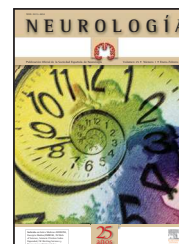


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REVIEW ARTICLE

Descartes' influence on the development of the anatomoclinical method

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Abstract

The development of the anatomical-clinical method was a huge advance for modern medicine since it revealed a new approach to understanding diagnostic procedures. This change in medical thinking towards a more scientific basis has gradually evolved over several centuries, reaching its brilliant zenith with the contributions of the French school. There are certain similarities between the guidelines of the anatomical-clinical method and René Descartes' philosophical principles, so it is fair to consider him as one of the major precursors in this new line of thinking that definitely influenced the historical course of medicine.

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La influencia de Descartes en el desarrollo del método anatomoclínico

Resumen

El desarrollo del método anatomoclínico supuso un gran avance para la medicina moderna, ya que fue una nueva forma de entender el proceso diagnóstico. Este cambio de pensamiento hacia una forma más científica fue desarrollándose gradualmente durante varios siglos y culminó de forma brillante con las aportaciones de la escuela francesa. Hay ciertas similitudes entre el planteamiento del método anatomoclínico y el método filosófico propuesto por René Descartes, por lo que parece justo considerar a Descartes como uno de los precursores de una forma de pensar que cambió para siempre la medicina.

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The precursors of the anatomoclinical method

In the development of modern medicine, there is a milestone that is fundamental to its subsequent development: the emergence of the anatomoclinical method. Autopsies of human corpses were practiced in Europe since the Early Middle Ages, but their frequency gradually increased between the fifteenth and sixteenth centuries¹ and led to the discovery of an increasing number of morbid alterations in the interior of dissected bodies. Over the centuries, this situation awoke scientific interest and there were attempts to relate the different types of mutations identified with the conditions presented by the patients in their lives. There was thus a transition from the conception of anatomical injury as an autopsy finding (what might be called "pure empiricism") to another where the anatomical injury constituted the foundation of clinical knowledge. Doctors sought to diagnose in life the lesion causing the disease, according to the trend that Lain Entralgo (1994. p. 323) called "rationalized empiricism".

The precursors of rationalization in the anatomopathological empiricism were Giovanni L. Lancisi (1654-1720) and Ippolito F. Albertini (1662-1738), who attempted to relate the symptoms and signs that produced heart disease with the lesions observed during the autopsy of deceased patients.^{2,3} This way of understanding medicine became settled in medical circles through the appearance of *De sedibus et causis morborum per anatomen indagatis*, written by the Italian Giovanni B. Morgagni (1682-1771) in 1767. In this work, Morgagni records what would become the bases of the anatomoclinical method in a thorough and systematic way. Its publication may be considered the beginning of a change in clinical thinking, and it also provided the seed for the birth of two modern sciences: pathological anatomy and the anatomoclinical method.

Origins of the anatomoclinical method

Until the seventeenth century, medicine moved between the vestiges of the traditional conception and the constant emergence of new (and often erroneous) concepts, which combined together to try answer problems as they arose. Without an established, appropriate method of analysis, the gap between medicine and the exact sciences seemed to be evident, given that the latter had managed to systematize their body of knowledge using the scientific method based on observation and implementation of the data collected. The main objective of the great clinicians in the nineteenth century was to convert medicine into a true science.

It has already been indicated that *De sedibus et causis morborum per anatomen indagatis* was published in the late eighteenth century, and that this work by Morgagni laid the foundations of the anatomoclinical method. However, the real need for a scientific method that systematized how to approach the disease began to be felt in 1801, when Marie-Francois Xavier Bichat (1771-1802) published his *Anatomie générale*. Bichat wrote in it that "medicine has been rejected for a long time within the realm of the exact sciences; it will have the right to approach them, at least with respect to the diagnosis of disease, when strict

observance has been joined by the examination of alterations present in organs" (quoted in Lain Entralgo, *History of Medicine*. 1994, p. 465). This statement can be considered a turning point in modern medicine; the starting point for what the French school developed so brilliantly: *la méthode anatomoclinique*. Although both Lancisi and Albertini, and subsequently, Joseph Leopold Auenbrugger (1722-1809) took the first steps in what would later become the anatomoclinical method (the latter was the first to describe chest percussion as an exploratory procedure), it would be the members of the French school who would further this method of reaching a clinical diagnosis. The contributions of physicians such as Jean Nicolas Corvisart (1775-1821), Gaspard Laurent Bayle (1774-1816) and Fene Theophile Hyacinthe Laennec (1781-1826),^{4,7} among others, were crucial for establishing the modern concept of the diagnostic exercise, so that the anatomoclinical method changed clinical practice. If until that moment clinical diagnosis was essentially conjectural (except, of course, with regard to external injuries), the French school began looking for internal pathological manifestations that allowed certain and scientific diagnoses to be established. Therefore, a new quest began to attempt to find the signs, both spontaneous and induced, that might relate to the existence of certain lesions; to obtain this valuable information, it became necessary to thoroughly examine the patient. It was at that time that most medical eponyms related to exploratory findings were minted, because many discoveries and innovative contributions took place in this field. However, the information obtained from patients was not always definitive, so a logical and structured reasoning of diagnostic possibilities was essential: the differential diagnosis.

We see how a new way to understand medicine was established, which has lasted until today; this consists of an exhaustive search for the external manifestations of internal injuries (anamnesis and physical examination), to establish a possible anatomical location and, from there, look for a specific aetiological origin (differential diagnosis).

The anatomoclinical method in neurology

The anatomoclinical method proposed and developed by the French school also served to consider how to foster internal medicine and its various branches. However, the influence of this scientific method has been particularly meaningful in neurology for two fundamental reasons. First, nervous system disorders produce a series of functional alterations that can be identified during the clinical examination of the patient. Second, the disorders affecting other organs and systems not only result in clinical manifestations, but also in analytical abnormalities, a characteristic that has impeded the full implementation of the anatomoclinical method.

The great driving force behind the anatomoclinical method in the field of neurology was Jean-Martin Charcot (1825-1893), who today is considered one of the fathers of modern neuroscience because he took this analytical procedure to its conclusion. Before 1862, Charcot had not devoted himself to neurological disorders, but in that year he joined the Hospice of the Salpêtrière⁸ and began his

specialization. One of his aims was to try to classify and systematize nervous system diseases, and to do so, he applied the anatomoclinical method proposed by the French school at the beginning of the century.⁹ The importance of the teaching method used by Charcot at Salpêtrière is undeniable, since this centre later formed many clinicians who were fundamental in the history of medicine for their role in the development of modern neurology. These figures have left us a specific way to establish a diagnosis, divided into three stages: first, the syndromic diagnosis, which is the set of symptoms and, above all, of signs that subsequently enable the topographic diagnosis (or most probable location of the injury), in order to define, lastly, the aetiological diagnosis, the most likely cause of the condition.

Descartes and the Cartesian method

René Descartes (1596-1650) can be considered, without fear of error, one of the great thinkers in the history of mankind. Most of his work focused on philosophy, mathematics and science,¹⁰ but he also dedicated many of his writings to matters of physiology, adopting a mechanical vision.¹¹ Descartes also contributed to modern science and, as we will try to explain later, to medicine, with a concept crucial to the development of both: the Cartesian method.

Traditionally, philosophy and the beginnings of science were based on beliefs and accepted truths. On the contrary, Descartes raised the need to not accept any truth until being satisfied that it was really true; this is the methodical doubt "[...] so with respect to the opinions that I may have accepted so far, the best I could do was to undertake, once and for all, the quest to abandon them and replace them with better ones or to accept them again after submitting them to the trial of reason [...]"¹²

Accordingly, to reach the quintessence of truth, Descartes devised his analytical method. In 1637, he wrote the *Discours de la Méthode pour bien conduire sa raison, et chercher la vérité dans les sciences* (fig. 1). Its second part outlines the basic steps of the Cartesian method, which can be summarized as follows: a) not to accept anything just because it has been pre-established, if it is not evident to what he called reason (Descartes is the father of rationalism); b) to divide each problem into as many parts as necessary; c) to think in order, from the simplest to the most complex, and d) to make as many enumerations as needed, to verify that nothing is omitted. In short, Descartes proposed a method based on: a) doubt (methodical doubt), b) analysis, c) synthesis, and d) verification. The development of this method undoubtedly brought about a break with the line of thought prior to Descartes and gave rise to what became the scientific method. Therefore, it seems reasonable to assume that this approach was crucial for the subsequent development of science.

Is there a relationship between the Cartesian method and the anatomoclinical method?

It has been stated that the anatomoclinical method derives mainly from the influence of the French school of neurology,

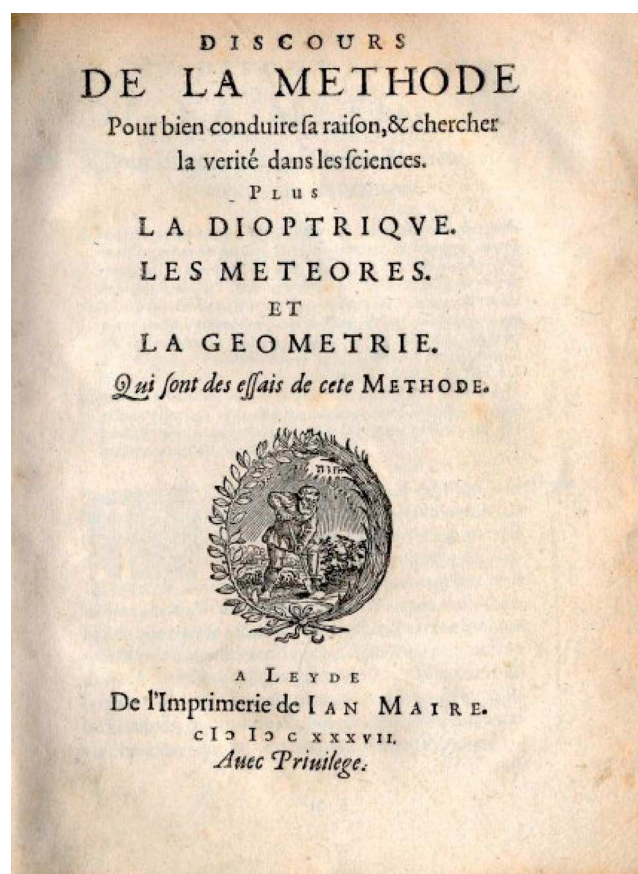


Figure 1 Cover of the first edition of *The Discourse on the Method*, published in 1637.

and also that the arrival of Charcot to Salpêtrière was crucial for the emergence of neurology as a specialty based on this method. Likewise, Cartesian thought was crucial to physiology in the seventeenth and eighteenth centuries, in which there was, inter alia, a mechanistic current influenced by the Cartesian conception. In fact, one of the great figures of this time was Hermann Boerhaave (1678-1738), who tried to design a pathology based on a systematic construction, in the image of what already existed in, for example, philosophy.^{13,14} His work was characterized by a strong Cartesian influence, so his proposal was based on some ideas taken from Descartes.

With all this, it is tempting to look for a relationship between the principles of the Cartesian method and the subsequent development of the anatomoclinical method. Indeed, there are many parallels between how Descartes understood his analytical approach for arriving at the truth and the way that followers of the French school had for reaching a clinical diagnosis.

The comparison of both methods, using a reductionist scheme that could be considered quite simple but very instructive, would therefore say that:

1. Descartes proposed reaching truth by not accepting any preconceptions that could not be demonstrated, while the anatomoclinical method aimed to reach a diagnosis

without accepting conjectural elements that could not be demonstrated.

2. Descartes proposed breaking each problem into as many parts as needed, while the anatomoclinical method reached a diagnosis by analysing the symptoms and signs, seeking each one in each patient.
3. Descartes proposed reconstructing the elements in an orderly way, from the simplest to the most complex, while the anatomoclinical method analysed the semiology of the patient, either individually or as part of a group, to find the location of the lesion. This analysis was often carried out gradually, to define the anatomical structure most likely to be affected.
4. Descartes proposed making as many enumerations as possible so as not to omit any important elements, while the anatomoclinical method reached an aetiological diagnosis by establishing a differential diagnosis where every conceived possibility was considered, and which was then confirmed through detailed analysis of the evidence available.

We thus see that there is little actual distance between the Cartesian approach to reaching the truth and the structure of the anatomoclinical method to achieve disease diagnosis. It is clear that this relationship is not at all direct, and that more than a century passed between the conception of the Cartesian method and the origins of the anatomoclinical method. Therefore, we do not intend to say that the thoughts offered by Descartes led to the creation of the anatomoclinical method with an immediate cause-effect relationship. We do however believe that the birth of this analytical way of thinking, which was a novelty with regard to previous thought trends, had a major impact on the subsequent development of science and its branches and influenced, in an indirect but real way, the evolution of medicine as a science.

Conclusions

The influence of the anatomoclinical method in the development of modern neuroscience is indisputable, as is the importance of the French school in general (and of Salpêtrière in particular) for the effective implementation of this understanding of medicine. However, the influence of the Cartesian method in the birth of the anatomoclinical method is an aspect that is traditionally less studied. While medicine in the eighteenth and nineteenth centuries was based on an eclectic conception influenced by various philosophical and scientific currents, the influence of

Cartesian thought in the subsequent development of the anatomoclinical method seems undeniable. The work of Descartes must be understood in a specific context, attempting not to overestimate its importance as an isolated figure, but as a very important element in a historical and cultural moment that represented a step forward for modern science. Although medicine was not among the main areas of thought cultivated by Descartes, it seems fair to think of him as an important precursor of a way of thinking that, over the centuries, helped create an understanding of medicine that elevated it to the category of science.

Conflict of interests

The authors declare no conflict of interests.

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