

Neuroblastoma for the Pediatric Patient

Each year about 700 children in the United States develop neuroblastic tumors, which include neuroblastoma, ganglioneuroblastoma, and ganglioneuroma. Neuroblastoma is the most common type of neuroblastic tumor and is one of the most common types of cancer in children. The vast majority of neuroblastoma tumors occur in children younger than five years old. Neuroblastoma is less common in older children and teenagers. The cause of neuroblastoma is unknown. However, no chemicals or exposures of any kind have been linked to causing neuroblastoma.

About two-thirds of neuroblastoma tumors start in the adrenal glands (which sit on top of the kidneys) or in clumps of nerve cells next to the spinal cord (called "ganglia"). Other neuroblastoma tumors begin in the chest, neck or pelvis. By the time many cases of neuroblastoma are diagnosed, the cancer has spread (metastasized) to the lymph nodes, liver, bones, the bone marrow, or other organs.

What are the symptoms of neuroblastoma?

Early symptoms of neuroblastoma tumors are often vague and may include fatigue, fever, weight loss, and loss of appetite. As the tumor grows, symptoms usually depend on the location of the tumor.

- Abdominal tumors can cause stomach pain, loss of appetite or problems with urination or bowel movements
- Tumors pressing on the spinal cord can cause arm or leg weakness, resulting in difficulty moving or walking
- Cancer that has spread to the bone can cause bone pain
- Cancer that has spread to the bones around the eye can cause bulging eyes with dark circles under the eyes

How is neuroblastoma diagnosed?

If your child's doctor thinks your child has neuroblastoma, he or she will conduct a careful exam and order several diagnostic tests. These tests may include:

- An MRI scan – This test uses magnetic fields to create computerized pictures that can show the location of tumors in different parts of the body.
- A CT scan – This test uses an X-ray machine and a computer to create detailed pictures of the body, including 3-D images. It provides detailed information about the size, shape and position of a tumor.

- Blood and urine tests - These tests will look for the potential effects of tumors on blood counts and electrolyte levels and will look for chemicals produced by most neuroblastoma tumors that are excreted in the urine
- Bone marrow aspiration – This test involves removing a small sample of bone marrow (usually from the hip) through a needle and looking at it under a microscope.

These tests will determine whether a tumor is present, and, if a tumor is found, the size and location of the tumor and whether it has spread to other parts of the body. This process is called staging, which is important to plan treatment. If a tumor is found, a biopsy will likely be performed to confirm the diagnosis. Doctors will take a sample of tumor tissue, usually during surgery, and look at it under a microscope. Additional tests on the tumor tissue will also be done to help determine the best treatment.

Since symptoms caused by neuroblastoma are similar to symptoms of other, more common diseases and health problems, there may be a delay in making the diagnosis. An experienced pediatric oncologist or pathologist will be able to diagnose neuroblastoma once he or she reviews a biopsy of the tumor and the results of other tests.

How is neuroblastoma treated?

Treatment for neuroblastoma can involve combinations of:

- Surgery
- Radiation therapy
- Chemotherapy
- Bone marrow transplantation

Treatments are determined based on the stage of disease, the child's age and the tumor's location. Some low-risk neuroblastoma tumors will go away without any treatment, and others may be cured by surgery alone. However, many tumors will have tumor cells that have spread to other parts of the body when the tumor is first found and will require intensive combinations of treatment.

Doctors at the Children's Cancer Hospital at MD Anderson Cancer Center are working on developing new therapies that act in different ways to help treat patients with high-risk neuroblastoma. For more information about clinical trials, ask for a copy of "Clinical Trials at MD Anderson" booklet or visit our Web site at <http://www.clinicaltrials.org>