Lessons From Pediatric HIV: A Case for Curative Intent in Pediatric Cancer in LMICs

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Antiretroviral medications (ARVs) are now being provided to nearly 50% of children living with HIV (CLHIV) in low- and middle-income countries (LMICs), an increase of 30% in the past 5 years.[1] The provision of ARVs in LMICs demonstrates that effective therapy can be delivered to children with complex medical issues. An estimated 96% of CLHIV and 80% of children <15 years of age living with cancer reside in LMICs, where 94 900 pediatric AIDS deaths and 120 000 pediatric cancer deaths occur annually.[2,3] The health system infrastructure gains in the fight against HIV and other communicable diseases represent a promising platform for long-overdue, transformational cancer care in LMICs.

Similar to combination antiretroviral therapy in the context of pediatric HIV, the advent of combination chemotherapy in the mid-1960s revolutionized pediatric cancer treatment. Before chemotherapy, pediatric cancer was uniformly fatal, and care was focused on palliation. By the 1970s, over half of children diagnosed with cancer in high-income countries (HICs) were cured. Today ~4 out of 5 survive.[4]

In LMICs, however, the story is different. An estimated 215 000 children are diagnosed with cancer globally each year, and fewer than half of these children currently survive.[5] Many countries do not capture pediatric cancer diagnoses or related mortality, meaning that even the current numbers may reflect an underestimate of the total burden of pediatric cancer in LMICs.[6] The reasons behind the lack of progress in treating pediatric cancers in LMICs are due in part to beliefs that chemotherapy is too expensive, that the disease burden is too low to warrant investment, and that pediatric cancer care is too complex.[6]

Although the costs of treating childhood cancer vary by cancer type, treating certain common pediatric malignancies, such as acute lymphoblastic leukemia (ALL), is relatively affordable. A 2016 systematic review of costs for ALL treatment revealed differences among LMICs, showing a range of $4400 to $6100 spent. The variation was largely due to the costs of treating complications rather than to drug expenses. Significant differences in regimens and drug costs exist among LMICs, making direct comparisons difficult.[7] Successful Burkitt lymphoma (BL) therapy in Malawi, for instance, costs <$50.[6] These examples suggest that curative therapy for ALL and BL is similar in cost to suppressive lifetime

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antiretroviral therapy for CLHIV and can be accomplished in LMICs.[6,8]

We propose that health programs adopt established, successful, cost-effective treatment strategies to deliver high-quality, curative therapy to all children with cancer in LMICs. Expansion of financially reasonable, LMIC-appropriate regimens now provides a backbone on which improvements can be made and allows for extension of chemotherapy to other cancer types.

Government and nongovernment stakeholders should work together to ensure adequate access to essential pediatric chemotherapy agents. As was true with pediatric ARVs in the early 2000s,[1] expanding access to chemotherapy agents is crucial. Furthermore, to ensure stable access to these medicines, appropriate forecasting, procurement, and delivery systems must be in place.[6,9]

To properly institute a treatment program, a scale-up of professional training is necessary. The African Pediatric Fellowship Program based at the University of Cape Town and the Red Cross War Memorial Children's Hospital trains physicians from across Africa in pediatric oncology. In Uganda and Rwanda, new cancer facilities have been established, with more space for patients and research. These facilities have also allowed for new training programs, which have begun educating physicians and nurses.[9] Twinning programs between HIC hospitals and several countries (Uganda, Bangladesh, Costa Rica) have furthered improvements in pediatric oncology service delivery. These collaborations have not only developed training for oncologists but have also provided an avenue for knowledge-sharing, including internet-based learning.[9]

Pediatric cancer programs in LMICs should build on the strengths of existing health systems, such as the pediatric HIV treatment platform. Baylor College of Medicine and Texas Children's Hospital, through the Baylor International Pediatric AIDS Initiative, have established comprehensive pediatric HIV treatment centers throughout southern Africa. In Botswana, pediatric hematology-oncology services are now an extension of comprehensive pediatric HIV programs based at tertiary referral hospitals. This program provides direct patient care while training local health care workers and conducting clinical research.[10] In Rwanda, investment in the health system to combat HIV/AIDS has strengthened cancer management, including the treatment of childhood malignancies in rural areas.[11] In each positive example, a shared commitment among governments and other stakeholders, domestic and international, to improve both the access to and the quality of cancer care has led to progress despite many challenges.

The provision of ARVs to pediatric patients worldwide demonstrates that the treatment of children with complex disease processes can occur in challenging settings. Widespread adoption of established, low-cost, curative treatment regimens for high-burden malignancies is a reasonable first step for many LMICs. Even a relatively conservative 60% ALL and 50% BL cure rate would mean 48 000 child lives saved annually.[6] If an 80% survival rate were achieved across all diagnoses, as occurs in HIC settings,[3] 172 000 children could achieve life-long cures each year. The ultimate goal is to provide comprehensive curative therapy, equivalent to standards in HICs, to all children with cancer throughout the world, following the successful model of pediatric HIV treatment now in place in many LMICs.

ABBREVIATIONS

ALL: acute lymphoblastic leukemia
ARV: antiretroviral medication
BL: Burkitt lymphoma
CLHIV: children living with HIV
HIC: high-income country
LMIC: low- and middle-income country

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