

Improving the outcome of children with Burkitt Lymphoma in sub-Saharan Africa

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The International Network for Cancer Treatment and Research (INCTR) is an international not-for-profit organization based in Brussels, Belgium. INCTR is dedicated to helping to build capacity for cancer control by increasing the ability of partners in low- and middle-income countries (LMICs) to diagnose and treat cancer promptly, with the ultimate goal of improving survival rates and quality of life of all cancer patients. One of INCTR's major programmes is in paediatric cancer. While other branches of INCTR such as *Alliance Mondiale Contre le Cancer* and INCTR Brazil conduct their own specific projects in childhood cancer that contribute to this programme, INCTR Brussels has its own projects that are also part of the overall paediatric oncology programme. The main project is the treatment and characterization of Burkitt lymphoma (BL) in Africa.

Background

BL, a relatively rare childhood cancer in the United States and Europe, is common in equatorial Africa and accounts for approximately half of all childhood cancers in this world region. It is one of the few cancers that can be cured with chemotherapy alone. In order to improve the outcome of young patients with BL in Africa, INCTR, through its African BL Strategy Group comprised of doctors from Africa, implemented a standard treatment protocol in 2004. The protocol was initially conducted by four institutions – the Ocean Road Cancer Institute in Dar es Salaam, Tanzania, the Kenyatta National Hospital in Nairobi, Kenya, the Obafemi Awolowo University Teaching Hospitals Complex in Ile-Ife, Nigeria and the University College Hospital in Ibadan, Nigeria. In 2010, St Mary's Hospital Lacor (LH) in Gulu, Uganda joined the study. Over 800 patients have been entered on the study. It is presently on-going at LH.

The treatment protocol

The INCTR protocol for BL is relatively simple, affordable, and can be safely delivered in the context of sub-Saharan Africa where there are limited resources for treatment and supportive care. The protocol consists of a First-Line regimen (FL) for newly diagnosed, previously untreated patients

which is comprised of cyclophosphamide, vincristine and methotrexate (MTX) (COM) plus intrathecal (IT) therapy with MTX and cytarabine (ara-C). For patients who fail to respond to FL or who relapse early following completion of FL, there is a Second-Line regimen (SL) which consists of ifosfamide, etoposide, ara-C and IT therapy with MTX and ara-C.

Results

The majority of patients who have been treated are young children – with a median age of seven years. Over 90% of all patients had multiple sites of disease at the time of initial presentation. The most common sites of disease at presentation were abdominal and pelvic masses (62%), followed by jaw tumours (54.5%), orbital tumours (18.8%) and lymph node involvement (18.7%). The majority of patients (76.5%) had a complete response (CR) to FL and 16% had either a partial response or no response to FL. An additional 7.5% of patients could not be evaluated for response because of early deaths within the first cycle due to infection, tumour lysis syndrome, bleeding, sudden respiratory arrest or progressive disease. Seven patients who could not be evaluated for response were lost to follow-up. At the time of relapse or when PR or NR was determined, SL therapy was administered to 129 patients – and 41.1% of these patients went on to achieve a CR. Unfortunately, no treatment was given at the time of disease progression to 25% of this group of patients. With this protocol, overall survival (OS), when calculated using appropriate statistical methods, is 65% at two years. This protocol demonstrates that it is possible to cure children – even those who relapse or who do not respond to initial therapy.

Challenges encountered by families of children with BL

Families of children with BL are faced by many challenges. Families are often rural subsistence farmers who live on a less than two US\$2 a day. They may exhaust what financial resources they have in trying to obtain help at nearby health centres. The centres that they often consult are unable to diagnose, let alone treat children with BL. The majority of families live long distances from the hospitals capable of treating them. Travel can be expensive and difficult, particularly when roads



and more efficient means of transportation are difficult to access. Once they arrive at a hospital capable of diagnosing and treating their child, they must bear the costs associated with treatment, including blood tests, x-rays and ultrasound examinations, biopsy and spinal needles and they must have sufficient funds to support the costs of accommodation and food during treatment.

Parents have other children who remain at home and whose care has to be provided for during their absence. While one parent may remain with a child at a hospital during treatment because of the time it takes to travel back and forth, this proves costly for families in that there are lost wages from the one parent. Even if discharged in between treatment cycles, parents can be confronted with difficult choices such as losing income during harvest season or delaying subsequent therapy for their child so that not only the parents, but also their child with BL, if well enough, can assist with the harvest.

Ways in which INCTR supports children with BL

Over the years, INCTR has supported the participating hospitals and the children in a variety of ways. INCTR has provided training and education to the staff about the protocol as well as providing salary support for medical, nursing and data management staff. It has also ensured that diagnoses made can be more accurate through training of pathology staff and by providing the necessary reagents for more sophisticated tests such as immunohistochemistry that can be performed on diagnostic specimens. The importance of an accurate diagnosis cannot be emphasized enough because without it, children may receive therapy for a malignancy that they do not have. To ease the burden on families, INCTR has provided the funds required for the chemotherapy and for other medicines, patient travel, food and local accommodation. This has been possible from funds raised by a variety of sources – including grants and charitable donations. One fund-raising strategy has been to post a project that is hosted by GlobalGiving (a US-based 501c not-for-profit organization) which is entitled,

“Cure 250 Children with Burkitt Lymphoma in Africa”. GlobalGiving requires INCTR to post reports about the project every three months. These reports go more into depth about specific patients, their stories and the challenges that they have encountered. All reports related to this project can be accessed on INCTR’s project page on GlobalGiving via this link: <https://goto.gg/9630>. Each report conveys meaningful messages about the care of children with BL – intended for both lay-people and healthcare professionals.

Lessons learned and future directions

INCTR continues its collaboration with LH. The INCTR protocol for BL at LH led to other positive changes for all children with cancer seen at LH. A family home, funded by an Italian NGO and staffed by a local NGO, was built on the hospital’s grounds such that families living too far away from LH had accommodation and food. The family home also provides psychosocial support. INCTR made the decision to support a teacher for the children because, due to prolonged periods of time away from home, they were falling behind in their education. Supportive care practices to manage treatment-related complications – the most frequent being febrile neutropenia – were established for all children with cancer. Professional education about the signs of childhood cancer were conducted by LH and included healthcare professionals within the northern part of the country. Public awareness through community engagement has been carried out. And, for many years, LH had dedicated staff involved in the care of paediatric cancer patients. Due to the departure of key personnel, it seemed timely to review how best to train and educate new staff about childhood cancer care. And, while BL remains the most common cancer seen by LH, the care and treatment of the other most common childhood malignancies – Wilms tumour and rhabdomyosarcoma – needs to be addressed. Therefore, using the lessons learned by the implementation of the BL treatment protocol, the mutual goal is to ensure that all children receive high quality cancer care. ■