Isabella Coler Herb, MD: An Early Leader in Anesthesiology

Robert A. Strickland, MD

Department of Anesthesiology, Mayo Medical Center and Mayo Foundation, Rochester, Minnesota

Women have played a profoundly influential role in the development of anesthesiology. Virginia Apgar, MD, and Gertie F. Marx, MD, are two names that quickly come to mind. But even before these two, other women were in the forefront of this relatively new medical specialty. Isabella Coler Herb, MD, was one of the first, arguably *the* first, woman physician who concentrated on providing the highest quality of anesthesia and teaching others to do the same. She was the first "physician-anesthetist" at the Mayo Clinic in Rochester, MN (Figure 1), and developed the Department of Anesthesiology at what became Rush-Presbyterian Hospital in Chicago, IL. She was one of the first female physicians at Mayo and was the first woman appointed to the medical staff at Presbyterian Hospital. Analyzing morbidity and mortality in anesthesia, evaluating old and new anesthetics, discussing medicolegal problems, and developing equipment were some of the areas in which she pioneered to improve and develop the practice of anesthesiology.

There is little information available about Dr. Herb's life, even from the Wood Library-Museum of Anesthesiology and other sources. Many state, county, and institutional records were not kept during her early years or else have been discarded, and there are significant discrepancies in the available information. What is presented here is taken from the most reliable sources available and may not agree with some previously published information.

Dr. Herb was born Isabella Coler, probably in Clyman, WI, on November 6, 1863[1] or 1864.[2] There are many errors about her date of birth and, consequently, her age at death, in various books and journals (1–3). Even information obtained from the Wood Library-Museum of Anesthesiology stating she was born on November 5, 1869, is incorrect. Also, it is doubtful that she was born "in the Chicago area" (1). She died on May 28, 1943[2] (Figure 2) when she was either 78 or 79 yr old.

Her father, George Coler, was born in Havre, France, on June 16, 1828, and died on April 16, 1890. While still young, he moved with much of his family to the United States and settled in Clyman. Dr. Herb's mother, Mary Ann O'Keefe, was born in Northampton, MA, on March 15, 1841, and died January 16, 1915. She moved to Clyman when she was only 4 yr old and presumably lived there for the rest of her life.

Dr. Herb was raised and educated in Clyman, which, then as now, is a small, rural village with a current population of 370. When her father died in 1890, her living siblings included one brother and three sisters. She also had another brother who died in 1886 at the age of 15 yr.

Details of her early life are missing. She married "Professor" Charles Albert Herb apparently in her late teens or early 20s. Herb was a musician in Houston, TX, and the leader of a 24-member band called "Herb's Light Guard Band." (Frank Herb, also a musician, and presumably his brother, was later listed in the Houston City Directories and lived there for many years, raising at least four children.) Isabella lived with Professor Herb in Houston, but was widowed after either 2[3] or 5 yr[4] of marriage, when he died at the age of 35 on July 2, 1888 (4). She would probably have been only 23 or 24 yr old at the time.

The circumstances of his death are well described in the Houston newspapers. After performing at the 18th Annual Houston Volkfest, he and his band, plus about 150 other celebrants, were on a barge which struck the San Jacinto bridge at approximately 12:30 AM on May 25, 1888. This accident resulted in portions of the bridge collapsing onto the crowded barge. Herb was the only person seriously injured when he "was caught, it seems, in a sitting posture and the weight of the timbers crushed him forward injuring his spine" (5). His death certificate lists the cause of death as

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Address correspondence and reprint requests to Robert A. Strickland, MD, Mayo Clinic, 200 First Street SW, Rochester, MN 55905.

[1] Information from grave headstone and Class History for 1892, Northwestern University Woman's Medical School, Chicago, IL.

[2] Information obtained from Certificate of Death, Cook County, IL.

[3] Wood Library-Museum of Anesthesiology, Park Ridge, IL.

[4] Class History for 1892, Northwestern University Woman's Medical School, Chicago, IL.

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Figure 1. Photograph of Isabella Coler Herb, MD, at the Mayo Clinic, circa 1900.

Figure 2. Grave headstone of Isabella Coler Herb, MD.

"fracture of spine." Isabella Herb returned to Clyman shortly thereafter for an unspecified period of time.

Although Dr. Herb's college or premedical education is unknown, it is well documented that she obtained her Doctor of Medicine degree from the Northwestern University Woman's Medical School in Chicago in 1892. From 1877 to 1892, it was known as the Woman's Medical College of Chicago, until it merged with Northwestern University. The Woman's Medical College of Chicago was thus the school into which Dr. Herb matriculated. The date of her entry is uncertain (Teresa R. Taylor, Associate Archivist, Archives and Special Collection on Women in Medicine, Medical College of Pennsylvania, Philadelphia; personal communication). Students at this time were being advised to enter the 3-yr program, but could graduate in 2 yr if they were able to demonstrate a year of study either with a preceptor or at another medical school. Dr. Herb's name first appears in the Woman's Medical College of Chicago faculty minutes, dated April 1, 1890, where her grades for histologic laboratory and pharmacy are noted. Since histology was offered to the 3-yr students during their junior year, Dr. Herb should have matriculated into the Woman's Medical College of Chicago during the 1888–89 school year. However, it is interesting to note that she is not on the list of students for that school year. If she was a junior student during the 1889–90 school year, then why did she not graduate in 1891 rather than 1892? The only other records in existing school documents states that on March 24, 1892, she was awarded a Certificate of Pharmacy. Possibly she was allowed to take histology early, in her first year, because she had received some medical education elsewhere.

After graduation, she served a 1-yr internship at Mary Thompson Hospital for Women and Children in Chicago, and was Assistant to the Medical Staff until 1894.[4] After this, she was Dispensary Physician and Superintendent at the same facility[4] (6). Then she spent 3 yr as an anesthetist and pathologist at Augustana Hospital in Chicago (6,7).

At Augustana Hospital, she collaborated with Dr. Lawrence Prince, a major developer of open drop ether and chloroform anesthesia. Her earliest published work in anesthesia evaluated 1000 consecutive general anesthetics, beginning on September 3, 1897, and continuing through November 9, 1898 (7). It is interesting to note that this was the third in a series of articles which evaluated 500 or 1000 consecutive anesthetics at Augustana Hospital. Dr. Prince published his experience with 500 consecutive ether and chloroform anesthetics in 1895 (8) and followed up with an unpublished presentation of another 500 cases mentioned at the time Dr. G. W. Green published the second series of 1000 cases (9). This was followed by Dr. Herb's report (7). She defined the male-to-female ratio, extremes of age, anesthetic (ether, chloroform, or both), and number of times each was used, the various categories of surgical operations, and the general technique for administering an anesthetic (7).

In November of 1899, she joined the medical staff of the Mayo Clinic in Rochester as the anesthetist for Dr. Charles Mayo and as a pathologist. This appointment was the result of a friendship between Dr. Albert J. Oschner, the chief of surgery at Augustana Hospital, and the Mayo family, especially Dr. Will Mayo (10). Apparently, Dr. Herb's skills and expertise as an anesthetist and pathologist were thought to be needed at the Mayo Clinic, still in its early development at that time.

She was the first "physician anesthetist" at Mayo, which had for many years used junior surgical residents or nurses trained to administer ether and chloroform. Her education and experience while in Chicago made her well suited for this position, since the nurses administering anesthesia at Mayo at this time were using the open-drop method developed by Dr. Prince (11). In addition to her anesthesia-related responsibilities, she was in charge of the Section on Pathology and assisted in the early development of the clinical pathology laboratory (12,13).

In late 1904, Dr. Herb left the Mayo Clinic and went to Europe for further study (1,2,12–14). It is also possible that she went to Europe for postgraduate studies shortly after graduating from medical school (3,14). She subsequently returned to Chicago in 1905 where she performed bacteriology research in the Pathological Laboratory of Rush Medical College and the Memorial Institute for Infectious Diseases using a grant from the American Medical Association.

In 1909, she was asked by Dr. Arthur Bevan, the head of surgery at Presbyterian Hospital and Rush Medical College, to become the chief anesthetist at these two closely related facilities. In accepting this position, she not only became the first woman on the staff of Presbyterian Hospital, but she also assumed a full-time anesthesia career and remained in this position until her retirement in 1941.

Between 1905 and 1910, she authored several articles based on her work in pathology which were published in well respected journals, such as *Surgery, Gynecology and Obstetrics*, and *Journal of the American Medical Association* (15–22). The remainder of the journal articles and book chapters during her career concentrated on anesthesia.

Her second article on an anesthesia-related topic briefly discussed the legal responsibilities of surgeon and anesthetist (23). In this and subsequent articles, she stated her belief that the anesthetizer (a term she used early in her career) or anesthetist should be a physician and be responsible for the selection and delivery of the anesthetic (23–30). The surgeon's only responsibility regarding the anesthetic was in choosing a competent physician to administer it (23). Throughout her career, she advocated a strong didactic and practical education program for medical students and interns in the practice of anesthesia. This program was to be delivered by a physician whose primary responsibility was to oversee the delivery of anesthetics in that hospital, and not by surgeons who might have limited training and expertise in anesthesia (23,26–29). She felt very strongly about this latter point: "Unfortunately," she wrote, "most anesthetists receive their meager instruction from surgeons during the operations, and it is a notorious fact that the majority of surgeons are poor anesthetists. From the fact that a man operates hundreds of times a year, it does not follow that he is proficient in the art of producing and maintaining anesthesia" (23).

In her discussions of the medicolegal aspects of anesthesia, she questioned the "Captain of the Ship" doctrine (23,25,30). Some of her attitudes about anesthesia may have evolved in part as a result of the 5 yr she spent early in her career at Mayo Clinic. At that time, anesthesia, usually with ether, was administered by nurses. She believed strongly that anesthesia should be regarded as a separate specialty in medicine. "It seems a travesty on justice," she once wrote, "that according to law no one but a licensed physician is allowed to prescribe drugs or perform the slightest operation, but persons with absolutely no training are administering anesthetics without hindrance . . ." (25,30). "The legal responsibility (of the anesthetist)," she maintained, "is to show he is a regularly qualified physician and has administered the anesthetic according to recognized methods" (25,30). She also described the differences in legal responsibilities between the anesthetists in England, where she had apparently lived briefly, and the United States (25,30).

Dr. Herb also thought that "nurses when properly trained make very good anesthetizers . . ." but that ". . . their lack of medical training . . ." prevented them from being able to choose a particular anesthetic technique that would best suit the patient's and surgeon's needs (23). This same lack of training would hinder research in anesthesia (23).

Premedication, or "drugging before general anesthesia" was a topic Dr. Herb discussed several times (23,31,32). She thought that the preoperative administration of morphine with either scopolamine or atropine was unsafe because of the associated respiratory depression. Much could be discerned about anesthetic depth with ether or chloroform by observing the respiratory rate and pattern, and morphine premedication, she thought, abolished much of this potential. She had other complaints about atropine and scopolamine, such as pupillary and circulatory changes.

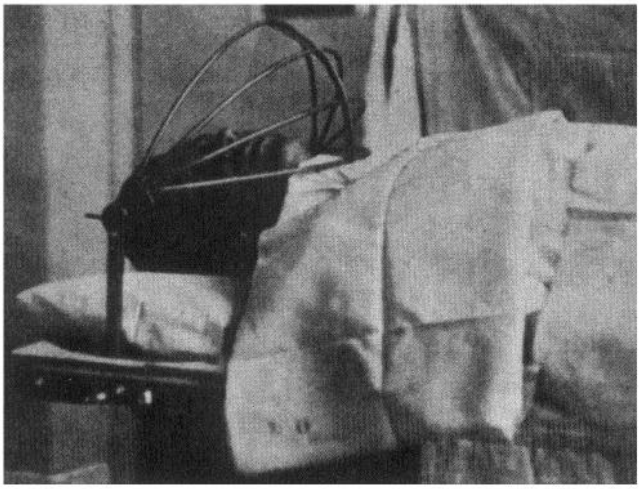

Figure 3. Anesthetic ether screen designed by Dr. Herb. [Reprinted with permission from Herb (34)].

Two of Dr. Herb's methods of reviving debilitated patients after difficult operations are somewhat humorous by today's standards (23). The first of these involves the use of strychnine to improve respiration and circulation, the second, the instillation of "warm saline solutions given per rectum, especially if there has been much hemorrhage" (23).

Dr. Herb reviewed adverse perioperative events, such as hypothermia, postoperative pneumoniae, low urine output, and nerve injury, such as brachial plexus neuropathy (25,30). She described airway manipulations that are used today to improve respiration in an unconscious patient. Some of the other techniques for resuscitation, such as dilating the anal sphincter to improve breathing, have not continued in practice (25). Dr. Herb was among the first to advocate orotracheal intubation with a "hard rubber tube," cardiac massage, and intracardiac epinephrine administration for resuscitation (25).

Dr. Herb's last two journal articles about ether anesthesia defended the open method of administration as late as 1918 (33,34). She warned of the inherent dangers of intravenous ether and of ether-oil colonic anesthesia, which was advocated by well respected people in the specialty such as Dr. James T. Gwathmey. The open method of administering ether was the safest and the most readily reversible method.

Dr. Herb was also active in equipment design and modification. In 1917, she described a new type of ether or anesthetic screen (35) which has significant advantages when compared with current ones. Her anesthetic screen provides excellent protection for the face, anesthesia mask, or endotracheal tube (Figure 3).

The safety and efficacy of ethylene as a general anesthetic was demonstrated initially on laboratory animals by Luckhardt and Carter (36). They next experimented on themselves and others. Finally, after it

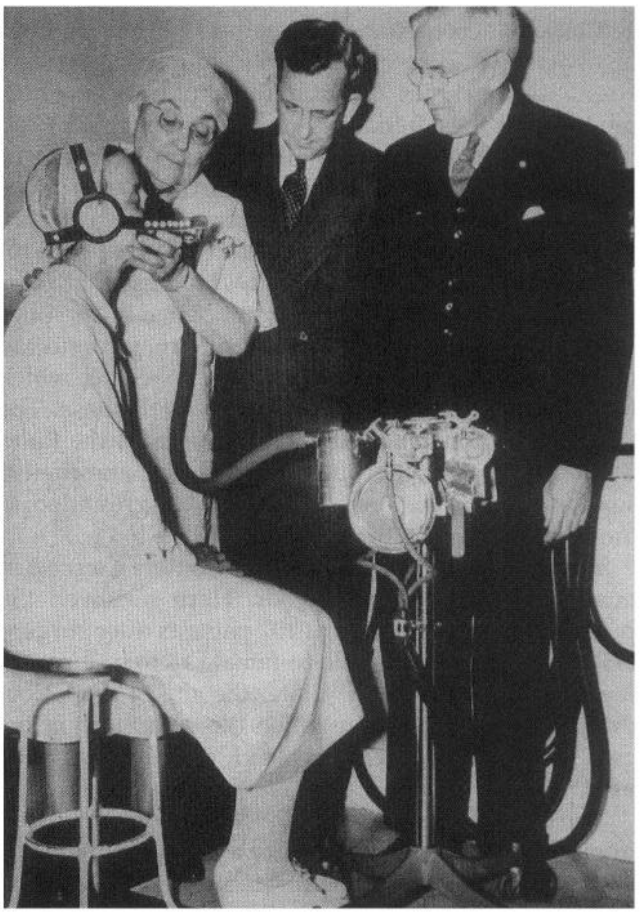

Figure 4. Dr. Herb (standing) with Drs. Arno B. Luckhardt (right) and J. Bailey Carter (photo courtesy of Dr. John B. Stetson).

was demonstrated to Dr. Herb and other anesthetists and surgeons on March 11, 1923, she agreed to introduce this new anesthetic into clinical practice (Figure 4). "So convincing was that demonstration," she wrote, "that three days later I administered ethylene-oxygen to four patients. I think that morning was the most exciting, the most thrilling, the most anxious—and I may add, the most satisfactory one—in my life. My anxiety was due to the fact that I had no knowledge of the signs of anesthesia to guide me as to the depth of narcosis, and I was fearful that I might administer an overdose, while the excitement and thrill were doubtless due to the thought that a new anesthetic agent was on trial" (37). In several articles, she discussed the safety of this anesthetic in all types of surgery performed at that time (38–41).

One very serious problem with ethylene anesthesia was its propensity to explode, with possible injury to the patient and others in the operating room (42). To solve this potentially life-threatening problem, Dr. Herb enlisted the assistance of the Commonwealth Edison Company. It was determined that a high relative humidity would decrease the potential for

electrostatic charges, but this was a technically difficult task to accomplish. The method ultimately used involved grounding all moveable equipment, such as anesthesia machines, tables, and personnel to the hospital water pipes. Initially a large steel plate was used to cover the floor. Subsequently, floors were made "of small squares of terrazzo separated by narrow brass strips . . .placed 5 inches on centers each way" (42). These strips were all interconnected in a grid pattern. The anesthesia bag was wrapped with brass chain and the outer aspect of the breathing tubes had brass spiral wire. The brass chains and wires were then connected to a metal portion of the anesthesia machine, which had lengths of brass chains attached to the base. The latter chains contacted the metal surfaces of the floor. Thus, the patient, pertinent equipment, anesthetist, surgeons, and other personnel were all grounded to the water system of the hospital (42).

In what would be considered a credible exercise in quality control even today, Dr. Herb reviewed the pulmonary complications of 107 patients after surgery (43). She defined the male-to-female ratio, the age of the patients, the mortality rate, the site of operation, the postoperative day in which the complication began, the type of surgery involved, and the anesthetic used (43).

One of her last publications, a case report, discussed intraoperative difficulties in airway management of a patient undergoing radical mastectomy (44). Notably, the patient had undergone a thyroidectomy 8 yr previously and postoperatively had incurred difficulties in breathing and developed a "husky voice." After Dr. Herb's difficulties in airway management, the patient was found to have "bilateral paralysis of the cricoarytenoideus posticus" muscles, apparently the result of the thyroidectomy which produced recurrent laryngeal nerve injury (44).

Dr. Herb was very active in many professional societies. She served as Secretary of the Section on Pathology and Physiology of the American Medical Association from 1915 to 1918 and she chaired the Section on Miscellaneous Topics from 1921 to 1924. A charter member of the Interstate Association of Anesthetists, American Society of Anesthetists (subsequently the American Society of Anesthesiologists), National Anesthesia Research Society (subsequently the International Anesthesia Research Society), Midwestern Association of Anesthetists, and the Associated Anesthetists of the United States and Canada, she also was President of the Chicago Society of Anesthetists, President of the Interstate Association of Anesthetists in 1916, and the tenth President of the American Association of Anesthetists in 1922 (3). Because of her service in this latter office, she was honored with a special award (Figure 5). In addition, she was on the

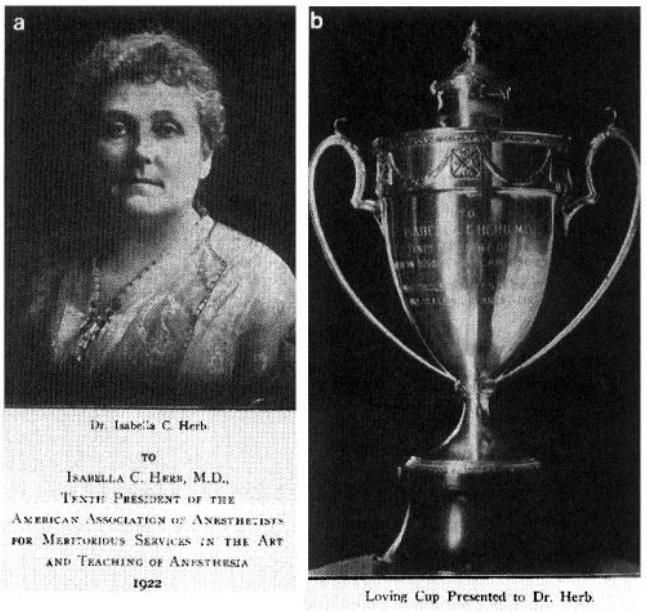

Figure 5. A, Portrait; B, Loving Cup Award for Dr. Herb's service to her specialty. (Reprinted with permission from: More honors richly deserved. Am J Surg 36:121–3, 1922.)

Research Committee of the National Anesthesia Research Society, the Editorial Board of the *Quarterly Supplement of Anesthesia and Analgesia* for the *American Journal of Surgery,* and the Council on Teaching and Hospital Service for the Associated Anesthetists of the United States and Canada (3).

Dr. Herb retired on June 7, 1941, as Professor of Surgery (Anesthesia) at Rush Medical College and Chief Anesthetist at Presbyterian Hospital. In her retirement notice in *The Presbyterian Hospital Bulletin* (14), she was credited with teaching anesthesia to "hundreds" of students at Rush Medical College and "several score" of interns during her career. Clearly, Dr. Herb embodied the attributes that the Drs. Mayo espoused, namely "patient care, research, and teaching."

She died May 28, 1943, and was buried in a humbly marked grave in the Holy Assumption Catholic Cemetery in Clyman (Figure 2). In her obituary in *Anesthesia and Analgesia,* tribute was paid to her as " . . . a pioneer American Anesthetist and Dean of the women physicians in the specialty" (3).

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