

Brief History of Neurosurgery in Colombia

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1. Pre-Columbian Craniotomies

Findings of multiple craniums in several parts of the world are widely known, where trepanations made since the Neolithic period have been observed that have been subject to study as of the second half of the XIX century. But it was not until 1874 when Prunieres demonstrated to the French Association for the progress of Science in Lyla, survival after craniotomies in two pre-Columbian skulls studied, a fact that is evidenced upon the scar formation around the osseous defect. (1). These studies were confirmed by Broca 2 years later in 1876 and thereafter they have been universally accepted. (2)

Craniums which have been more deeply studied and in greater quantity have been the Peruvian ones of the Paracas region as their conservation has been possible thanks to the chemical composition and land dryness. However, significant findings have been made in the Maya and Aztec cultures, and in Colombia the one made by the Anthropologic Institute, published in 1971 by doctors Jaime Gómez and Gonzalo Correal, reporting the existence of pre-Columbian craniotomies with survival in the Chibcha culture (200 years BC to 1500 years AD). Applying the carbon 14 method, these craniums were dated in around 350 years AD. Of the cases studied, one reflects cranioplasty composed of clay with a high content of iron. (3)

In these cases, as in the great Peruvian series, the most frequent location in the parietal region of the left side, what most infers in a direct manner the relationship with the surgery with traumatic injuries, both associated with subsidence and hematomas. It is interesting pointing out mortality data of these great Peruvian series, which in accordance with studies of Tello and Weiss vary from 10.5% to 34%. The man-woman relationship with osseous defects is of 4 to 1, which reaffirms the above mentioned fact of being traumatic injuries. (4, 5)

The practice of these surgeries involves an important cultural development. Several studies demonstrate the outstanding knowledge these cultures had of anesthetic

agents or analgesics such as coca. The use of coca leaves in the form of emplastrum on injuries causes a local anesthetic effect, a fact that constituted one of the important pre-Columbian contributions to the world pharmacopeia; in addition, the "mambeo" (chewing of coca leaves mixed with lime) provided the sick person with greater physical and analgesic resistance. Pardo informs that the Araucanians used the *Datura ferox* flower, which contains scopolamine and in greater quantity atropine and hyoscamina.

The stated studies demonstrate that in the intervened craniums infection was present in very low indexes and there is evidence of the use of antiseptic agents to wash injuries; mercury, arsenic, copper sulfite salts and other antiseptic substances have been found in the Paracas tombs (strong wind from the Pacific), which were supposedly used in the way of infusions or watery solutions. It is widely known that with the arrival of the conquerors, the treatment made in Europe of injuries was based on astringent substances, completely different from that used in America, which were with washes of natural infusions called "soft". The other aspect necessary to perform these operations successfully was the control of bleeding. Certain astringent substances deriving from vegetal products, such as the known "pumacucu", common in the Peruvian Andes, have been found. Bone needles have also been found and it is considered that sutures were basically made with cotton; mummies have also been found whose wounds have been approximated using scalp hairs around the borders thereof (6).

Lastly, the necessary sharp objects to realize the cranium defects are many: objects of silica and obsidian have been found and subsequently the famous "tumi", which is elaborated with copper and is constituted by a handle and with a sharp half-moon at the other end. Likewise, objects have also been found made of bone and of an alloy of gold and copper "dumbaga" or of silver and gold

“champi”. The osseous defects were mainly in a circular or cuadrangular form as a result of the craniotomies.

The multiple studies made in hundreds of craniums subject to trepanation demonstrate that in the territories of the ancient Perú (Perú, Bolivia and Ecuador), trepanations were systematically made since 3000 years BC until the XVI century, mainly for therapeutic purposes in: Traumatismos; Hematomas; Endocranial hypertension, Osseous injuries (Syphilis); Osteomas or Exostosis of the auditive meatus (in Zambullidores)(7).

The surgical instruments used evolved in a logic form as a result of the indigenous evolution. Upon the high survival index it is inferred that they knew the anatomy of important cerebral structures, such as the venous sinus. In addition, they achieved covering appropriately the osseous defects Cranioplasties and suture soft tissues.

In no other region of the earth as in the ancient Perú, is the practice of trepanations for therapeutic purposes as so disseminated and generalized and up to now these are the oldest findings in the history of humanity.

2. Craniotomies Practiced Until The XX Century

The first medical publications of successful craniotomies were performed by Dr. Antonio Vargas Reyes from 1847 and 1860 and published in 1856 in “Medical-Surgical Observations” (8), it was the first esquirlotomy in a patient with an open comminuted and subsidence fracture, and others for drainage of epidural hematomas and penetrating wounds to the cranium. Dr. Vargas introduced chloroform during the 60s and founded the first Colombian medical publication “La Lanceta” in 1952 and subsequently, “La Gaceta Médica”. In 1864 he created the first Faculty of Medicine which would give rise in 1868 to the Faculty of Medicine of Universidad Nacional de Colombia.

During the second half of the XIX century and the first third of the XX century, most of the Colombian physicians were educated under the influence of the French medicine. In this period, Dr. Nicolas Osorio was highlighted; he had studied with Velpeau in Paris and was awarded a doctorate degree in 1865 with the thesis “RemarquessuruneTumeurprovenanad de la SustanceGrissCephalorachidienne”. He made multiple cranial operations and was Professor and Rector of the Faculty of Medicine, Founder and President of the National Academy of Medicine (9). Also, during the second half of the XIX century, doctors Samuel FajardoCamero, Julio Z. Torres, José Maldonado, and PompilioMartínez, were prominent physicians who performed and described several cranial operations upon different pathologies (6).

It is important to highlight the surgery performed by Dr. TomásQuevedoRestrepo in the city of Medellín in 1894, in a 35-year old patient who showed a convulsive episode followed by right hemiparesia and aphasia. With the clinical examination his diagnosis was “Left Cerebral Tumor,

probably glioma”, he performed a frontal craniotomy, removal of the glial tumor, with postoperative survival, although he died in the following days.(10) This surgery demonstrates the knowledge at that date of the cerebral anatomy/physiology contributed by the experimental studies on the cerebral functions of Ferrier and Hitzig, the descriptions anatomy/pathological by Virchow, the studies of cerebral functional location by Jackson and Broca, and the work of Ferrier y Charcot, among others. Ten years before Bennet and Godlee had operated on a similar case in England and Sir Victor Horsley in 1890 described the first 44 cases of craniotomies and 19 cases of surgeries of the spinal medulla with which the birth of Neurosurgery has been considered.(11)

3. Establishment of Neurosurgery as A Specialty

After the First World War the influence on the Colombian medicine was transferred to the United States of America. The first physicians trained in Neurosurgery were Dr. Álvaro FajardoPinzón who was trained in Stokey and Scarf at the Neurological Institute of New York and at the Mayo Clinic in Rochester with Adson and Cray, returning to Bogotá in 1941 where he worked for the San José and San Juan de Dios hospitals, performing the first Pneumoencephalographies and several neurosurgical procedures.(6) Afterwards, Dr. Mario Camacho Pinto, who was trained in New York, returned to Bogotá in 1945 and was appointed as “Neurosurgeon” at the Hospital San Juan de Dios. In 1951, he was appointed Professor of Neurosurgery of Universidad Nacional and in that year he performed the first cerebral Arteriography. He performed multiple operations within which the most outstanding ones were the first frontal lobotomies in 1942 (12). Dr. Camacho was the founding member and first President of the Neurologic Society of Colombia in 1961 where all specialists in neurological sciences participated.

4. First Neurosurgery Services

4.1. City of Bogota

The Neurosurgery Service of the Hospital San Juan de Dios of Bogotá, dependent from Universidad Nacional de Colombia, was established in 1950. Professor Alejandro J. Jiménez Arango was appointed as Director. He had been trained with Dr. Asenjo in Santiago de Chile, with Penfield in Montreal and subsequently participated in a fellow in Neurology at the Mass General Hospital in Boston. Since 1954, in this service in addition to the general neurosurgery room, there was a special room for the surgery of epilepsy, with intraoperative corticography.

Dr. José Mora Rubio, who did his residence in Stockholm with H. Olivecrona, replaced Dr. Alejandro Jiménez as head of the service as of 1961, giving to it a new impulse and organization which consolidated it as one of the neurosurgery services of excellence and where outstanding

neurosurgeons have been formed to date.

The first esterotactic surgeries were performed by doctors Hernando and Álvaro Corredor and published in 1957 in the magazine "Anales Neuropsiquiátricos de Bogotá" under the title "Surgical Treatment of the Parkinson Disease". Dr. Hernando Corredor was trained with Talairach in Paris and was one of the co-authors of the pioneer "Esterotaxic Atlas" (13) from 1958 to 1962, Dr. Fernando Rosas performed esterotaxic surgeries in animals and designed an esterotaxic apparatus with which he performed several procedures on human beings. (6)

In this service of Hospital San Juan de Dios, Dr. Salomon Hakim, based on the observations of 3 sick patients, described and published the Syndrome of Hydrocephaly of Normal Pressure. (14) The results were published in the journal of Neurological Sciences in 1965 in association with Raymon Adams. (15). Dr. Hakim continued deepening into his studies on the dynamics of the cephalaquid liquid and initially designed valves of different pressures and subsequently with his son - engineer Carlos Hakim - designed a programmable valve of wide use at an international level (16).

4.2. City of Medellin

Dr. Ernesto Bustamante Zuleta was trained in Neurosurgery with Dr. Alfonso Asenjo in Santiago de Chile and upon his return he conducted the neurology and neurosurgery service at the Hospital San Vicente de Paul of Medellín, creating the first regular neurology professorship chair in Colombia (17).

Dr. Bustamante performed for the first time procedures such as the Aneurism Clipping, temporal lobectomy, Hemispherectomys, comisurotomys, etc. and in 1969 introduced the microscope for neurosurgical operations. Several generations of outstanding neurosurgeons have been formed in this service (6).

The above were the pioneer services in Colombia. Neurology and neurosurgery remained together initially. At the Universidad Nacional (Bogotá) the Neurology service ascribed to the Department of Internal Medicine was created in 1961 and at the Universidad de Antioquia (Medellín) it did not separated until 1980. The impulse given by doctors Gabriel Toro González (in Bogotá) and Federico LópezGaviria (Medellín) was added to this joint activity, who after their residence in Neuropathology, were the pioneers of Neuropathology in Colombia during the 1960s and 1970s.

4.3. Neurological Institute of Colombia

The Neurological Institute of Colombia was created in 1966, founded and conducted by Dr. Jaime Gómez

González, in the city of Bogotá and ascribed to Universidad Javeriana. It initiated operations in 1973 and gave a great impulse to the Colombian Neurology and Neurosurgery. The first CT arrived there in 1977 and the first Magnetic Resonance in 1989. Unfortunately its doors were closed in 1996.

New Neurosurgical teaching services of several cities of Colombia were developed: Bogotá, Medellín, Cali and Cartagena, today counting upon ten services where most of the Colombian neurosurgeons are formed.

The various specialties in neurosciences have been integrated more every day, which has permitted progress in neurosurgery, upon the incorporation of the neurophysiology immunology molecular biology, biological, genetic and imagenological studies.

Based on the foregoing, the International Neuroscience Journal is created under the integrator paradigm of neurosciences, receiving the contributions from the most diverse regions of the world.

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