

Optimizing bone marrow transplantation in Bulgaria

The challenge...

In 2009, there were some 35 000 new cancer cases and around 17 000 deaths from cancer in Bulgaria.¹ These included haematological cancers (i.e. leukaemia, lymphoma and multiple myeloma) and solid tumours such as neuroblastoma (the most common cancer in infancy), which are treated with bone marrow transplants (BMTs). Total body irradiation (TBI) is an important part of the conditioning regime required prior to BMT. Radiotherapy helps to make space for the transplanted marrow, kills the malignant cells that may be left after chemotherapy and suppresses the immune system to help prevent rejection of the transplant. Also, in several clinical conditions, such as autologous bone marrow transplant or peripheral blood stem cell transplant, patients should receive irradiated cellular blood components to avoid transfusion-associated graft-versus-host disease (TA-GVHD), a significant and usually fatal complication.

Optimizing TBI and reducing the incidence and severity of TA-GVHD is key to improving cancer treatment in Bulgaria.

The project...

TBI is best performed with linear accelerators (LINAC). An IAEA technical cooperation project to optimize BMTs and reduce TA-GVHD occurrence, especially in children, has made possible the commissioning of a new LINAC, installed in November 2010, at the Queen Giovanna University Hospital (QGUH) in Sofia. The project has also supported the optimization of dose delivery to patients and the purchase of a blood irradiator. Staff at the hospital's newly established radiotherapy clinic received hands-on training in state of the art techniques for TBI performance in the setting of BMTs.

The impact...

The project has contributed significantly to improving Bulgarian onco-radiological practice, especially as the QGUH radiotherapy clinic is the only one in the country where a blood irradiator is available and where TBI is performed.

Since November 2010, 1778 blood samples of patients with acute lymphoblastic leukaemia, acute myeloid leukaemia, chronic myeloid leukaemia and non-Hodgkin's lymphoma have been irradiated, of whom 195 were children. Over the same period, TBI was performed on 13 adults and 3 children affected by the same diseases.

The routine application of a highly specialized and expensive therapeutic procedure such as BMT with TBI conditioning is now a reality in Bulgaria, while blood irradiation is used to support several areas of practice such as transfusion haematology, transplantation of organs, tissues and cells, and neonatology. These services are of especially high value for the children of Bulgaria.



Young patient at the paediatrics clinic of the QGUH in Sofia, Bulgaria (2011).

¹ Bulgarian National Cancer Registry (2011).