Research article

Spinal: history of a revolution in orthopedics

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Abstract

Spinal anesthesia is a commonly used technique, either on its own or in combination with sedation or general anesthesia. We reported the history of spinal anesthesia.

Keyword: History, anesthesiology, epidural, Fidel Pagés

Introduction

Modern general anesthesia invention was a revolution for the entire surgical world. For the first it was possible to operate on a patient without pain warned that it will die for it during surgery. In orthopedic surgery, anesthesiology, however, the real revolution was the one known as epidural anesthesia that allowed to operate in the best conditions of safety for the patient.

The origin of anesthesia

The first attempts to lessen the pain inherent in surgical procedures date back to the EGYPTIANS, whose medical knowledge was very advanced, so as to enable them to administer poppy extract (opium) to their children because they slept at night.
In papyrus 'Ebers' (1550 BC) will lie with hieroglyphic writing about 900 pesticide recipes, made with thyme, castor and especially mandrake and henbane as sedatives containing scopolamine.

In 3000 BC The Assyrians also resorted to plant narcotics, such as poppy, mandrake and Cannabis Indica (marijuana), but the people of Mesopotamia also resorted to cerebral ischemia induced by compression of the carotid arteries to cause a state of transitional coma during which to operate.

As early as 500 BC INDIOS the Peruvian provoked anesthesia of the tongue and lips, chewing coca leaves, while the greek philosopher Hippocrates (460-377 BC) described a "soporific sponge" soaked in opium, henbane and mandrake and able to sleep a sufferer. It's still a greek, Dioscorides, who coins the word "anaisthèia" to describe the soporific effects of the mandrake, which we find used in Bologna, in 1200, by Brother Domenico de Luca.

In parallel, proceed anatomical studies thanks to the dissection of corpses, and the Belgian Vesalius, in his monumental work "De human corporis fabrica" in which already assumes the artificial ventilation, describing the feasibility animal.

Meanwhile Valerius Cornus discovers the hypnotic properties of ether disolforico and Paracelsus discovers the analgesic power, but both do not intuit the clinical importance, so the fight against pain proceeds on other roads, such as the cooling of the area to be operated.

In 1600, Sir W. Raleigh, the founder of Virginia, on his return from Guyana describes the root of Strycnos Toxifera and the extract, "el urari" curare.

In the same century appear the first attempts to intravenous administration of opium through the quill of a feather, but in 1836 that F. Rynd invented in Ireland metallic hypodermic needle, and in 1851 the Frenchman Charles G. Pravor perfected the syringe.

At the end of the '700 with an even high operative mortality rate, also due to lack of adequate body protection from surgical stress, until in 1796, when, in a period of fervid studies on gases, the nitrogenous (= Nitrous oxide is produced Nitrogen), a non-toxic gas, however, still used for several years to come just to give the show with his hilarious effects on those who inhale, who was called "Laughing gas", instead of neglecting the anesthetic properties.

Oxygen is detected and produced by J. Priestley, former coach of Nitrogenous; these gases are studied later by Lavoisier, but it will be in 1800 that the great physicist Michael Faraday will verify the effects of nitrogen, dimostrandoli similar to those obtained by inhaling an air / ether mixture.

Things protracted more or less unchanged until 1844, when the United States begins the story that will lead to the birth of modern anesthesia was discovered, in a laboratory, but in Luna Park!

In 1844 in Hartford, Connecticut (USA), in one of the various pavilions of the fair where he was taking a fun show, based on the antics on the stage of some volunteers who were made to inhale nitrous oxide. In the front rows, to enjoy the effects of laughing gas were sitting a dentist, Horace Wells, and his friend, Cooley, who at the invitation of Colton presenter volunteered to experience, together with other volunteers, the gas intoxication. But on him nitrous made a bad effect making so violent to trigger a fight with another volunteer and be thrown back in the audience. Suddenly, the spectator who sat behind him Cooley warned that under his chair was spreading a blood stain: during the scuffle he was indeed seriously wounded in the leg, but he had not noticed anything, nor had warned no pain...
Wells thought and thought the episode, much to conclude that the gas had somehow reduced sensitivity to pain in his friend. And he persuaded him to such a degree, that he decided to try the laughing gas as an analgesic for the extraction of a tooth. He called a colleague and after inhaling a breath of laughing gas is made to extract a molar that has long bothered him: the extraction proved perfect and without any pain!

Entusiasmato for the result and procuratosi a volunteer, Wells organized a demonstration extraction sacred in the amphitheater of the Massachusetts General Hospital in Boston. But unfortunately, or Wells error in calculating the timing, or -as some affermarono- because it is paid by some detractors, the patient shouted several times from the pain. So the first demonstration ended in a total fiasco.

Wells left the profession and as he tried in vain to convince colleagues of the veracity of this claim, his friend and apprentice, William TGMorton, developing ideas, greatly publicized its work on the ether pursuing his demonstrations: in September 1846 for the first time used the airwaves to extract a tooth, and October 16, 1846 showed up at the Massachusetts General Hospital in Boston with a glass sphere equipped with an inlet and an outlet containing a sponge soaked ether. He made it to the patient breathing the vapors and this allowed the First Surgeon, Dr. John Collins Warren, to remove a large tumor of the neck, quickly and without any pain.

The sensational event was published November 18, 1846 in the Boston Medical and Surgical Journal, and a well-known doctor, Oliver W.Holmes suggested about the greek term "anesthesia" to indicate "insensitivity to pleasure and pain" had born modern anesthesia!

While the poor Wells fell into depression and Become aware betrayed by Morton, he began experimenting with chloroform, which became addicted and began to esere lascivious in her life enough to attend prostitutes. After a stop to have scarred with two prostitutes acid, just quattro years after his intuition took his own life.

In 1853: in London Dr. Snow administered chloroform to Queen Victoria when she gives birth to Leopold, and together with the prince so too comes the childbirth analgesia. Since that time, the discoveries and inventions in anesthesiology inalzandosi one another, thanks to the contemporary with the great advances in technology and studies in Medicine, Chemistry, Physics and Physiology:

1871: appears the first cylinder of compressed nitrogen.

1880: first endotracheal intubation for artificial ventilation.

1882: appears cyclopropane, anesthetic gases, but dangerous as explosive.

1882: first report of the mouth-to-mouth ventilation.

1885: first local anesthesia by infiltration of the area to operate first and peridural anesthesia.

In 1902 he coined the word ANESTESIOLOGIA indicating the science and the means to achieve insensitivity to pain with or without hypnosis.

In 1911 Dräger launches first mixing apparatus for anesthetic gases, which combined with a trolley equipped will be the "Dräger - Kombi", the first apparatus for anesthesia combined with circuit back-and-forth.

Six years later, in 1917, Ombredanne draws a device to vaporize ether ( "the Ombredanne") mask.

The first illuminated laryngoscope batteries and fashioned "L" is designed by Dr. Janeway, in 1913 and a year later introduced the use of soda lime for the absorption of CO2 in ventilator circuits.
Guedel public in 1920 the "signs" of anesthesia (and two years later he will describe the "Plans"), Magill proposes the use of an endotracheal tube for administering inhalation anesthetics.

In 1923, it is using the first closed circuit and in '27 the first electroanalgesia.

Pharmaceutical companies are now competing in the research and production of anesthetic drugs, inhalers both for local use: in 1934 Lundy uses for the first time as the anesthetic sodium thiopental (pentothal), a barbiturate used intravenously until then as "serum of truth" for its propeietà disinibenti; South America Meanwhile, in Buenos Ayres, shows the first APPARATUS ANAESTHESIA, assembled by joining J.C.Delorne bottles of O2 and CO2, vaporizers ether and chloroform, a filter-lime soda container, tubing and mask.

1938 - Bennet uses for the first time curare to prevent muscle trauma in patients subjected to electroshock, and in 1942 it is used clinically for the first time, to achieve the relaxation of the patient's muscles, need for intervention, without having to employ huge amounts of anesthetic until then essential to achieve the same result, but it is only in 1946 that is provided d-tubocurarine, curare first semisynthetic.

The Spanish paraplegia of Pagés

Fidel Pagés Mirave was born January 26, 1886 and raised in the Spanish city of Huesca in an upper class family. His parents were Juan Pagés Maraque and Concepción Mirave Sesé. His father died when Fidel was 7 years old and his mother remarried, which strengthened the personality of Fidel.

In 1901, began his medical studies at the University of Zaragoza, where he graduated in Medicine and Surgery with honors in 1908. During these years he learned the German language, which was very important later in his career, because it gave him the opportunity to exchange experiences with the German-born surgeons, and to read texts in native language of chemistry and pharmacology most important in the world.

In 1908 Pagés to keep decided to enter the Royal Spanish Army as a medical officer and, after a year of attendance at the Academy of Military Health, received the degree of a second medical officer. In 1909 the War of the Rif was at its peak at this point, the Spanish army had undergone a series of dramatic defeats the most popular one Barranco del Lobo and health of Melilla services were overworked. Pagés, was sent in July 1909 as part of medical reinforcements had to create emergency military hospitals in different cities. He remained in Melilla for two years, first as an assistant surgeon during the six months of the campaign, and later was responsible for improving the organization of equipment and in the mountains places surgeries also was an instructor of the medical corps recruits. Back in mainland Spain, he stayed for a few months at the Military Hospital of Carabanchel. During his stay in Melilla, he developed a fundamental experience in emergency surgery.

He left Melilla in 1911, after being promoted to chief medical officer. He published his first article in 1912, entitled "The fight against infectious diseases in war campaign" by analyzing the techniques that the Japanese doctors who had successfully developed during the Russo-Japanese war and that he had applied to Melilla. He served in several Spanish cities and earned a doctorate in Madrid in 1913. That same year he married Berta Concepción y Bergenmann Quirós, a Spanish woman Spanish-German origin. He returned to Madrid in 1915 to work at the Ministry of War. In the same year in first place in a competition for a place in the Madrid Provincial Hospital. The prestige of Pagés grew during his stay in Madrid, he was called to attend to her work on several occasions for the Queen Maria Cristina, with whom he would have developed a personal friendship.

In 1917, during World War II, thanks to his knowledge of the German language and his experience treating war wounds, was commissioned to inspect the prisoner of war camps in Austria and Hungary. During these months he has also drilled a large number of surgeries the military hospital in Vienna. Pagés, was probably aware of the German and
French medical literature on previous experience of anesthetic into the epidural space and had contact with the German surgeons in Vienna who had experienced that technique.

After his return to Madrid, he continued to practice his work Surgery at the General Hospital of Madrid, publishing several medical articles, he became the chief editor of the "Revista de Sanidad Militar", and returned to work at the Ministry of the Spanish War. In 1919 he founded together with the physician Ramírez de la Mata the "Revista Española de Cirugía" where he published a number of essays and articles on anestesia as: Anesthesia Endotracheal according to Meltzer, the inhaler Ombredanne, the canula Trendelenburg, intravenous anesthesia Victor Horsley and total spinal anesthesia the Filliatre.

In 1920 he was assigned to the Emergency section of the 'Military Hospital of Madrid, although for a short time he was sent to Melilla in 1921 following the Spanish colonial disaster, where he practiced a hundred surgeries on wounded. Two of his major contributions in this period are the publication of his article "Prince" sull'anestesia epidural and a series of articles on the need of immediacy of early intervention for abdominal injuries based on his war experiences in contrast to the general opinion of the time when, the therapeutic nihilism or intervention deferred to the hospital intervention was the gold-standard period.

In 1901, the use of anesthesia through the epidural space has been reported, mainly for the treatment of urological diseases, but not for surgical interventions. Several techniques have been developed over the years, but never became popular in surgical purposes. It was used to induce a twilight state. Already in 1885 he had been practiced before the epidural anesthesia but it was introduced into clinical practice in 1899, when August Bier underwent a clinical experiment in which observed the anesthetic effect, but also the typical side effect of the wrong post puncture head.

In July 1921 Fidel Pagés published an article titled "Anesthesia metameric" that is metameric anesthesia or epidural anesthesia, in the "Revista Española de Cirugía" and "Revista de Sanidad Militar". In this article, he explained the technique that had developed in order to be able to inject the anesthetic in the lumbar region, leaving the spinal canal intact and without the need to achieve general anesthesia.

The article explains how the pages, which had frequently performed spinal anesthesia, developed the idea of injecting the anesthetic through the space between the lumbar vertebrae L4 and L5, of which 43 operations were carried out using this technique, providing details on each pace and advice on the correct dose of anesthetic, double what had been recommended previously in similar techniques. Pagés also illustrated the effects of the gradual numbness and motor paralysis, the indications and contraindications to the use of epidural anesthesia technique for surgeons interventions. The technique has been widely practiced in the months during the Spanish campaign in Ref. However this method was relegated to the Spanish dimension, without being exported nanny in the world. The worldwide dissemination of Pagés studies in the 1930s and in 1940 was given by Italian cardiac surgeon Achille Mario Dogliotti.

Conclusions

Thanks to the experience of war and knowledge made of texts and the knowledge exchange with the German Fidel Pagés world has enabled a great leap to orthopedic surgery. From his intuition it has developed the regional anesthesia that allows us to operate the body segments with conscious patients almost eliminating the risk anesthesia.

Essential references

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