



## Original Article

## Accepting Pain Over Comfort: Resistance to the Use of Anesthesia in the Mid-19th Century☆☆☆

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## ARTICLE INFO

## Article history:

Received 18 November 2014

Received in revised form 23 July 2015

Accepted 23 July 2015

## ABSTRACT

News of the successful use of ether anesthesia on October 16, 1846, spread rapidly through the world. Considered one of the greatest medical discoveries, this triumph over man's cardinal symptom, the symptom most likely to persuade patients to seek medical attention, was praised by physicians and patients alike. Incredibly, this option was not accepted by all, and opposition to the use of anesthesia persisted among some sections of society decades after its introduction. We examine the social and medical factors underlying this resistance. At least seven major objections to the newly introduced anesthetic agents were raised by physicians and patients. Complications of anesthesia, including death, were reported in the press, and many avoided anesthesia to minimize the considerable risk associated with surgery. Modesty prevented female patients from seeking unconsciousness during surgery, where many men would be present. Biblical passages stating that women would bear children in pain were used to discourage them from seeking analgesia during labor. Some medical practitioners believed that pain was beneficial to satisfactory progression of labor and recovery from surgery. Others felt that patient advocacy and participation in decision making during surgery would be lost under the influence of anesthesia. Early recreational use of nitrous oxide and ether, commercialization with patenting of Letheon, and the fighting for credit for the discovery of anesthesia suggested unprofessional behavior and smacked of quackery. Lastly, in certain geographical areas, notably Philadelphia, physicians resisted this Boston-based medical advance, citing unprofessional behavior and profit seeking. Although it appears inconceivable that such a major medical advance would face opposition, a historical examination reveals several logical grounds for the initial societal and medical skepticism.

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## Introduction

Henry Jacob Bigelow, MD's (1818–1890; surgeon and major supporter of the introduction of anesthesia, Boston, Massachusetts, USA), 1846 article announcing William Thomas Green Morton, MD's (honorary) (1819–1868; dentist, first public demonstrator of insensibility by inhalation of ether, Boston, Massachusetts, USA), demonstration of ether anesthesia at the Massachusetts General Hospital (MGH) has been hailed as the most influential article ever published in the *New England Journal of Medicine*.<sup>1</sup> Within 1 year, ether was used in Europe, Africa, India, China, Japan, and Australia.<sup>2</sup> Much of

the publicity surrounding the breakthrough came from Morton himself, who began publishing a regular “Letheon circular” (Letheon was the name he gave to the vapor of sulphuric ether) with advertisements and testimonials from patients and practitioners.<sup>3</sup>

One would expect swift acceptance of such a miraculous advance. However, despite being bolstered by praise from Morton's patients, legitimized by the US government, and used widely in Boston, many leading physicians elsewhere in the United States remained skeptical. Numerous prominent surgeons and dentists decried the use of ether anesthesia to their colleagues in opinion pieces in medical journals and to the public in letters to the editors of daily newspapers. Pennsylvania Hospital, the country's oldest hospital and home of the first surgical theater, initially prohibited the use of anesthesia by its surgeons, “it being considered by the judicious surgeons in this institution as a remedy of doubtful safety.” That ban was not revoked until 1853.<sup>4</sup>

The challenges to anesthesia ranged from clinical to religious and cultural, fueling debate, outrage, and public dialogue surrounding the fields of surgery and medicine. We explore the complex interplay between medicine and society, highlighting the fact that medical advances can only occur within the societal context.

☆ Funding: Intramural funds only.

☆☆ This report was presented, in part, at the Annual Meeting of the American Society of Anesthesiologists, New Orleans, Louisiana, on October 13, 2014.

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**Fig. 1.** On July 12, 1848, 15-year old Hannah Greener received chloroform during foot surgery and died 2 minutes into the case. Sheila Terry/Science Photo Library. Reproduced with permission.

### Concerns About Safety

On September 30, 1846, Ebenezer Hopkins Frost (1824–1866) became WTG Morton's first identified patient to receive anesthesia.<sup>5</sup> The patient was slow to awaken after the short dental extraction, and Morton was worried that the unresponsive patient might have died. Cold water splashed on Frost's face promptly woke up the startled patient who inquired about when the procedure would start. As more anesthetics began to be administered throughout the country and the world, it was only a question of time before major complications, including death, would occur.<sup>6,7</sup> As newspapers and journals published reports of deaths under anesthesia, safety became a major reason for the initial skepticism about the many unknown side effects of this poorly understood treatment<sup>8</sup> (Fig. 1). Monitoring of patients under anesthesia was limited to measurement of pulse, observation of respiration and the color of the skin, and assessment of muscle tone.<sup>9</sup> Practitioners reported unpredictable effects of ether in its early days, with most of the correspondence focusing on convulsions or excitations of the central nervous system. Many wrote to journals to describe deaths of their patients secondary to hypoxia and asphyxiation.<sup>10</sup>

During this period, there were no clear guidelines for dosing, nor was there any uniformity in the apparatus used to administer ether or chloroform. John Snow, MD (1813–1858; epidemiologist and considered the first full-time physician anesthetist, London, UK), conducted pioneering work on physical properties of ether and chloroform<sup>7,11,12</sup>; however, this did not allay fear among physicians or the lay public. The early opposition cited fears of overdose, akin to alcohol poisoning, as a reason for avoiding anesthesia. Overdose was also feared when anesthesia was administered to children and to pregnant women, with concern of harm to the fetus.<sup>13</sup> There was also worry that anesthesia in a laboring woman would prolong recovery from labor and delivery.

Although early reports of the dangers of anesthesia were full of alarm, most of them were based, in fact, not on exaggerations

deliberately designed to scare patients. Reports of sudden cardiac death appeared soon after the introduction of chloroform by Sir James Young Simpson (1811–1870; discoverer of chloroform anesthesia, Professor of Midwifery, University of Edinburgh, UK), in Edinburgh in 1847. Reported complications included incomplete anesthesia, madness, death, and a variety of medical problems.<sup>14–22</sup> England had a tradition of a coroner's inquest which attempted to obtain scientific medical evidence and provide an explanation for the death.<sup>23</sup> Unfortunately, lack of understanding about anesthesia meant that all deaths and complications were viewed as an indictment against the discipline, rather than the limitations of practitioners or characteristics of patients. Anesthesia was often cited as the obvious cause of death, even when death occurred 2 days after surgery.<sup>14</sup> Anesthetics were thought to poison the blood, cause hemorrhage, and delay union by adhesion.<sup>24,25</sup> Anesthetics were believed to result in bronchitis, pneumonia, and inflammation of the brain.<sup>26</sup> Other complications included thickening of the blood, suffocation, and abortion or poisoning of the fetus.<sup>26,27</sup> Both ether and chloroform were used in military conflicts—the Mexican American War,<sup>25</sup> the Crimean War,<sup>28</sup> and the Civil War.<sup>29,30</sup> Although anesthesia was used safely,<sup>29</sup> it would still carry the blame for poor healing,<sup>25</sup> and many military surgeons from the preanesthesia days still “characterized the cries of patients as music to the ears.”<sup>30</sup> It was decades before the medical profession began to understand the side effects of anesthetics and began to investigate the etiology of complications. By the turn of the 20th century, medical students in England were yearning for more training to make anesthesia safer.<sup>31</sup> When British hospitals began teaching anesthesia during medical school clerkships, the Council of the Society of Anaesthetists expressed understanding that “the responsibility of giving anaesthetics involves risks to life.”<sup>32</sup>

### Modesty

Several factors discouraged some women from seeking pain relief with the newly introduced agents, ether and chloroform. Traditionally, the process of birthing occurred in the privacy of the home under the care of experienced midwives.<sup>33,34</sup> Early hospitals devoted to obstetrics usually catered to the needs of the poor and indigent, but women from the upper classes usually preferring delivery at home, sometimes with the assistance of a male physician.<sup>35</sup> Early midwives were almost always women,<sup>34,36,37</sup> and society accepted the reasonable idea that modesty dictated that it would be best if women provided care during labor and delivery, a natural process that has taken place without artificial means since time immemorial. Man-midwives appeared on the obstetrical scene in the 19th century, and physicians, almost always men, began to provide medical care during labor and delivery a few decades later.<sup>27,34,36,37</sup> Physicians who practiced obstetrics faced two problems—to prove that they were as good as medical physicians and surgeons and competition from midwives who considered the field of obstetrics and gynecology to be their domain.<sup>38–40</sup> The introduction of the speculum in the 19th century allowed physicians an opportunity to observe internal structures as never before and permitted better diagnostic and therapeutic options, but this advance created much debate even as physicians attempted to develop gynecology into a scientific discipline.<sup>40</sup> The debate over the speculum was primarily a moral argument, and medical issues were of secondary importance.<sup>41</sup>

Patients undergoing nonobstetrical anesthesia had other fears. Surgical theaters were a male domain, and many female patients considered it immodest to be unconscious in that setting (Fig. 2). These fears were confirmed when the Philadelphia Medical Examiner and other publications reported sexual exploitation during anesthesia.<sup>42,43</sup> As a result, women who would otherwise have opted to receive anesthesia instead chose surgery under poorly controlled analgesia.<sup>26</sup>



**Fig. 2.** All-male participants during typical operations in the mid-19th century. Robert Cutler Hinckley, *The First Operation with Ether*, 1893. Oil on canvas, 8' × 10'. Boston Medical Library in the Francis A. Countway Library of Medicine, Boston, Massachusetts.

Under the influence of anesthetics, female patients were also reported to behave inappropriately with members of the surgical team, and others reported erotic dreams.<sup>26,44</sup> The effects of anesthetics were considered to be similar to alcoholic intoxication and something to be avoided, especially after reports of chloroform addiction and one addiction-related death were reported.<sup>45–47</sup>

### Religious Beliefs

In the late 1840s, the introduction of pain relief during surgery was generally welcomed by patients and physicians, and religious matters played only a minor role among those who opposed this advance. Scottish obstetrician Sir James Y. Simpson was the first to administer anesthesia for labor and delivery, using ether on January 19, 1847.<sup>48,49</sup> He is also credited with the first use of chloroform for anesthesia on November 8, 1847.<sup>50</sup> In America, Nathan Cooley Keep, MD, DDS (honorary) (1800–1875; physician, dentist, and founding Dean of Harvard School of Dental Medicine, Boston, Massachusetts, USA), was the first to use ether in obstetrics. He used it on Fanny Longfellow (1817–1861), wife of Henry Wadsworth Longfellow (1807–1882; poet and Smith Professorship of Modern Languages, Harvard College, Cambridge, Massachusetts, USA), on April 7, 1847, while Walter Channing, MD (1786–1876; obstetrician, Boston, Massachusetts, USA), conducted the delivery.<sup>49,51,52</sup> Later, Channing would administer ether to his patients and published a classic treatise about his experience.<sup>53</sup> Pain relief during surgery was one matter, but extending such treatment during labor and delivery was considered to be completely different in the minds of some. Having anticipated religious objections, Simpson, labor analgesia's principal advocate, preemptively cited "Eve's curse," and remarked that religious opposition "was much more generally indulged in during the first few years after the discovery than it would now be believed."<sup>54</sup> Although much has been written about religious opposition to labor analgesia, scant evidence can be found to support religious objections. Opponents, mostly physicians and the lay public, viewed pain as necessary both physiologically for surgical healing and morally as a means of divine punishment. Often quoting the Bible's Book of Genesis 3:16 ("...in sorrow thou shalt bring forth children"), the religious public firmly believed that women should be in pain during labor and, to intervene



**Fig. 3.** Michelangelo, *Original Sin*, 1509. Ceiling Fresco. The Sistine Chapel, Vatican, Rome.

with ether, would be meddling with God's will (Fig. 3). A leading textbook in obstetrics noted that pain was a natural phenomenon and that anesthesia would impair postoperative healing.<sup>55</sup>

Most members of the medical profession and the public were swayed in favor of accepting modern pain relief by two developments. The first was a reversal of sorts, with an earlier citation from Genesis to show that God was the first anesthetist—during the operation in which Eve was created from a rib removed as Adam was kept under a divine sleep (Genesis 2:21) (Fig. 4). The way was finally cleared for obstetric analgesia in 1853 when Queen Victoria (1819–1901; Queen of the United Kingdom of Great Britain and Ireland, London, UK) accepted chloroform from John Snow during the delivery of Prince Leopold (1853–1884), her eighth child, and praised its efficacy in no uncertain terms.<sup>56</sup> There was initial uproar from the British medical community, citing the dangers of the "unnecessary inhalation" (emphasis in the original) of chloroform, but conceding the "immense importance" of surgical anesthesia.<sup>56</sup> The British public followed the Queen's example, and both religious and scientific objections to labor anesthesia were soon abandoned. The use of anesthesia during labor and delivery spread widely, and by 1900, approximately 50% of births were conducted under the influence of ether or chloroform when physicians performed the delivery.<sup>57</sup>

Although religious objections to the use of analgesia during labor have been cited in scientific articles and textbooks, evidence of official opposition from the church is scant, and most of the opposition arose from physicians and patients, reflecting prevailing social values.<sup>58</sup> While the sentiment that pain was natural or good for healing existed, the introduction of anesthesia brought out a debate about the role of pain as punishment. While it was easy to understand the cause of pain related to injury and trauma, the pain associated with labor or diseases that were not readily identified was generally ascribed to divine will.<sup>26</sup> Francis Henry Ramsbotham, MD (1801–1868; obstetrician, London, UK), offered that pain was "an ordinance of the Deity" in a letter to Simpson.<sup>59</sup> Advocates of natural healing such as hydropath Thomas Low Nichols (1815–1901; dietitian, author and reformer, New York City, New York, USA) stated that a pain-free existence was possible because there was no room for pain in a state of perfect health.<sup>60</sup> Hydropaths also felt that pain and physical suffering was a result of sinful lives led by humanity, and pain could be eradicated by exercise, fresh air, and natural living—childbirth was painful in women in proportion to their unnatural existence.<sup>26,60</sup> The mere fact that someone was in pain would suggest that the person lived an unnatural and sinful life.<sup>61</sup> Ramsbotham and Charles Delucena Meigs, MD (1792–1869; obstetrician, Philadelphia, Pennsylvania, USA), felt that pain was universal and of divine origin, whereas hydropaths believed that pain was an individual punishment for unnatural living. Another viewpoint was that of counterirritation, where the surgeon was part of the divine enforcement, meting out deserved punishment to the sinful. Even Benjamin Rush, MD (1746–1813; a Founding Father of the United States,

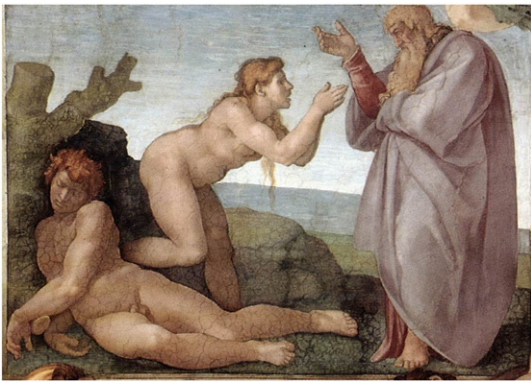


Fig. 4. Michelangelo, *Creation of Eve*, 1508–1512. Ceiling Fresco. The Sistine Chapel, Vatican, Rome.

physician, social reformer, and educator, Philadelphia, Pennsylvania, USA), declared “Punishment, therefore, of all kinds (is) benevolent.”<sup>26,62</sup> In the midst of all these divergent opinions, patients sought out pain relief rather than suffer due to circumstances and predestinations they could not understand.

### Benefits of Pain

Pain was believed to be a part of life, a natural difficulty that played a role designed by the creator, either as punishment or an integral part of our physiology. The ability to perceive pain was clearly recognized as an attribute of being healthy and alive. Clinicians had observed that the moribund patient did not complain of pain as vigorously, and these patients also had poor outcomes. As a result, some surgeons believed that insensibility to pain, whether a preexisting condition or induced specifically for the procedure, was undesirable because it probably was associated with morbidity and mortality. Life and pain were interminably linked, and those wishing to suspend pain, irrespective of the anesthetic agent used, were considered foolhardy.<sup>22</sup> The converse also held true, with young patients healing better, their loud screams a sign of being in good health.<sup>63</sup> As with the strong cry of a just delivered healthy baby, surgical pain was believed to be associated with good healing. Once again, a clinical observation was used to discourage the use of anesthesia. Patients with poor circulation, nerve damage, or gangrene were also noted to suffer less operative pain. These patients also exhibited poor wound healing, reinforcing the idea that a painful experience ensured good healing.<sup>64</sup> Using an extension of this logic, surgeons often refused to operate on comatose patients until they regained consciousness.<sup>65</sup> Patients were familiar with the concept of “no pain, no gain” and preferred remedies whose effectiveness could be felt and, therefore, were reluctant to undergo a surgical procedure where there would be no sensation. Thus, patients readily agreed with practitioners who were of the opinion that pain was essential and anesthesia would prevent wound healing.<sup>30</sup>

Many obstetricians were opposed to use of anesthesia during labor for medical reasons. Labor and delivery were considered natural processes, designed by God, and it was felt that man should not interfere with this natural mechanism. No other species need assistance or pain relief during the birthing process. Some believed that pain triggered uterine contractions, and they feared that abolishing pain would result in arrested labor.<sup>27</sup> They also believed that screaming would help expel extra air from the lungs and, by decreasing pressure in the abdomen, avoid perineal lacerations.<sup>27</sup> The opinion of obstetricians who opposed anesthetic use was that pain ensured the mother's safety and its abolition ensured her destruction. In any

case, only analgesic doses of ether or chloroform would be used because an obtunded patient could not be expected to help by voluntary “pushing.” Famous Philadelphia obstetrician Charles D. Meigs was a lifelong opponent of anesthesia during labor and delivery—he felt that anesthesia unnecessarily interfered with a natural process ordained by Divine Will, in addition to interfering with labor and healing.<sup>30,55</sup> Moreover, it was felt that just as tolerating pain was a sign of a strong individual, especially for men, pain also resulted in women becoming tender and more capable of emotional bonding with their offspring.<sup>64,66</sup> An opposite view was held by Boston obstetrician Walter Channing who first introduced etherization during childbirth in America.<sup>53</sup> The concept of puerperal fever and the importance of hand hygiene in spreading childbed fever were advanced by Oliver Wendell Holmes, Sr, MD (1809–1894; physician, poet, author, and educator, Boston, Massachusetts, USA),<sup>67</sup> and Ignaz Philipp Semmelweis, MD (1818–1865; obstetrician, Vienna, Austria).<sup>68</sup> Meigs differed from both by emphatically stating that physicians are gentlemen and a gentleman's hands are always clean.<sup>69</sup> In Edinburgh, Sir James Young Simpson discovered the anesthetic properties of chloroform and used it extensively during labor and delivery.<sup>70</sup> He remained a strong proponent of anesthesia.<sup>49,71</sup> While these giants battled for and against pain relief during childbirth, individual patients remained torn between religious, medical, and safety concerns related to ether and chloroform.

### Professional Decorum

Ether had been known as a recreational intoxicant for nearly a decade before its use for medical anesthesia.<sup>72–76</sup> Horace Wells (1815–1848; dentist, Hartford, Connecticut, USA), credited with the first medical use of the analgesic properties of nitrous oxide, got his idea when attending a laughing gas entertainment demonstration in Hartford, Connecticut, on December 10, 1844.<sup>77</sup> Its introduction to the medical field coincided with the popularity of the “Temperance Movement” in the United States and was met with disapproval from those who fought the epidemic of alcohol abuse in the mid-19th century.<sup>78</sup> Its ability to produce laughter, dancing, and grotesque gestures as well as the inactivity and unconsciousness suitable for surgery was thought to be determined by the state of mind of the patient. Cartoons appeared in popular magazines in Europe and America about the nonmedical use of ether and nitrous oxide. These associations and unsuccessful attempts at obliterating surgical pain effectively by older preparations had created a healthy skepticism in the medical profession.

Another difficulty faced by W.T.G. Morton was the fact that he had not graduated from dental or medical school. Morton left his training in Baltimore for a dental apprenticeship in Connecticut, although he soon moved to Boston to enroll in medical school. Even dentists who did receive medical diplomas practiced a “much abused and down-trodden profession,”<sup>79</sup> wrote J.B. Flagg, a dentist credited with the first use of ether in Philadelphia. Senior surgeons and physicians at MGH expected another fiasco on the morning of October 16, 1846. Several years after Morton's successful demonstration, in 1852, he was awarded an honorary degree from Washington University School of Medicine (WUSM).<sup>80,81</sup> WUSM and the College of Physicians and Surgeons (CP&S) operated concurrently as rival institutions for a few years, before WUSM merged into CP&S (1877). After the 1915–16 session, CP&S merged into the University of Maryland.

Secrecy, internal fighting among the participants involved in the discovery of anesthesia, and a strong desire by Morton to gain financial reward for his role did not help gain acceptance of anesthesia by the medical community. Morton's refusal to disclose the identity of the inhaled agent until forced to do so and his financial motivations in patenting “Letheon” and its delivery apparatus did not win him

any friends. His entrepreneurial spirit did not sit well with his colleagues, “who had for some time regarded with distrust the large and lucrative business which he had so suddenly created, and now had double cause to fear, from the power which the sole possession of the new agent would give him.”<sup>5</sup>

In Boston, dentist Josiah Foster Flagg (1788–1853; considered the first American-born dentist, Boston, Massachusetts, USA), a cousin of J.B. Flagg from Philadelphia, appealed to the public in a newspaper article voicing strong opposition to Morton's efforts to commercialize the discovery of anesthesia. In a letter to the editor published on December 7, 1846, he urged “all *regular* and *honorable* medical men” (emphasis in the original) to oppose Morton's “attempt to keep secret or to prevent the free use of any article or discovery which would be of universal benefit in relieving human or even animal suffering” and to understand that to do otherwise is “derogatory to the character of an enlightened and liberal profession.”<sup>82</sup> Involving the public even further in this professional debate, both Morton and Bigelow responded with letters to the editor on December 9, 1846.<sup>83</sup> They argued for the legitimacy of the patent application, dispelled the notion that Letheon was a “secret” or “patent medicine,” and sought to discredit Flagg in this public forum and regain the public's trust.

The credibility of Morton and the validity of his discovery were diminished by claims from Horace Wells in Hartford, Connecticut, and Crawford Williamson Long, MD (1815–1878; surgeon, pharmacist, credited with the first use of ether for surgical anesthesia), in Jefferson, Georgia. The dispute was brought to public attention and eventually reached Congress which, in 1849, issued Minority Report #114 ascribing to Mr. Morton “the credit of having made the first practical application of sulphuric ether as an anesthetic agent.”<sup>84</sup> The topic about which of the claimants is most deserving for the discovery of anesthesia is beyond the scope of this article but has been discussed extensively in texts devoted to history of anesthesia<sup>76,76,85–88</sup> as well as publications featuring the careers of Morton<sup>5,80,89–91</sup>; Wells<sup>92–95</sup>; Charles Thomas Jackson, MD (1805–1880; physician, chemist, and geologist, Boston, Massachusetts, USA)<sup>96,97</sup>; and Long.<sup>98–100</sup> The dispute has not been satisfactorily resolved, but there is agreement that Long was the first to administer ether during general surgery, Wells the first to use nitrous oxide during dental procedures, Morton the first to publicly demonstrate the efficacy of ether during surgery, and that Jackson suggested that Morton ought to use ether.<sup>86,87</sup>

### Patient-Surgeon Relationship

The new practice of rendering patients unconscious during surgery presented novel problems for surgeons. Previously, patients had been their own advocates during surgery, confirming the surgical site and even assisting surgeons in debridement. If patients were made nonverbal, there was new concern that surgical errors would increase. During certain operations, patients would be consulted intraoperatively about the extent of the procedure or about options from which patients could select their own preference.

Even in the 19th century, patients who were not obtunded were believed to exert an appropriate amount of “checks and balances” during surgery.<sup>101</sup> Patients were helpful in avoiding excessive surgery and in providing useful information to the surgeon in minor procedures such as fracture repair, drainage of abscesses, or exploration of wounds. A patient who is capable of following instructions is critically important during normal vaginal delivery. Unconscious patients are unable to protect themselves against an incorrect limb, lesion, or tooth being removed. Henry Jacob Bigelow, one of the most ardent supporters of anesthesia, expressed concern that surgeons might perform unnecessary surgery once pain had been conquered.<sup>102</sup>

Before the era of painless surgery, patients and surgeons could be considered as working as members of a team.<sup>103</sup> In a famous 1818 operation in New York, surgeon Valentine Mott, MD (1785–1865; Professor of Surgery at Columbia College, New York City, New York, USA), was to ligate a major artery to repair an aneurysm, a procedure he had never performed. The patient's chest was open when Mott's assistant asked the patient about abnormal sensations when the vessel was clamped. The patient answered that there was no change, and the surgeon proceeded with ligation and completed the procedure without complications.<sup>104</sup> In another famous operation, in 1843, George Wilson, MD (1818–1859; physician and Regius Professor of Technology at the University of Edinburgh, UK), underwent a Syme amputation at the hands of James Syme, MD (1799–1870; Chair of Clinical Surgery at University of Edinburgh, Edinburgh, UK).<sup>105</sup> Although Syme resisted the use of anesthesia when it was subsequently available, one has to wonder why he did not advocate the use of opiates, alcohol, and belladonna derivatives.

### Rivalry

Philadelphia was the leading center of medicine in mid-19th century America. It boasts the first medical school in the United States (University of Pennsylvania School of Medicine, established in 1765) and the oldest hospital in the United States (Pennsylvania Hospital, established in 1751 by Thomas Bond, MD [1712–1784; physician and surgeon, Philadelphia, Pennsylvania, USA], and Benjamin Franklin [1706–1790; a Founding Father of the United States, scientist, inventor, diplomat statesman, Philadelphia, Pennsylvania, USA]).<sup>106</sup> The discovery and introduction of anesthesia was perceived as a Boston phenomenon, and this was one more reason for physicians and surgeons in Philadelphia to oppose it. The first anesthetic at Pennsylvania Hospital was introduced in July 1853, but between 1853 and 1862, about a third of major limb amputations at this hospital took place without the use of anesthetics.<sup>26,107,108</sup> Almost 40% of fracture amputations were performed without anesthesia, a practice that changed markedly when two senior surgeons were replaced in 1861.<sup>26</sup>

Medical rivalry between practitioners in cities with leading medical centers is not new. In the United Kingdom, practitioners in Edinburgh and London have contributed much to developments in anesthesia. John Snow of London and Sir James Y. Simpson of Edinburgh are responsible for introducing and promoting the use of safe anesthesia and conducting scientific and clinical work that forms the basis of modern anesthesia.<sup>11,12,49</sup> Although there is no evidence that medical advances that arose in one city were used very slowly elsewhere, practitioners in London, Edinburgh, and Glasgow were justifiably proud of their accomplishments,<sup>109</sup> and this was reflected in regional preferences between ether and chloroform.<sup>110</sup> Paris was another major medical center, and many physicians from America went there for basic or additional medical training.<sup>111,112</sup> The long list of eminent physicians who visited Paris for its famous hospitals, clinicians, and medical facilities included Oliver Wendell Holmes; John Collins Warren, MD (1778–1856; Hersey Professor of Anatomy and Surgery, Harvard University, chief-surgeon and cofounder of MGH, founder of the New England Journal of Medicine, first Dean of Harvard Medical School, Boston, Massachusetts, USA); Jonathan Mason Warren, MD (1811–1867; pioneer plastic surgeon, son of John Collins Warren, MD, Boston, Massachusetts, USA); Charles Thomas Jackson; and Valentine Mott.<sup>112,113</sup> Many American physicians obtained training in other European centers of excellence, but further discussion about this topic is beyond the scope of this article. It is not surprising that Jackson and Wells sought recognition for the discovery of anesthesia in Paris.

## Conclusions

All medical and technological advances face opposition from existing stakeholders and skeptics, due to the many unknowns that accompany the discovery or invention. When viewed from this broad perspective, one can understand the rationale used by the medical establishment and some segments of society to oppose the use of anesthesia. One major problem with retrospective analyses such as this is that we rely on primary source documents that only report on part of what was happening. We are only able to provide opinions expressed by physicians, members of the press, editors of journals, and patients, but we do not have good data on the behavior of the population at large. Therefore, we have no means of knowing the extent of the opposition faced by the introduction of anesthesia for obstetrics or general surgery.

Opposition to the use of anesthesia in obstetrics faded within half a century, and by 1900, almost half of the patients received anesthesia when physicians participated in the delivery.<sup>57</sup> Over a century later, a 2008 study representing patients in 27 states in the United States showed that more than 61% women who had a singleton birth during vaginal delivery received either an epidural or spinal anesthetic.<sup>114</sup> Less than 1% of births occur at home,<sup>115</sup> and certified nurse-midwives or certified midwives attended 11.8% of all vaginal births (or 7.9% of total births) in the United States.<sup>116</sup> Finally, it is safe to state that almost all elective surgical operations in the United States are performed under conditions in which pain is controlled by one or more of the many options available.

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