

## *Neuroblastoma Fact Sheet*

### About Neuroblastoma

Neuroblastoma is one of the 12 major childhood cancers, and is difficult to treat. Neuroblastoma is a tumor in which cancer cells form in nerve tissue of the adrenal gland, neck, chest, spinal cord, and other areas of the body.

- Approximately 500 to 1,000 children are diagnosed with neuroblastoma in the United States each year.
- Doctors have known about neuroblastoma for approximately 35 years.
- Neuroblastoma is primarily diagnosed in children ages 14 and under, with most cases in children younger than 5 years.
- The cause of neuroblastoma is unknown, and it is more likely to occur in males than females.
- Neuroblastoma is difficult to diagnose in small children, and its progression is often rapid and painful.
- Neuroblastoma accounts for 8 percent of childhood cancer cases, but is responsible for 15 percent of all childhood cancer deaths.

### Diagnosis and Prognosis of Neuroblastoma

The age of the child at diagnosis and the phase of the disease are the two most important factors in evaluating the prognosis for a child with neuroblastoma.

- Like many cancers, early diagnosis is an important element for survival.
- Neuroblastoma is often discovered when a mass or tumor is felt on a child's body, often the abdomen.
- Symptoms of neuroblastoma vary from no outward symptoms to those common with childhood illnesses such as bruising, mild flu symptoms, diarrhea, and loss of appetite.
- Other acute symptoms include bone pain, hypertension, anemia, skin nodules, a pronounced lump, or a refusal to walk.
- Neuroblastoma can be diagnosed through a urine test, ultrasound, CT scans, or MRI scans, and biopsy of tissue.
- Infants less than one year old have a better chance for remission and survival than older children.

### Neuroblastoma Classification

There are three risk groups for determining the proper treatment for neuroblastoma. The proper risk group is determined by stage of the cancer, age of the child, tumor biology, size and position of the tumor, and whether the tumor has spread.

- **Low Risk:** Patients classified as low risk have three specific characteristics. The tumors are localized to one area, can be mostly or completely removed by a surgeon, or have features which indicate the tumor is unlikely to spread or reoccur.
- **Intermediate Risk:** Patients classified as intermediate risk have tumors that are difficult to remove completely with surgery. Their tumors also have some mixed cell characteristics and the patient may have symptoms stemming from the tumor compressing other organs.
- **High Risk:** Patients with high risk neuroblastoma have tumors that show aggressive characteristics. In addition, the disease is found in multiple places throughout the body. The prognosis for patients with high risk neuroblastoma is significantly worse than low and intermediate risk.



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### **Treatment**

Treatment can involve one or more options depending on the specific patient, but can include:

- **Surgery:** Physicians may recommend surgery for a patient as the primary treatment if tumors have not spread to other parts of the body and no lymph nodes are exposed.
- **Chemotherapy:** If a patient is determined as high-risk with a tumor that has spread, chemotherapy is usually the course of action. Chemotherapy uses drugs to destroy cancer cells and is given to the patient intravenously.
- **High Dose Chemotherapy with Stem Cell Transplant:** This procedure is used for high-risk neuroblastoma patients and starts with a high dose of chemotherapy to eradicate the patient's immune system and bone marrow. Then, stem cells are given to the patient intravenously. After a two to four week time period, the patient will hopefully start to develop new, healthy bone marrow and rebuild the immune system, both of which continue to grow over time. The patient remains in isolation with specialized nursing through the process.
- **Radiation:** Another treatment for high-risk patients involves using external high-energy radiation to destroy cancer cells while leaving healthy, normal cells alone. Radiation is administered by a machine outside the body. Internal radiation is also used by injecting or swallowing radioactive material to kill cancer cells.

### **Side Effects**

Side effects of the treatment may include:

- Nausea and vomiting
- Hair loss
- Increased risk of infection
- Bruising and bleeding
- Fatigue
- Diarrhea
- Mucositis (Sores affecting the digestive tract)

Though it is rare, some children develop side effects later in life after treatment. These side effects include:

- Reduction in bone growth
- Fertility problems
- Issues with heart and kidney function
- Hearing problems
- Increased risk of developing cancer in the future

*Sources: National Cancer Institute, Neuroblastoma Children's Cancer Society, National Childhood Cancer Foundation, and Children's Oncology Group*



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