

## History of Neurosciences and Neurosurgery in Spain

Miguel Angel Arraez Sanchez<sup>1,\*</sup>

<sup>1</sup>Department of Neurosurgery, Carlos Haya University Hospital, Malaga, Spain

\*Corresponding author: Miguel Angel Arraez Sanchez, Department of Neurosurgery, Carlos Haya University Hospital, Malaga, Spain. Tel/Fax: +34-951290000,

E-mail: marraez@commalaga.com

Received: March 2, 2015; Accepted: March 16, 2015

**Keywords:** Neurosurgery in Spain; Neurosciences in Spain

The medical sciences related to the Nervous System have impressively evolved over the last decades. The great advantage of the traditional clinical neurosciences (Neurology, Neurosurgery) and also the progressive interaction with other disciplines that very much have contributed to this fascinating development is obvious. This interaction with the clinical Neurology and Neurosurgery has led to the creation of new subspecialties (Neuro-radiology, Neuro-oncology, etc.) that have become new real disciplines with their own body of knowledge. Basic sciences (Biochemistry, Immunology, Histology, Molecular Biology, Pathology, Genetics, Anatomy) have changed concepts in diagnosis and therapy of the Nervous System. Computational sciences have made one of the most transcendent changes involving every scenario of Neurosciences (surgery, imaging, neuromonitoring, prosthesis) and also in every field of Medicine.

In regard to Neurosurgery, the last decades have witnessed a dramatic evolution about how these so-called subspecialties have modified its practice. While a brain tumor in the 60s could only receive surgery and hardly radiation therapy, few decades after, the same lesion is able to benefit from a sophisticated management under the multidisciplinary context of Neuro-oncology in which the surgical treatment plays a very important role but-of course-linked to many other disciplines (pre, post and intraoperative computerized imaging, pathology, molecular biology, nuclear medicine, radiation therapy, chemotherapy, etc.). This is a very common example in our neurosurgical practice that can be extrapolated to the different fields (functional neurosurgery, skull base surgery, cerebrovascular diseases, etc.). It is under such a comprehensive vision and interaction among specialties that the International Neuroscience Journal comes into light. Its name defines the mandatory multidisciplinary context that the patient requires nowadays and also evokes how the neuroscientist international community can enrich this new and original vehicle of dissemination

of the current developments and knowledge about Nervous System diseases.

The Spanish Neuro-community is very proud to contribute to this wonderful project. As a matter of fact, if a good look is taken into the past history, Spain has made some great contributions to set down some keystones in Neurosciences. Not without merit Santiago Ramon y Cajal has been considered by many “the father of Neurosciences”. After years of meticulous refinement of the silver nitrate staining (developed by Golgi in 1873), Ramon y Cajal was first to identify the base of the modern neuroscience: the so-called neuron doctrine. He definitely described the real microscopic structure of the brain including “the dendritic spines” and sharing with Golgi the Nobel Prize for Medicine in 1906 (although Golgi attacked Cajal’s concept of the independent neuron even the day of the ceremony in Stockholm!). This pioneer work of Ramon y Cajal about the neuron was complemented by Del Rio Hortega (1882-1945), Spanish histologist who first described the microglial and oligodendroglial cells. This tradition related to basic neuroscience was followed by several other Spanish neuroscientists in the XX century: Jesús Avila de Grado (neurodegenerative diseases), Carlos Belmeonte-Martinez (neural sensory-receptors), Facundo Valverde-García (neuro-plasticity, visual cortex), Pablo Enrique Gil-Loyzaga (acoustic system, neurotoxicity, neurotransmitters), Justo Gonzalo Rodríguez-Leal (sensory cortex), Jose Lopez-Barneo (stem cells, ion channels), Jose Mira-Mira (neuroscience and computational science), Fernando Reinoso-Suárez (associative cortex).

If we look at Spain under the neurosurgical perspective, we can see clear evidence of trepanations (the “first” neurosurgical procedure) at the Neolithic Iberian Peninsula (2.000-5.000 years B.C.), some of them done in live persons (in some tribes of Canary islands trepanations were found in more than 10% of the population). This procedure was also done by the romans during the period of occupation of the aforementioned land. The contribution of

Abulcasis (Cordoba, circa 936-1013) to Neurosurgery during the Middle ages is noteworthy: the description of the currently so-called “ping-pong” fractures as well as management of scalp wounds, knowledge of neuroanatomy and practice of real craniotomies. His written treatises were disseminated throughout Christian Europe. Later on, in the Renaissance period, several physicians must be brought to attention: Alcazar (“De vulneribuscapitis”), Arceo and Daza-Chacon, who spread the practice of trepanations and craniotomies all over Europe at that time, (Daza-Chaco’s book on Surgery was translated into Latin, English and Dutch). Unfortunately there were no relevant contributions to Neurosurgery during the XVIII and beginning of the XIX centuries in our country.

The modern Neurosurgery in Spain started approximately between 1890 and 1939. In 1939 Neurosurgery became clearly separate from General Surgery, after a fruitful period of Spanish development in Biology and Neurology. The specific neurosurgical procedures used to be done by general surgeons with some predisposition toward cranial surgery (Barraquer, Buisien) or -less frequently- by neurologist with some proclivity toward surgery of the brain (Lopez-Albo, Bueno-Ituarte). Several pioneers of the modern Spanish neurosurgery must be quoted: Rubio y Gali (surgery in posttraumatic epilepsy, “pterigoid approach” to Gasserian ganglion), Cervera (brain abscess, peripheral nerve surgery), Otero, Ribera, San Martin, Planellas, Ribas, Caedenal, Puig and Areilza among others.

After the Spanish civil war there was a clear trend to crystallize Neurosurgery as a fully independent surgical specialty by a group of real pioneers (Obrador, Tolosa, Ley, Urquiza, Barcia, Izquierdo, Aldama, Chamosa) that contributed at that time to the launch of nascent and real neurological surgery, as described very well in many writings by Izquierdo (Neurosurgeon and Historian). The fifties and sixties are linked to the next generations of Spanish neurosurgeons that carried out their duty all over Spain: Lasierra, Bordes, Ucar, Peraita, Obiols, Anastasio, Jacas, Boixados, Barcia-Salorio, Arrazola, Reyes-Oliveros, Sanchez-Juan and Ortiz-Gonzalez. At the same time, the consolidation of the Spanish Health System came along with the development (70’) of a vast network of hospitals nationwide, many of them incorporating the latest in-

traoperative refinements at that time. A new generation of neurosurgeons -usually trained abroad in prestigious institutions- lead Spanish Neurosurgery to a balanced situation between public health care and vanguard neurosurgical techniques. Among others we have to mention Isamat, Bravo, Arjona and Martin-Rodriguez who really introduced and made popular many of the current microsurgical techniques for tumor and cerebrovascular surgery as well as stereotactic surgery for functional neurosurgery. They represent the finest expression of a very good neurosurgical practice in our country over the last decades, many of them with a tireless international activity and representation of our country. Dr. Martin-Rodriguez served over many years in the World Federation of Neurosurgical Societies reaching leading positions with wide international recognition. It is fair just taking advantage of this opportunity to pay a tribute to these giants of the Spanish Neurosurgery who clearly contributed to the education of the new generation of neurosurgeons in the context of modernity and sophistication for the good of our patients.

Thus far, the Spanish Neurosurgery is currently in a good health, although facing several challenges. Quality in Neurosurgery is unequivocally associated to expensive Medicine. As the practice of our specialty is very much based in a public health system, Spanish leaders have to pay attention to the short and long term effects of the cutting in budget due to the financial global crisis. It is also important to redefine and potentiate the role of neurosurgeons in the multidisciplinary context in which our clinical practice is evolving (endovascular treatment, radiosurgery, etc.). It is also important to continue putting some emphasis in aspects related to planning in our specialty -number, composition, and distribution of neurosurgical units- whose decisions in our country are in the hands of the politicians. Professionalism (how to practice Medicine) must also be a matter of concern. Fortunately, our Spanish Society of Neurosurgery is playing a very active role trying to give an appropriate answer to all these questions and many others. Under this perspective, Spanish neurosurgeons are very willing to contribute to the nascent International Neuroscience Journal, a good example of globe neurosurgical cooperation with our allied disciplines.