

The CEANNE experience in Brazil – closing the gap in neurosurgical care between public and private healthcare patients

Gustavo R Isolan MD

Neurosurgeon, founder and director CEANNE; Professor of Medicine Faculdade Evangelica Mackenzie de Paraná, Porto Alegre, Brazil

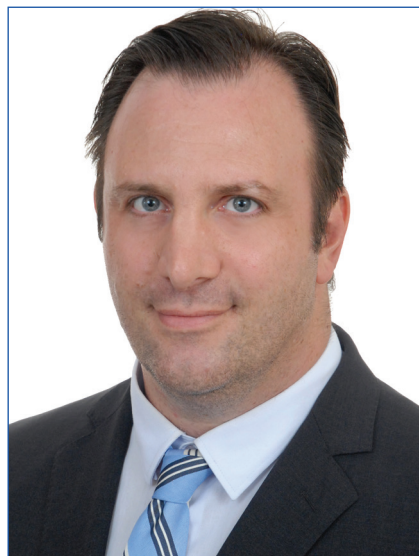
Rafael Roesler PhD

Department of Pharmacology, Institute for Basic Health Sciences, Federal University of Rio Grande do Sul, Porto Alegre, Brazil

Brazil is an enormous country with 213 million inhabitants (1) and has one of the largest and most complex public healthcare systems in the world, known locally as SUS (Unified Health System, Sistema Único de Saúde). Healthcare under this system is cost-free to patients, from medication to organ transplants. However, because SUS covers many areas that are isolated and quite socio-economically heterogeneous, it is often unable to provide treatment. Bureaucratic and financial obstacles further prevent all Brazilians from receiving “comprehensive and universal” access to healthcare as stipulated in the Brazilian Constitution.

Healthcare and challenges

This has led the wealthiest Brazilians to seek private healthcare plans, and also to large numbers of legal cases brought by individual patients who intend to force the hand of SUS. These cases press for the latest chemotherapy drugs not currently available from national healthcare, for highly complex surgeries, and for new technologies. In neurosurgical oncology, many such cases seek intraoperative neurophysiological monitoring and newer chemotherapy agents. In 2017 alone there were 95,700 healthcare claims filed in Brazilian courts (4). These lawsuits drain government resources that would be better spent on healthcare programs,



Dr Gustavo R Isolan, founder and director of CEANNE in Brazil

especially basic healthcare programs such as chronic disease prevention and vaccination campaigns, for example. In 2016, healthcare lawsuits brought against SUS drained US\$260 million from the federal budget.

Regarding the hunger for private plans, the 2019 National Healthcare Survey revealed that in the previous year 28.5% of Brazilians had a medical or dental plan, totaling nearly 60 million people (5). Even with this demand and a network of excellent private hospitals, seven out of ten Brazilians are still fully dependent



Dr Rafael Roesler

on SUS. As already noted, however, SUS is not able in many situations to furnish proper care to all patients.

Large hospitals in the Brazilian public healthcare system treat neurosurgical patients, and most are university hospitals. However, they are unable to effectively meet all the demands of patients with brain tumors, especially those from rural areas. Even if neurosurgeons are stationed in these areas, hospitals often do not have the proper neurosurgical instruments, such as ultrasonic aspirators, or multidisciplinary teams capable of treating patients with



Training seminar on palliative care for neurological patients with employees from various areas at Hospital Centenário de São Leopoldo

complex brain tumors, including eloquent area gliomas or certain skull base tumors.

The state of Rio Grande do Sul had a population 11.4 million in 2020 (6) and 18 public hospitals accredited by the government to perform oncological neurosurgeries (7). However, some of these hospitals did not have on hand the necessary instrumentation for treating patients. According to the state's regulatory system, patients have no choice but

to accept treatment exclusively from a specific hospital based on their city of residence. In 2020, many patients were sent for treatment to hospitals that did not have the minimum conditions for complex procedures such as neurosurgery. Such conditions potentially create and maintain wide disparities in the quality of care that brain tumor patients receive from SUS.

With the aim of reducing this disparity and providing adequate hospital

infrastructure for the treatment of patients with highly complex neurosurgical diseases, a group of neurosurgeons created CEANNE (the Center for Advanced Neurology and Neurosurgery) in 2012.

About the CEANNE project

CEANNE is a private company that, although not recognized in Brazil as a non-profit or NGO, operates within the public health system to bring state-of-the-art neurosurgery to SUS patients, and to predominantly low-income patients. For the several dozen neurosurgeons and neurologists at CEANNE, their mission is to treat patients with highly complex neurosurgical cases transferred from under-equipped and overburdened public hospitals and to create an island of excellence in the field of neurosurgical care.

Programs and strategies we have developed and observed over the last nine years serve as the foundation for the solid results we obtain with patients. Among these are:

- Equip a hospital we work in with adequate neurosurgical instrumentation, including microscope, ultrasonic aspirator, and intraoperative neurophysiological equipment monitoring for brain mapping;
- Assemble a team of professionals from various areas and with a broad variety of training and experience, such as spine, vascular, oncology, skull base surgery, etc;
- Use telehealth to discuss cases among professionals at various medical centers and select the most experienced neurosurgical team to treat the case at hand;
- Have a neurosurgeon either on duty at the hospital or on call within 30 minutes travel time for any emergencies;
- Maintain a secretary that will be available for direct communication with the patient and their families;
- Conduct training seminars for professionals in other areas of the hospital, especially for nurses and general practitioners who work in the hospital's emergency room;
- Follow protocols previously established by the team for each disease. For example, every patient with a tumor in the language area of



Training seminar on telestroke and telehealth with employees at Hospital São Francisco de Paulo in the city of Cruz Alta

the brain must undergo awake surgery with cortical and subcortical mapping. Also, every patient with vestibular schwannoma must have facial nerve monitoring in surgery;

- Offer an average of 500 elective consultations per month in each hospital for neurological and neurosurgical patients;
- Have a team of general practitioners assess the preoperative and clinical conditions of patients;
- Foster constant improvement among fellow neurosurgeons in all of the neurosurgical specialties. For example, three fellow neurosurgeons are currently working on their master's and three on their doctorates in the area of epigenetics of membrane markers of gliomas and medulloblastomas in the graduate program at the Faculdade Evangélica do Paraná and in partnership with the Brazilian startup Epigenica and CEANNE. In 2019, four neurosurgeons from CEANNE took part in the 8th edition of the Brazilian-American Hands-on Course in Skull Base Surgery offered by Professors Antonio Bernardo, Ricardo Lopes and Gustavo Isolan at the Cornell University Microsurgery Laboratory in New York City.

Working in hospitals in the cities of Rio Grande, São Leopoldo, Canoas, Viamão, Cruz Alta and Uruguaiiana, the 42 neurosurgeons of CEANNE operated on more than 5,000 neurosurgical patients referred by SUS between 2012 and 2020. Approximately 20% of these patients had brain tumors. All patients were operated on by a group of subspecialists, which presumably contributed to safer procedures. In addition, more than 70,000 elective SUS neurology and neurosurgery consultations were conducted by the medical team. Analyzing 55 microsurgical resections of insular gliomas by the same neurosurgeon (GRI) in different hospitals, there were no statistically significant differences in regard to extent of resection, morbidity, or mortality, between surgeries performed in private hospitals and those performed in public hospitals with a CEANNE program.

We believe that this type of organization and cooperation can greatly benefit patients from areas lacking adequate infrastructure for complex



Brain mapping performed on a musician with a glioma in the motor and pre-motor area at Hospital Municipal de Canoas



Setting up a neurosurgical microscope at the Hospital Centenário de São Leopoldo

neurosurgical procedures, and especially those in underdeveloped regions.

In Brazil, underfunding SUS often results in financial transfer to outsourced service providers such as CEANNE, sometimes

after delays of several months. This is why this project was discontinued in certain hospitals mentioned above. Even so, CEANNE has operated on an average of 50 patients each month in Southern Brazil. ■

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