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EDITORIAL

CANCER NETWORKS FOR CENTRAL NERVOUS MALIGNANCIES

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Primary malignant tumors of the Central Nervous System (CNS) are rare malignancies with an overall incidence in European Countries ranging from 3.5 to 0.7 cases per 100000 in children and adult patients respectively (1).

These malignancies are associate to a significant rate of long-term disability and mortality burning out economic and physical resource of patients and caregivers (2).

It has been demonstrated that equips with proven expertise on the management and treatment of CNS tumors can improve patients' survival and clinical outcome (3-5).

Unfortunately, not all cancer centers can offer a dedicate team to patients affected by CNS tumors and sometime patients and caregivers are obligated to migrate far from their residence.

Furthermore, clinical research on these tumors represents a challenge due to the rarity, low incidence of these malignancies (6).

It is often observed that patients with aggressive disease such as glioblastoma are rarely included in clinical trials despite the availability of only few effective treatments.

These problems could be bypassed adopting a centralization of patients in reference centers with specific expertise in CNS tumors, but this could be expensive and tiring for patients and caregivers (7, 8).

Cancer networks are profit or no profit associations aimed to sustain patients, caregivers, clinicians and scientist on different aspect of cancer care (9, 10).

There are several ways by which these networks can support patients, researchers, and brain tumor pathway of care:

1. Orienting patients and caregivers toward the nearest reference centers more likely to provide a high standard of care or with an active clinical trial for their specific malignancies;
2. Creating and coordinating a network between reference centers and other centers to share clinical, scientific, and research data;
3. Supporting development and progress of trials between several centers;
4. Supporting research integrating data from translational, pre-clinical, and clinical research;
5. Optimizing the enrollment of patients within clinical trials fasting the time required for study

results, offering innovative treatment for CNS patients, and reducing the risk of premature closure of the study due to slow accrual;
6. Promoting training, upgrading health care workers, and developing evidence-based directives for rare cancer diagnosis and care;
7. Sharing information about CNS tumor incidence, morbidity, and mortality to Institutions in order to optimize available resources assignment;
8. Providing economic and logistic support to patients and caregivers during care.

There are several active operating associations involved in the management of CNS malignancies, however, there are several critical issues that still require an answer.

Indeed, socio-economic disparities could influence patient's outcome and survival (2, 7, 8).

Despite the very limited number of effective treatments for patients with CNS malignancies, the accrual of clinical studies on CNS malignancies is generally slow. Nonetheless, only one patient out of ten benefits from the accrual in a clinical trial (11).

These networks can operate at international, national or local levels each one with a specific and own vision and mission (12).

Within networks operating in the European area, the European Organisation for Research and Treatment of Cancer (EORTC) is an independent, non-governmental, non-profit cancer research Organization established under the laws of Belgium.

The primary mission of this association is to coordinate and conduct international translational and clinical trials to improve the standard of care of cancer treatment by coordinating 35 different countries. This association also provides a patient panel offering the point of view of patients and caregivers during the design and conduction of clinical trials

The European Reference Networks (ERN) are patient-centered networks aimed to connect specialized healthcare providers to manage rare diseases and complex conditions. In this contest, European Network for Rare Adult solid Cancer (EURACAN) represents the ERN for solid adult rare tumors, including CNS tumors (13).

EURACAN's aim is to facilitate access of patients with rare cancer to reference centers optimizing their quality of care. In order to allow clinical discussions or second opinions of complex clinical situations, EURACAN is adopting the Clinical Patient Management System (CPMS), a secure web-based platform provided by the European Commission.

A similar network is represented by the International Brain Tumor Alliance (IBTA) is a patient founded association mainly focused on patient support and directly sustaining patients by commissioning external services in the course of cancer treatments.

Similarly to European large networks, each nation presents a large number of networks and operates at a national or a local level. These networks assume the same tasks as their European counterpart but have the great advantage of having a better vision of effective strengths, weaknesses, and effective needs of a specific geographic area. This knowledge gives the opportunity to optimize the organization of clinical practice, allowing to provide a high standard of care and are of extreme importance for rare tumors.

Regional or larger national networks could optimize resources by dividing tasks and roles and defining integrated care pathways for patients with CNS tumors. For example, the achievement of an integrated molecular/pathological diagnosis is a well-recognized standard of care as established by the World Health Organization (WHO) 2021 CNS classification. However, this multilayered integrated diagnosis may need in some cases different tools and technologies (*i.e.*, Next Generation Sequencing (NGS), chromosomal alteration analyses, or DNA methylation assessment) not present in all the centers.

Similarly imaging evaluation and treatment can be provided in the nearest local reference center (delegating rehabilitation near to the patient's home) referring the patient to regional or national centers only if required.

Moreover, teleconsultation can also easily overcome the issue of distance to allow second opinions limiting the need of travels for patients only to specific situations/populations (*i.e.*, inclusion in clinical trials, ultrarare tumors, complex imaging interpretation, *etc*.)

At this moment several different networks are promoting CNS tumor care with different visions, missions, and areas of competence.

Patients, health care providers, and researchers require a better integration between these networks as well as increasing attention to the CNS tumor theme.

In particular, the primary endpoint of all networks must be to avoid socio-economic status influences clinical outcome and survival. Furthermore, more

facilitated access to innovative treatment strategies, diagnostic techniques, and drugs should be encouraged and promoted.
To achieve these goals, the integration of international, national, and local networks represents the most intriguing future challenge.

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