A resource sheet for Parents and Professionals. Brought to you as a public service by the Pediatric Neuropsychology Special Interest Group of the AACN.

Brain Tumors

What is a Brain Tumor?

- A growth of cells that occupy space in the brain or in the area immediately surrounding the brain.
- The phrase 'brain tumor' (sometimes referred to as lesion or mass) includes both cancerous and non-cancerous tumors.
- Given the functions of the brain, non-cancerous tumors can be just-as or more life-threatening depending on their location.
- Brain tumor is the second leading cause of childhood cancer after Leukemia

Understanding Brain Tumors

- The type and location of the tumor will drive treatment and have implications on outcome.
- **Incidence**: 1 – 5 cases per 100,000 children (nih.gov)
- **Primary Brain Tumor:** Tumor that originated in the brain
- **Secondary Brain Tumor:** Cancer that spread from elsewhere in the body, sometimes referred to as metastases
- **Benign:** Does not contain cancer cells (may still invade normal cells). Often called WHO Grade I
- **Malignant:** Contains cancer cells
    - Malignancy is graded according to the World Health Organizations scale II-IV, with IV being the most severe.
    - Sorted according to cell of origin and presumed rate of cell-growth and division
- Nearly all pediatric brain tumors are 'primary'
- Approximately 70% of childhood brain tumors are in the posterior fossa (i.e., back of the brain, near the brainstem and cerebellum) region of the brain

Most Common Types of Childhood Brain Tumors

- Low grade and high grade gliomas (including astrocytoma,DIPG, DNET, Optic nerve glioma)
- Medulloblastoma
- Atypical teratoid rhabdoid tumor (ATRT)
- Primitive neuroectodermal tumors (PNET)
- craniopharyngioma
- Ependymoma
- Pituitary

Treatments

Resection
Complete or partial removal of the tumor via neurosurgery without significantly compromising daily functioning. A biopsy takes only a small sample of the tumor.

Radiation
(photon or proton)
Beams of high frequency energy directed at tumor bed and surrounding areas and kills tumor cells

Chemotherapy
Medicine to slow/stop the growth of cells. Can be administered orally, intravenously (IV), or intrathecally (IT)

Common Impact of Brain Tumors & Treatment

- **Local impact**: Deficits in skills controlled by area of brain tumor (e.g., motor, sensory, language, endocrine)
    - **Posterior Fossa Syndrome**: difficulties with talking, controlling emotions, moving parts of the face and body, seeing clearly, and walking smoothly.
- **Cognitive Deficits**: attention, processing speed, working memory, executive functioning, short term memory difficulties, and more
    - Deficits from radiation and high dose IV and IT chemotherapy can occur years following treatment and can be progressive depending on factors such as dosage, number of sessions, and type of delivery
- **Hearing loss**: particularly with platinum-based chemotherapy agents
- **Peripheral Neuropathy**: weakness, numbness, tingling in hands/feet
- **Endocrine dysfunction** - due to tumor site and/or chemotherapy
- **Dental issues** are more common in children who underwent chemotherapy
- **Infertility**: due to tumor site, chemotherapy, or radiation
- **Social Emotional Distress**: many children experience anxiety or distress adjusting to their new normal
- **Secondary Tumor/Malignancy**: some treatment will place you at higher risk for a new malignancy. Regrowth of old tumor or new tumors can further impact cognitive and motor function

What do I do if my child is struggling?

- **Contact your physician**: There are likely clinic-based team-members who can help (psychologist, social worker, neuropsychologist, physical therapist, etc)
- **Consider neuropsychological evaluation**: standard clinical care for many children with brain tumors includes an assessment of their neurocognitive functioning
- **Request School Accommodations**: By law (Individuals with Disabilities Education Act), schools are required to provide support to children whose learning has been impacted.
- **Engage in psychotherapy**: individual and group formats of cognitive-behavioral therapy may help with social emotional distress
- **Rehabilitation**: physical therapy, occupational therapy, speech language therapy and cognitive training in a rehabilitative setting has been used to help patients improve their long term outcome

RESOURCES

Pediatric Caregiver Resources Center
Children's Oncology Group (COG) Family Handbook
Brain Tumors - Patient Version - NCI
Childhood Brain and Spinal Cord Tumors
Children's Oncology Group

Additional Information

What is pediatric neuropsychology?

- Pediatric neuropsychology is a subspecialty of neuropsychology focusing on brain and behavior relationships in children.
- Visit (scn40.org/) for more information.

What is a board certified clinical neuropsychologist?

- Board certification requires a clinician to have specialized training in neuropsychology. Each has also passed a rigorous written and oral examination demonstrating knowledge and skills in neuropsychology.
- Board-certified neuropsychologists have attained formal certification by the American Board of Professional Psychology (ABPP) and the American Board of Clinical Neuropsychology (ABCN).
- A board-certified pediatric subspecialist has attained a formal certification in the subspecialty of pediatric neuropsychology by ABPP and ABCN.

How do I find a board-certified clinical neuropsychologist?

- You can search for a board-certified neuropsychologist or a pediatric subspecialist on the AACN website (theaacn.org/).
- Once you find a neuropsychologist near you, click on the clinician's name for more information and how to contact the clinician.