

Progress in Childhood Cancer

Since the mid-1950s, cooperative research has improved the survival rates for childhood cancer from less than 10% to almost 80% overall. Cure rates vary according to each specific type of childhood cancer. Some types remain very difficult to cure. All cure rates need to be improved.

Multi-institution cooperative research of major scope has also paid dividends well beyond childhood cancer, contributing to:

- understanding the abnormal biology of cancer cells,
- treatments for adults with cancer,
- developing principles of team management for other diseases of children and adults, and
- pioneering the enormous advantages of multi-institution cooperation in clinical research.

Important Steps in the History of Childhood Cancer Research

Multi-institution Cooperation in Clinical Trials

One of the most important contributions to developing better treatments for children with cancer was the formation by the National Cancer Institute of the first group of hospitals that agreed to cooperate in clinical trials of new drugs that had been developed to treat acute leukemia, the most common cancer among children.

Cooperative clinical trials of chemotherapy for acute leukemia were begun at seven hospitals scattered through the U.S. in 1955. Research grant support was provided by the NCI.

Leukemia Chemotherapy

The original seven member hospitals of the group were convened by the National Cancer Institute to cooperate in conducting trials of new chemotherapy for acute leukemia. This was the optimal way to quickly evaluate new chemotherapies that showed promise in laboratory experiments on leukemia cells. The first cancer clinical trials cooperative group treated only one type of childhood cancer; acute leukemia, using only one modality of treatment: chemotherapy. The era of chemotherapy for cancer had been heralded by discovery of several chemical agents that could eliminate leukemia cells from the bone marrow and circulating blood in children with acute leukemia. This was a breakthrough that demanded rapid trials of many potentially effective new agents. The NCI developed groups of institutions to cooperate in joint conduct of clinical trials to perfect new chemotherapies being developed in many laboratories. National cooperation in clinical research was very successful. Many new agents were found to be effective in treating acute leukemia and gradually the remissions of leukemia extended from several months to several years. At that time, however, there was little discussion of cures.

Treatment of Solid Tumors in Children

Due to the success of chemotherapy in acute leukemia, it was imperative to try chemotherapy against the cancers of solid organs. The NCI supported childhood cooperative research group pediatric surgeons, pediatric radiation oncologists and pediatric pathologists to their membership, in order to combine surgery, chemotherapy and radiation therapy in treating the solid malignant tumors of children. After a few years, the group required multi-disciplinary teams to be formed at each member institution. The group which had been formed originally to test chemotherapy for leukemia, was significantly re-organized to include the principal medical disciplines needed to diagnose and treat solid tumors of children as well as leukemia.

Multi-Disciplinary Team Care of Childhood Cancer

Childhood cancer groups developed special national studies combining surgery, chemotherapy and radiation therapy to treat certain types of cancers of the kidneys and muscles which occurred mainly

in children. Combined modalities of treatment, including surgery, chemotherapy and radiation therapy were found to produce the best results for these childhood solid tumors after surgical removal of as much of the tumor as possible.

New treatments based on immunology, bone marrow and stem cell transplantation and newer treatments derived from molecular biology and genetics are now in increasingly wider use as the research horizon expands. Multi-institution clinical trials by cancer clinical researchers are the most efficient way to apply new laboratory discoveries to advance diagnosis, selection of the most appropriate treatment and, increasingly, to prevent cancer.

The best response and survival rates of children with cancer have been achieved by treatment according to a clinical trial protocol at a cooperative group member hospital with experience in conducting multi-disciplinary clinical trials. To participate in cooperative national clinical trials, a member institution now must have a multi-disciplinary team of experts that can comply with all diagnosis, treatment, supportive care and laboratory requirements of cooperative clinical trial protocols and provide combinations of treatments adjusted to the needs of each child.

Laboratory and Translational Research on Childhood Cancer

Research in cellular and molecular biology, genetics, immunology and epidemiology has become an important aspect of cooperative group cancer research. To improve diagnostic evaluation, to develop new treatments and to evaluate how they affect cancer cells, many group member institutions developed laboratory research programs to further accelerate progress in diagnosis, treatment and cure of all types of cancers that attack children. The cooperative groups have incorporated laboratory research programs in many basic sciences. These have led to new understandings of how normal cells transform into cancer cells and how to develop therapies to overcome that process without harm to normal cells and tissues. Current treatments that directly affect only cancer cells are referred to as "targeted" therapy. Many of the important discoveries of the Human Genome Project have led to better diagnosis and treatments.

The majority of the laboratory researchers conducting research related to childhood cancer are located at academic medical centers throughout the U.S. and Canada. When they produce laboratory research findings which have potential application to diagnosis, treatment, supportive care or prevention of childhood cancer, they have ready access to their clinical colleagues on the COG team at their institution. One of the primary objectives of the COG is to facilitate the translation of important laboratory research to clinical applications to benefit children with cancer. This has been a research priority of COG institutions for several decades.

The Concept of Total Cure

A major emphasis for the past two dozen years has been on improving the quality of life for patients cured of cancer during childhood. The modern definition of "cure" for children goes far beyond achieving disappearance of the evidences of cancer. It now includes the goals of psychosocial, educational, and occupational reintegration of the child into a successful life. In social terms, the impact of this achievement is considerable: The cure of a child saves an entire lifetime.

http://www.curesearch.org/our_research/index_sub.aspx?id=1473

CURE SEARCH FOR CHILDREN'S CANCER

CureSearch unites the world's largest childhood cancer research organization, the Children's Oncology Group, and the National Childhood Cancer Foundation through our mission to cure childhood cancer. Research is the key to the cure.