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Using the numerical method in 1836, James Jackson bridged French therapeutic epistemology and American medical pragmatism

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Abstract

Objectives: To review James Jackson's analysis of bloodletting among pneumonitis patients at the newly founded Massachusetts General Hospital, in which he implemented the numerical method advocated by Pierre-Charles-Alexandre Louis.

Study Design and Setting: The study sample included 34 cases of clinically diagnosed pneumonitis admitted to Massachusetts General Hospital between April 19, 1825, and May 10, 1835, and discharged alive. Patient data were extracted from meticulously kept case books. Jackson calculated mean number of venesections, ounces of blood taken, and days of convalescence within groups stratified by day of the disease when first bloodletting occurred. He also calculated average convalescence within groups stratified by age, sex, prior health, vesication, and day of the disease when the patients were admitted to the hospital.

Results: To Jackson's surprise, it ''seemed to be of less importance, whether our patients were bled or not, than whether they entered the hospital early or late'' after the onset of the pneumonitis. Bloodletting was ineffective. Our multivariate reanalysis of his data confirms his conclusion. Outstandingly for his time, Jackson ruled out unwarranted effects of covariates by tabulating their numerical relations to the duration of pneumonia.

Conclusion: Using novel gathering of patient clinical data from hospital records and quantitative analytical methods, Jackson contributed results that challenged conventional wisdom and bridged French therapeutic epistemology and American medical pragmatism.

Keywords: Jackson, James; Bloodletting; Venesection; Pneumonitis; Numerical method; Louis, Pierre-Charles-Alexandre

> P. Ch. A. Louis, physician of the Hospital de la Pitié, is a man, whose labors and whose writings must become more and more known for ages. I should deem it service enough to my brethren in this country, if I could induce them, one and all, to read and study the works of this great pathologist. M. Louis is the founder of the numerical system, as it has been denominated, in respect to the science of medicine. It is the object of this note to state what that system is, and briefly to advert to the successful application of it by its founder (James Jackson, [1], p.vii-viii).

1. Introduction

The origins of clinical epidemiology are usually situated in 18th century England and 19th century Paris [2,3]. Several American doctors discovered the numerical method, that is, counting the characteristics of patients and comparing groups of patients to assess treatment efficacy, from the teachings of Pierre-Charles-Alexandre Louis in Paris [4]. Warner has superbly described how these doctors brought back with them the new philosophy emanating from the Parisian hospitals, which was rooted in a skepticism toward the old therapeutic systems [5]. Much less has been written about the application of the numerical method by American doctors [6]. In this article, we call attention to the outstanding contribution, in the 1830s, of James Jackson Sr. (1777–1867), the first Harvard Professor of Clinical Medicine, cofounder and first physician of the Massachusetts General Hospital and, during his lifetime, one of the

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What is new?

- In the 1830s, James Jackson reproduced at the Massachusetts General Hospital some aspects of Pierre-Charles-Alexandre Louis's *Researches on the Effects of Bloodletting in Some Inflammatory Diseases.*
- Jackson used stratification to examine the effect of variables other than bloodletting on the outcome, extending Louis's approach.
- Jackson's comment that "this is a result, which would not probably have been anticipated even by men of experience" was an extraordinarily bold claim in the 1830s.

most eminent physicians in the United States [5]. Today, the Chair of the Department of Medicine at the Massachusetts General Hospital still has an endowed professorship in Jackson's name, but Jackson also deserves to be recalled for having promoted and applied quantitative methods to evaluate medical treatments in the United States.

Jackson became acquainted with the ideas of Louis through his son, James Jackson Jr., who attended clinical rounds with this world-renowned Parisian teacher at the hospital La Pitié ([5], p.127–32, [7,8]). Although Jackson Sr. had completed his medical training in London [9], Jackson Jr.—like his friends and classmates Oliver Wendell Holmes, Henry Ingersoll Bowditch [10], and Jonathan Mason Warren—sought an apprenticeship in Paris, which at that time was considered to be at the cutting edge of medical innovation [11,12].

In 1832, Jackson Jr. wrote a 209-page quantitative report on an epidemic of cholera in Paris. The book, inspired by Louis's numerical method, was edited and sent to publication by Jackson Sr. [13]. Perhaps as a tribute to his beloved son, who died tragically in 1834 at age 24, Jackson Sr. subsequently commissioned the translation of Louis's *Researches on the Effects of Bloodletting in Some Inflammatory Diseases* [14]. A first version of Louis's results, comprising patients from the Parisian hospital La Charité, had been published in 1828 [15], but Jackson translated the 1835 version, expanded to include data from La Pitié [16]. Jackson added a Preface with a vibrant call to follow Louis's ideas in the United States and an Appendix reporting the methods and results of his own attempt to apply Louis's ideas.

Large sections of Louis's book were dedicated to pneumonia [17]. As was common at the time, both Jackson and Louis held that pneumonia was a "pneumonitis," a lung inflammation associated with a preponderance of blood, one of the "hot" humors, which caused the telltale symptoms of fever and racing pulse. Consequently, bloodletting—either through venesection or leeches—was performed to stop the inflammation [3,18,19]. Combined with emetics and diarrhea-provoking cathartics, it comprised the "heroic depletive therapy" ([5], p.91).

In particular, Louis compared pneumonia patients bled during the first 4 days after disease onset to those bled later and found that bloodletting did not ameliorate the trajectory of the disease: patients bled early were more likely to die than patients bled later [3,17,19,20]. Jackson was surprised by Louis's conclusion of bloodletting's inefficacy and decided to try to reproduce Louis's findings in a different setting.

2. Study design and setting

Massachusetts General Hospital offered excellent conditions for such a study: opened in 1821, it had received about 300 medical patients annually since 1824 and documented each patient's stay according to a systematic record-keeping protocol ([1], p.100). On admission, the house physician (usually a medical student) took the patient's history. Every morning thereafter, the physician in charge examined each patient and, from bedside, dictated a daily report to the house physician, who later transferred the information to a case book consulted by the physician in charge on his next daily round ([1], p.100–101). Jackson scoured 68 case books, "each book being a folio, thirteen inches by eight, and containing upwards of two hundred and fifty pages" ([1], p.101). Of all the patients admitted to Massachusetts General Hospital between April 19, 1825, and May 10, 1835, 34 had been diagnosed with pneumonia and discharged alive (Box 1).

Jackson and Louis specifically defined as "pneumonitis" a case for whom the disease had "commenced with distinct chills, more or less prostration, and pain on one side of the thorax, followed within 2 days by cough and bloody or rusty sputa" ([1,20], p.105). Jackson claims that he was able to identify and exclude cases with signs of tuberculosis—"I have rejected all cases, in which there was reason to believe that tubercles existed" ([1], p.106)—or any other major disease. He also excluded patients with unavailable or unreliable data and—in contrast to Louis—patients with fatal outcomes ([1], p.107).

The main outcome was the duration of pneumonia, measured as the number of days between disease onset and convalescence, "fixed on the principles laid down by M. Louis" ([1], p.118). Louis had written:

> I have regarded as the time of convalescence the period, at which the sick began to take some light nourishment; three days at least after the febrile action had ceased; although the local symptoms had not disappeared in every case; that is to say, at a period when percussion of the chest did not always elicit a perfectly clear sound at the part affected, and when the respiration was not very pure; the ear