same family. Later, Aristotle proposed that the disease was contagious, transmitted through respiration, constituting one of the first approaches to the concept of infectious transmission. During the Middle Ages, medical knowledge about tuberculosis showed little scientific progress. However, various extrapulmonary manifestations were identified, especially scrofula or scrofulosis, later recognized as tuberculous lymphadenitis. Explanations of its origin were strongly linked to religious and supernatural conceptions.

In countries like France and England, the belief arose that scrofula could be cured through the ritual known as the “King’s Touch,” a ceremonial practice performed by monarchs to whom divine healing powers were attributed.² These ceremonies reflect the influence of religious and political structures on the understanding of disease and highlight the limitations of medieval medical knowledge.

The treatments used during this period included rest, abundant food, milk consumption, herbal preparations, opiates, and various other substances. Considered medicinal. However, these practices lacked scientific basis and proved insufficient given the high rate of disease transmission.

The emergence of new scientific perspectives **Conclusions**

In the late Middle Ages and during the Renaissance, anatomical approaches based on the systematic observation of the human body began to develop. In this context, Giovanni Battista Morgagni contributed to the anatomical study of various diseases through the practice of autopsies, allowing for the description of tuberculous lesions in different organs.

Simultaneously, the technological development of the microscope represented a turning point for medicine and the biological sciences. The optical advances made by Zacharias Janssen, as well as the microscopic observations of Antonie van Leeuwenhoek and Robert Hooke, enabled the identification of microorganisms and cellular structures, laying the conceptual foundations of microbiology and cell theory.

The strengthening of scientific thought during the 18th and 19th centuries fostered the consolidation of new disciplines such as bacteriology, immunology, and physiology. These transformations made it possible to question the prevailing magical-religious explanations and to orient research toward the experimental study of infectious diseases.

Inoculation, vaccination and modern microbiology

Early inoculation practices were fundamental to the development of vaccination. Various cultures implemented empirical procedures aimed at preventing infectious diseases through controlled exposure to contaminated substances. In China and India, practices involving the inoculation of materials from infectious lesions for preventive purposes were documented.³

Later, in 1796, Edward Jenner developed the smallpox vaccine based on observations of the immunity generated by cowpox. This discovery represented a crucial advance in the prevention of infectious diseases and paved the way for the development of new immunological strategies.

In the 19th century, Louis Pasteur's research demonstrated the relationship between microorganisms and decomposition processes, refuting the theory of spontaneous generation and solidifying the germ theory of disease. Simultaneously, Robert Koch developed staining techniques, bacterial cultures, and methods of microbiological isolation that revolutionized medical microbiology. His contributions made it possible to identify microorganisms responsible for various infectious diseases and established fundamental principles for the etiological study of diseases.

These scientific advances profoundly transformed the understanding of tuberculosis and laid the foundation for its diagnosis, prevention, and treatment from a biomedical perspective. They also fostered a cultural and epistemological transformation that contributed to the emergence and consolidation of modern medicine.⁴

The historical evolution of tuberculosis reflects the close relationship between cultural conceptions, scientific advances, and the development of medicine. For centuries, the disease was interpreted from religious, humoral, and hereditary perspectives that limited the understanding of its infectious origin and favored empirical therapeutic practices.⁵⁻¹¹

The emergence of pathological anatomy, the improvement of the microscope, and the development of microbiology allowed for the gradual transformation of these conceptions and the establishment of scientific explanations for the etiology of infectious diseases. The contributions of scientists such as Louis Pasteur and Robert Koch's work marked a turning point in the history of medicine by consolidating the germ theory and modern experimental methods.

Finally, the historical analysis of tuberculosis allows us to understand how scientific and sociocultural processes have influenced the construction of medical knowledge and the development of strategies for the control of infectious diseases.

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Conflict of interests

The author declares no conflicts of interest.

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