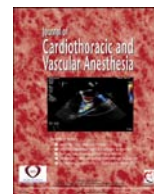




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Special Article

The History of Cardiovascular and Thoracic Anesthesia in Mexico

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"...So, the Lord God caused him to fall into a deep sleep. While the man was sleeping, the Lord God took out one of his ribs. He closed up the opening that was in this side..."

Genesis, 2:21

THE GOAL OF cardiovascular and thoracic anesthesia (CVTA) always has been to support the development of cardiovascular surgery worldwide, offering a safe environment and care to those patients who undergo cardiothoracic surgery. The history of CVTA in Mexico starts with the appearance of cardiothoracic surgery in the 1940s. Mexico was a pioneer in several anesthetic and surgical procedures in Latin America. Initially, cardiothoracic anesthesia in Mexico relied on the progress made by important hospitals throughout the world—in particular, those located in the United States. This was due to the significant exchange of information that has always existed between these 2 countries. Considering that CVTA is based on the development of anesthesia and cardiac surgery, this review includes progress made in both these medical disciplines in Mexico.

Background of Anesthesia in Mexico

As established in the Badianus Manuscript¹ (Fig 1A), during pre-Hispanic times, Aztecs used a variety of plants with sedative and analgesic effects. Two are illustrated in Figure 1B: *tolohuaxihuitl* (*Datura stramonium*) and *nexehuac*

(*Datura ceratocaula*). These plants were applied externally, alone, or in combined potions during bone setting, surgery, incision making, and the relief of painful bruises and other injuries.^{1,2} There is no evidence of the use of anesthetics in New Spain during the next 3 centuries. However, it is assumed that, throughout this period, alcoholic beverages and herbal infusions likely were used to reduce pain during surgical procedures. Figure 2 shows a timeline including the most important events in the development of anesthesia and CVTA in Mexico.

The use of sulfuric ether as an anesthetic was first introduced in 1847, when Edgar H. Barton, an American army surgeon amputated the left leg of a soldier, William Williamson, in Veracruz during the Mexican-American War (1845-1848).³ This occurred a few months after the application of ether by Morton in October 1846.³ After US army doctors demonstrated the use of ether as an anesthetic, Dr Jose Sansores anesthetized patients requiring upper limb amputations in the city of Merida, Yucatan, in 1847.⁴ In Mexico City, wounded Mexican soldiers in the battlefield were anesthetized by Dr Pablo Martínez del Río and Dr Miguel Jiménez using ether.⁵ Around 1852, Dr Martínez del Río began to use chloroform, bringing it from London.^{5,6} The use of ether and chloroform then spread throughout the country.

The first emergency hospital was created in 1847 and was initially known as San Pablo.⁷ The hospital was renamed afterward as Hospital Juarez in 1872 and continues operating to date.

Anesthetic procedures are not mentioned in the recordings of the first relevant events of cardiothoracic surgery in Mexico. These events include a published dissertation concerning 135 cases of heart wounds treated at Hospital Belen in Guadalajara, Jalisco,⁸ in 1870 by Dr Fortunato Arce. Two years later, in

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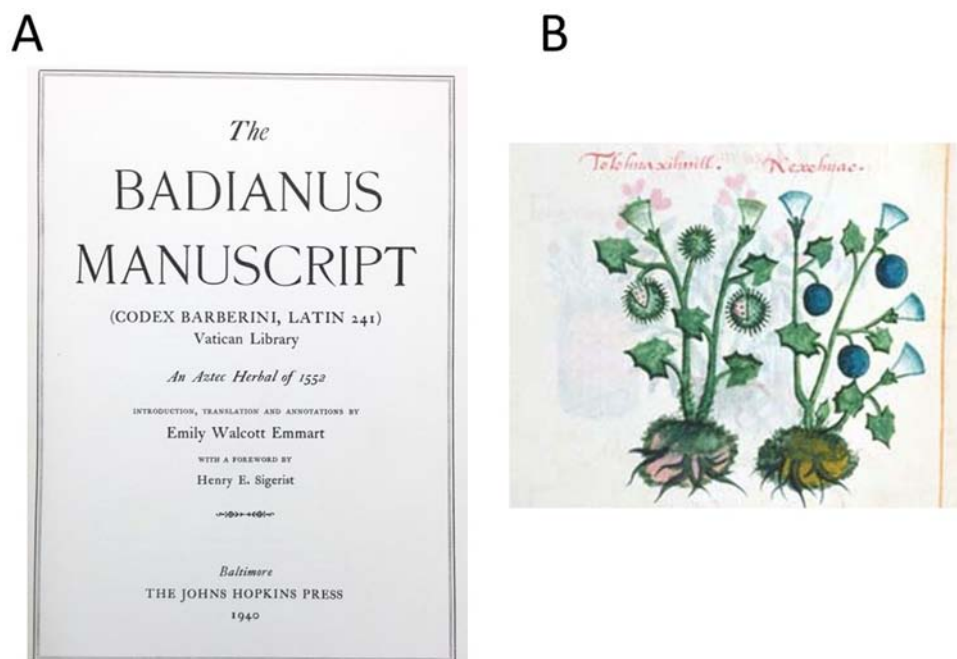


Fig 1. (A) The oldest known herbal American (1552)¹ by Martín de la Cruz and Juan Badiano. This manuscript appeared in 1925 in the Vatican Library, after centuries of apparent loss. In 1990, Pope John Paul II returned the code to Mexico, where it is guarded by the National Institute of Anthropology and History (INAH) Library. Images reproduced from: <http://www.sequiturbooks.com/image/cache/Product%20Images/2016-11/The-Badianus-1611020031/16110200316-800x800.JPG>. (B) Illustration of 2 plants used in Aztec medicine with sedative and analgesic effects, Tolhuaxihuitl (*Datura stramonium*) and nexehuac (*Datura ceratocaula*), taken from the Badianus manuscript. Images reproduced from: <https://i.pinimg.com/originals/27/fd/3f/27fd3f47fa1e80894f307445c3a6f42b.jpg>.

1872, Dr Eduardo Liceaga conducted the first subperiosteal costal resection and described the first case of Pott's disease.⁹ In 1874, furthering the development of cardiothoracic surgery, Dr Ricardo Egea y Galindo performed a pericardiocentesis using a Potain's aspirator to suction a pericardial effusion.¹⁰ The first pericardial punctures in the world had been carried out in 1870 in Vienna by Dr Shuh and in England by Dr Allbutt.¹¹

Thoracic surgery continued developing in Mexico and in 1881 Dr Ignacio Prieto published "Surgical Procedures in Tuberculosis."⁹ In 1888, Dr Joaquin Rivero treated a case of pyothorax using suction tubing for the first time in Mexico, mentioning the use of a water seal to treat pneumothorax.^{9,12} In 1902, Dr Adrian de Garay's team sutured a pericardium wound¹³ using the same procedure as Dr Henry C. Dalton and Dr Daniel Hale Williams had in 1891 and 1893, respectively.¹⁴ In 1933, Dr Ricardo Tapia, an otolaryngologist, reported the first direct laryngo-tracheobronchial endoscopy in Mexico; this has been an essential procedure since then, acting as a diagnostic and therapeutic tool in pneumology and thoracic surgery.¹⁵

Returning to the history of the use of the general anesthetics—after ether and chloroform—ethylene, hexobarbital, and cyclopropane began in Mexico in 1932, 1933, and 1935, respectively, by Dr Federico Vollbrechthausen at Hospital Juarez in Mexico City.¹⁶ The first use of ethylene worldwide was in 1927¹⁷ by Johnstone, of hexobarbital in 1932 by Weese and Scharpf,¹⁸ and of cyclopropane by Dr Ralph Waters in 1934.¹⁹

Beginning of Systematized CVTA in Mexico

This review mentions contributions made by Mexican cardiologists and researchers in the development of cardiology and cardiac surgery together with the development of CVTA. Unfortunately, there are no records of every anesthesiologist who took part in surgeries at that time. Before 1943, little progress was made in the development of cardiovascular and

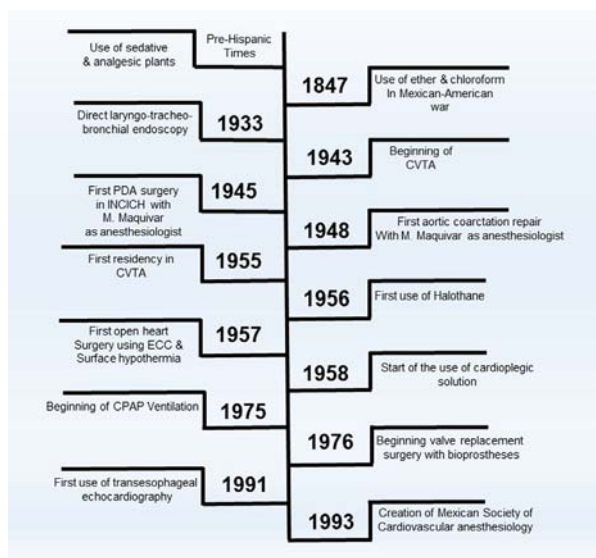


Fig 2. Timeline of major events in anesthesia and cardiovascular and thoracic anesthesia development in Mexico

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