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The Early Steps toward Establishing Pediatric Neuro-Oncology Services in Iran a National Experience

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Abstract

Pediatric brain tumors are among the most complex and life-threatening malignancies in childhood. Their management requires well-coordinated, multidisciplinary teamwork involving oncology, neurosurgery, neuropathology, radiology, and radiation oncology. In Iran, despite significant progress in pediatric oncology, there had been no defined national structure for pediatric neuro-oncology care. With the vision of Prof. Amir Ali Hamidieh and the initiative of the author, the Iranian Pediatric Neuro-Oncology Consortium (IPNOC) was established about five years ago. This editorial summarizes the foundational steps, achievements, and future perspectives of this initiative within the broader global context of pediatric neuro-oncology development in low- and middle-income countries (LMICs).

Introduction

Brain and spinal cord tumors represent the second most common malignancy in children after leukemia and remain a leading cause of pediatric cancer mortality. Their management demands a multidisciplinary approach integrating diagnostic imaging, surgery, pathology, and oncology.

While pediatric neuro-oncology is well-established in high-income countries (HICs), many LMICs still face systemic challenges including limited infrastructure, fragmented care, and lack of trained subspecialists. In Iran, pediatric neuro-oncology had historically been addressed within general pediatric oncology settings without a dedicated structure. Recognizing this gap, and under the mentorship of Professor Amir Ali Hamidieh, I initiated the Iranian Pediatric Neuro-Oncology Consortium (IPNOC)-a national movement aiming to establish structured, collaborative, and evidence-based care for children with brain and spinal cord tumors.

Formation of the Iranian Pediatric Neuro-Oncology Consortium (IPNOC)

Established in 2019, IPNOC unites pediatric oncologists, neurosurgeons, neuropathologists, neuroradiologists, and other specialists from universities across Iran. Its mission is to develop a structured national framework for clinical care, research, and education in pediatric neuro-oncology.

The consortium's main objectives are:

- Standardizing care pathways for pediatric brain and spinal tumors.
- Creating specialized educational programs to train future pediatric neuro-oncologists.
- Fostering national and international collaborations to enhance clinical and research capabilities.

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Major Initiatives and Achievements

Proposal for the Comprehensive Pediatric Brain and Spinal Cord Tumor Center of Iran

With guidance from Prof. Amir Ali Hamidieh and Prof. Reza ShervinBadv, a detailed national proposal was developed to integrate clinical, research, and educational components into a unified institutional structure.

Development of the Pediatric Neuro-Oncology Fellowship Curriculum

In collaboration with Dr. Mohammad Faranoosh, the first structured curriculum for a national pediatric neuro-oncology fellowship was prepared to train pediatric oncologists in subspecialized management of CNS tumors.

Publication of the Book Principles of Pediatric Neuro-Oncology

Authored with Dr. Faranoosh and postgraduate students, this is the first Persian-language academic reference for pediatric neuro-oncology, bridging a major educational gap in the field.

Establishment of a Multidisciplinary Tumor Board at Hakim Children's Hospital

This tumor board, the first of its kind in Iran, allows multidisciplinary discussion of complex pediatric brain tumor cases, improving diagnostic accuracy and treatment planning.

Designation of Hakim Children's Hospital as the National Referral Center

Hakim Children's Hospital now serves as Iran's national referral center for pediatric brain tumors, providing specialized multidisciplinary care to patients from all provinces.

Collaboration with MAHAK Pediatric Cancer Hospital and SickKids Hospital (Canada)

Collaborations with MAHAK Hospital and Prof. Eric Bouffet's team at SickKids, Toronto, have strengthened international knowledge exchange, multidisciplinary practice, and clinical mentorship.

Professional Outreach and Global Networking

Through consistent academic activity on LinkedIn, the consortium has established professional links with neuro-oncology expert's worldwide, promoting awareness of Iran's growing role in this field.

Global and Regional Context: Pediatric Neuro-Oncology in LMICs

The experience in Iran parallels similar initiatives in other low- and middle-income countries (LMICs) across Asia, Africa, and Latin America. In India, centers such as the Tata Memorial Hospital in Mumbai and AIIMS in New Delhi have built multidisciplinary pediatric neuro-oncology teams over the past decade, integrating surgery, oncology, and neuropathology under unified clinical programs [1]. In Egypt, the Children's Cancer Hospital Egypt (CCHE-57357) has developed a national pediatric neuro-oncology program focusing on multidisciplinary tumor boards and teleconsultation links with international partners [2].

Similarly, in Brazil and Chile, collaborative pediatric neuro-oncology groups have been established, emphasizing protocol harmonization and regional data registries [3]. In Sub-Saharan Africa, programs supported by international organizations, such as the St. Jude Global Alliance, have demonstrated that regional networks can successfully improve diagnostic accuracy and survival rates in pediatric CNS tumors [4-7].

These experiences demonstrate that multidisciplinary organization, structured education, and cross-institutional collaboration-rather than advanced technology alone-are the critical success factors for advancing pediatric neuro-oncology in resource-limited settings. Iran's experience through IPNOC aligns closely with these successful LMIC models, reinforcing the concept that knowledge-sharing, local leadership and national collaboration are the foundations of sustainable progress.

Challenges and Future Directions

Despite encouraging progress, challenges persist-including limited infrastructure for molecular diagnostics, shortage of trained personnel, and absence of a national CNS tumor registry.

The next phase of IPNOC aims to:

- Launch the official Pediatric Neuro-Oncology Fellowship Program,
- Establish a National Pediatric CNS Tumor Registry and Biobank,
- Initiate multicenter research collaborations,
- Expand telemedicine consultations with international experts,
- And integrate precision and immunotherapy approaches into clinical care.

Conclusion

The establishment of the Iranian Pediatric Neuro-Oncology Consortium represents a milestone in pediatric cancer care in Iran. It demonstrates that even in LMICs, the integration of multidisciplinary collaboration, structured education, and academic leadership can transform fragmented care systems into organized, patient-centered programs. Iran's experience offers an adaptable framework for other developing nations striving to build or strengthen their own pediatric neuro-oncology services. With continued collaboration and international engagement, the IPNOC model can contribute meaningfully to global efforts aimed at reducing the disparities in pediatric brain tumor care.

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