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EDITORIAL

Advances in neuroscience from a Latin American perspective

Avances en neurociencia desde una perspectiva latinoamericana

Antonio Arauz-Góngora

Dirección General, Instituto Nacional de Neurología y Neurocirugía Manuel Velasco Suárez, Mexico City, Mexico

This issue of the Revista Mexicana de Neurociencia (RMN) brings together a compelling collection of articles that underscore both the scientific rigor and the clinical relevance of contemporary neuroscience research in Latin America. These contributions, emerging from diverse institutions and disciplines, reflect the growing commitment to evidence-based neurology and the exploration of innovative diagnostic and therapeutic frontiers. This issue spans neuro-oncology, neurovascular medicine, congenital neurovascular anomalies, and neurodegenerative disorders, offering a panoramic view of the challenges and progress in the field.

The first original article by Jimenez-Ruiz et al.[1], titled *"Epidemiology of pituitary tumors treated by Gamma Knife radiosurgery in Mexico: a single-center study,"* provides a detailed retrospective analysis of 111 patients with pituitary adenomas treated with Gamma Knife Radiosurgery (GKR) over 17 years. The authors report that GKR was effective in achieving radiographic improvement in nearly 40% of cases, particularly when tumors lacked chiasmatic extension and visual field abnormalities were absent before treatment. Importantly, the study documents a complete absence of acute or chronic complications, reinforcing the safety profile of GKR in experienced hands. This research not only fills an important epidemiological gap in the Mexican context but also underscores the relevance of radiosurgery as a valuable therapeutic adjunct in neuro-oncology. It contributes to the regional understanding of treatment patterns and clinical outcomes in pituitary tumors, an area that remains underrepresented in Latin American literature.

This article also reflects the importance of access to advanced technologies and the need for continued investment in radiosurgical infrastructure in middle-income countries. As radiosurgery becomes increasingly integrated into multidisciplinary neuro-oncology programs, studies such as this one demonstrate the feasibility and safety of implementation in Latin American settings. Furthermore, the findings advocate for the establishment of regional registries and collaborative databases to further assess long-term outcomes, cost-effectiveness, and patient quality of life.

In the domain of neurodegenerative disease, the review article by Murguiondo-Pérez et al.[2], *"Comprehensive approaches in Alzheimer's disease: From general aspects to stem cell therapy and antidiabetic use,"* offers a sweeping overview of the multifactorial pathophysiology of Alzheimer's disease (AD) and potential future treatments. The authors delve into the emerging relationship between insulin resistance and neurodegeneration, often referred to as "Type 3 Diabetes," and highlight how antidiabetic agents such as metformin and liraglutide may modulate this pathological axis. In addition, the article explores the therapeutic promise of neural stem cells, both in animal models and pre-clinical settings. This contribution is timely and critical, as it draws attention to the necessity of translational research in AD, a disorder with profound personal and societal impact.

Correspondence:
Antonio Arauz-Góngora
E-mail: antonio.arauz@prodigy.net.mx

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The article is particularly valuable for its holistic review of both established and experimental treatments, emphasizing the urgent need for Latin American countries to engage in early-phase clinical trials and collaborative studies. The potential repositioning of widely available pharmacologic agents such as antidiabetics presents an appealing and cost-effective research avenue, especially in health systems facing constrained resources. Furthermore, the discussion on stem cell therapies, while still in early development, encourages bioethical reflection and the establishment of national regulatory frameworks that foster responsible innovation.

The third article by Ortega-Moreno et al.[3], *"Etiological characterization of ischemic stroke in a neurovascular care unit in Mexico,"* analyzes 738 consecutive cases of ischemic stroke using the TOAST classification. Conducted in a well-structured neurovascular care unit, the study demonstrates how standardized etiological investigation can reduce the proportion of cryptogenic strokes and support individualized therapeutic decisions. Notably, the study reveals a higher prevalence of lacunar and atherothrombotic subtypes, contrasting with previously reported data from other Mexican centers, and suggesting the influence of setting, access to diagnostics, and patient demographics. This work exemplifies how structured clinical pathways and multidisciplinary evaluation can optimize outcomes in stroke medicine.

Stroke remains a leading cause of disability and death in Latin America, and this article contributes critical data to the understanding of stroke subtypes in Mexican populations. Moreover, the implementation of a dedicated stroke unit model serves as a reference for other institutions in the region. The emphasis on TOAST classification also underscores the importance of etiologic precision in selecting acute and secondary prevention strategies. Such approaches not only improve immediate care but have long-term implications for health planning and resource allocation.

The final article, *"Twig-like middle cerebral artery: pathophysiology and imaging approach,"* by Cox et al.[4], describes a rare congenital vascular anomaly that mimics moyamoya disease and presents diagnostic challenges. Through a retrospective angiographic review and two illustrative case reports, the authors emphasize the importance of precise imaging criteria in differentiating twig-like MCA from other steno-occlusive vasculopathies. Their analysis, supported by high-quality neuroimaging, contributes to a nuanced understanding of cerebrovascular malformations and underscores the role of advanced diagnostics in neurology.

By highlighting this rare entity, the article calls attention to the need for specialized neuroradiologic expertise and high-resolution imaging techniques in the evaluation of pediatric and young adult stroke. Given the rarity of the condition, this work advocates for the creation of clinical-imaging registries that can consolidate cases and inform future diagnostic criteria. In doing so, it bridges the gap between clinical observation and pathophysiological insight, and aligns with the RMN's commitment to advancing diagnostic excellence in neurology.

Taken together, the studies published in this issue of RMN provide a testament to the expanding breadth and depth of neurological research in Latin America. From radiosurgical interventions in pituitary tumors to cutting-edge perspectives on AD and stroke, as well as rare congenital anomalies, each article offers insights that are both locally relevant and globally resonant.

This collection highlights the importance of institutional collaboration, multidisciplinary integration, and methodological transparency. It affirms the need for continued investment in research infrastructure and training, as well as the value of publishing platforms that amplify Latin American neuroscience on the international stage. As neurology continues to evolve in complexity and scope, initiatives such as RMN remain essential for fostering dialog, disseminating knowledge, and guiding evidence-based clinical practice.

We commend the authors for their rigorous contributions and the editorial team for curating a robust and visionary issue.

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