



Original Article

Obstetric and Other Uses of Ether Before Ether Day, According to the *Boston Medical and Surgical Journal* of 1828–1846[☆]

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ABSTRACT

From the inception of the *Boston Medical and Surgical Journal* in 1828 until the prominent public demonstration of surgical anesthesia on Ether Day of 1846, ether was often mentioned in the journal. Many of the examples were related to obstetrics. Because molecular structures were not available in the early 1800s, diverse volatile liquids were termed *ethers*. In addition to sulphuric ether, so-called ethers included cyanide-releasing propionitrile and ethanolic solutions of chloroform and of the potent vasodilator ethyl nitrite. Familiarity with anesthesiologically unsuitable ethers may have long deterred consideration of inhaled sulphuric ether for analgesia and anesthesia.

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Sulphuric ether was introduced into obstetric practice soon after October 16, 1846. That date, commemorated as Ether Day, is when William T.G. Morton prominently demonstrated surgical anesthesia by means of inhaled ether at Massachusetts General Hospital in Boston, Massachusetts. On January 19, 1847, in Edinburgh, Scottish obstetrician James Young Simpson (1811–1870) was the first physician to administer ether to a woman in labor to provide pain relief during the birthing process.¹ In Georgia, American surgeon Crawford Long (1815–1878) used the analgesic in obstetrics at about that time, and American physician Nathan Keep (1800–1875) gave it to “Boston Brahmin” Fanny Longfellow (1817–1861) on April 7, 1847.^{2,3}

It is readily apparent why ether was widely embraced as an anesthetic and an analgesic after Ether Day, but it is intriguing that the clinical power of ether was not fully exploited before that day. Accordingly, we examined the prominent medical literature of Boston in the years leading up to Ether Day. Specifically, we searched the *Boston Medical and Surgical Journal* (*BMSJ*) from volume 1 of 1828 until Ether Day for references to ether. The *BMSJ* was the precursor of the *New England Journal of Medicine* and was of broad scope.⁴ It carried local and international news of interesting case reports and medical and surgical advances. Its many cited applications of ether included ones related to obstetrics.

An interesting aspect of the search was that the word “ether” did not necessarily designate diethyl ether, the molecule of Ether Day. Molecular structures were unknown, and the word ether thus designated volatility rather than structure. Any liquid that easily vaporized was said to be an ether,⁵ and readers of the *BMSJ* learned of several ethers that could have been easily confused with each other. Neither today nor then was it helpful for a contributor from New Haven, Connecticut, to explain in 1834, “The definition of an Ether, given in the books, is ‘a combination of proto-carburet of hydrogen with some acid.’”⁶ Ethers in the *BMSJ* included sulphuric, chloric, hydrocyanic, and nitrous ethers (Fig. 1).⁷ Sulphuric ether was obtained from ethanol and sulphuric acid and is known today as diethyl ether, C₄H₁₀O. The pharmaceutical product called chloric ether was obtained through chlorination of ethanol, and it was interestingly an ethanolic solution of chloroform, CHCl₃.^{7,8} Liquid nitrous ether was a crude mixture of molecules that included ethyl nitrite, CH₃NO₂.⁹ Hydrocyanic ether, a “new ether” of 1834, is now called propionitrile, C₂H₅N.¹⁰ There were also mentions of muriatic, hydrobromic, and acetic ethers.^{11–13}

BMSJ readers were not notified until 1849 that chemists had come up that year with a conceptually helpful new word, namely, ethyl (Et).¹⁴ It was not until 1850 that English chemist Alexander Williamson (1824–1904) synthesized diethyl ether under alkaline conditions (without the aid of sulphuric acid) (Fig. 2).¹⁵ He thus deduced in that year that the molecule could be structurally designated as Et-O-Et, and the word ether then came to apply only to molecules of the general structure R-O-R’.

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Sulphuric	CH₃-CH₂-O-CH₂-CH₃
Chloric	CHCl₃ in ethanol
Muriatic	CH₃-CH₂-Cl
Hydrobromic	CH₃-CH₂-Br
Acetic	CH₃-CO₂-CH₂-CH₃
Hydrocyanic	CH₃-CH₂-CN
Nitrous	CH₃-CH₂-O-N=O in ethanol/ether

Fig. 1. Ethers mentioned in the early *Boston Medical and Surgical Journal*. Although elemental compositions were known by weight, the numbers of each atom per molecule were not correctly known. Molecular structures had not begun to be elucidated until the 1850s.⁷

Sulphuric Ether

The *BMSJ* relates several obstetrics-related applications of sulphuric ether before Ether Day.

Eclampsia

The *BMSJ* of 1830 related a case of 1827 in which a woman was suffering “fits” and “alarming faintings” during a labor of over 30 hours of duration.¹⁶ Dr. John L. Richmond of Newton, Ohio, wrote, “My first object was to prevent the convulsions and to recruit the sys-



Fig. 2. Alexander Williamson, circa 1854. When he synthesized diethyl ether under alkaline conditions in 1850, he was able to conclude that it had a structure that could be designated Et-O-Et. Ethers then came to be known on the basis of structure rather than volatility. The alkaline technique (eponymously well known as the Williamson ether synthesis) permitted the synthesis of unsymmetrical ethers of the general structural formula R-O-R'. Unsymmetrical ethers include isoflurane and the other modern anesthetic ethers. The chemist posed in profile because he lost use of one eye and an arm.

tem; for which purpose I gave laudanum and sulphuric ether, and applied flannel wet with hot spirits to the feet. These measures produced considerable mitigation of the convulsions, but the fainting increased”.¹⁷ The ethically torn physician decided “that whatever was done must be done soon.” In a candlelit, floorless, log cabin and armed only with “common pocket instruments,” he performed a cesarean delivery. The child did not survive, but the mother was ambulatory and had returned to work on the 24th postoperative day. Candles notwithstanding, the surgery may have been performed with the aid of flammable fumes of sulphuric ether.

In 1845, Dr. U. Potter of Hallsville, New York, bled a patient suffering headaches and vomiting during the seventh month of pregnancy. Despite the bloodletting therapy, she suffered a seizure. The doctor lamented that he had not availed of the advice of an authority named Burns, who said of such headaches, “They are relieved by the regular exhibition of laxatives, sleep, the moderate use of volatiles, and the application of ether externally.”¹⁶ It would be interesting to know what volatiles were intended and why the class of volatiles did not seem to necessarily include ether.

It is noteworthy that “external ether” was long applied to the head in nonobstetric cases of headache, although a refrigerant mechanism was invoked. As early as 1794, English chemist Joseph Priestley (1733-1804) wrote, “By the quick evaporation of aether a considerable degree of cold may be procured; and on this principle it has sometimes been applied to relieve the head-ach[e] and other pains.”¹⁸ A massive dose of ether for headache was mentioned in the *BMSJ* of August 1846.¹⁹ A 50-year-old woman suffered a blow to the head, followed in a few weeks by “exquisite” pain that “became so intolerable that she was obliged to resort of morphine, and eventually to sulphuric ether, both of which articles she eventually used in enormous quantities.” She was estimated to have consumed “from one to two drachms of morphine per week and 26 pounds of ether during the six months” before presenting for a successful surgical trephination. Alas, the route of administration of the ether is not specified in the report.

Delivery

In 1845, the *BMSJ* relayed a sketchy report from the French *Annalés d'Hygiene* on a “remarkable case of delivery during sleep.”²⁰ A physician (Monsieur Schultze) was called to see a woman at term of a fourth pregnancy. He “found her lying in a state of profound somnolency, so that it was quite impossible to rouse her, either by violently shaking her or by applying to her nostrils the most powerful stimulants, such as ammonia and ether. On the third day of this unnatural sleep, the woman, without awaking, was delivered of a healthy, living and well-formed male child. On visiting the female on the following day, M. Schultze found that she had not long spontaneously awakened from her sleep; and as she had no recollection of her delivery, she was somewhat astonished to find that the child had been born without her having been aware of it.”²⁰ One wonders how much ethereal stimulation had been involved in that intriguing French confinement of 1844. Her “unnatural sleep” may have been an ether anesthetic.

Postpartum Bleeding

In a case of postpartum uterine hemorrhage reported from Berlin, Germany, sulphuric ether was applied as a stimulant when “a most alarming haemorrhage took place.”²¹ Initial maneuvers included “cold water to the belly, injections of water and vinegar, the internal use of ether, tincture of cinnamon, and phosphoric acid.”²¹ Fortunately, abdominal aortic compression stanching the bleeding.

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