

Lymphoma Survivors: Time to Rationalize Use of Diagnostic Radiation Dose

Pediatric malignancy has a variable global incidence and in United States is about 125/million population.¹ Leukemia, brain tumor and malignant lymphoma are the most common childhood malignancy. Over last three decades, there has been a phenomenal decline in pediatric cancer related mortality and lymphomas stand in upper tier. The reasons behind this success story are aggressive multimodality therapy, better supportive care during and after these therapies and judicious utilization of imaging at various stages of management. In lymphomas, radiation based imaging tools like contrast enhanced CT and hybrid positron emission tomography with CT (PET/CT) are the primary methods used worldwide. Radiation dose incurred by fluorodeoxy glucose (FDG) PET/CT with contrast is considerably higher than CT alone. A patient with lymphoma is used to have at least 2-3 FDG PET/CT scan during the course of treatment. For initial staging of lymphomas, FDG PET/CT has sensitivities and specificities 96%–99% and 95%–100%, respectively (more sensitive than CT in detecting nodal and extranodal lesions including lesions in the spleen and bone marrow. For response monitoring, FDG PET/CT is used after 2-4 cycles (interim scan) and after completion of therapy (end of treatment). Although the interim scan is very sensitive in guiding the oncologists by detecting a non-responder and predicting the response after completion (due to its high negative predictive value which is near 100%) but has a limited positive predictive value (41-86%) and need further morphological imaging for validation.² All these procedures share humongous contribution to radiation those to these children.

Unfortunately, data has shown that survivors of Hodgkin's lymphoma are at increased risk for treatment-related subsequent malignant neoplasms. At 5 to 10 years after treatment, the relative risk of solid cancer is significantly higher among survivors of Hodgkin's lymphoma than in the general population, and this higher risk persists for at least 25 years.¹ To address this issue, there has been various modifications in therapeutic regimen (like dose /agents / cycles of chemotherapy and option of either low or no radiotherapy) especially for patients with Hodgkin's lymphoma. However, advent of PET/CT in last 02 decades has contributed a significant radiation dose to the survivors and increasing the risk of second primary malignancy. Therefore, it is need of rime that a multidisciplinary approach must be adopted for appropriate use of radiation based imaging techniques, adopting protocols ensuring lower radiation dose like using low dose non-contrast CT, lowering the dose of FDG and avoiding the unjustified use of PET/CT for surveillance in survivors. Arrival of PET/MR is a ray of hope as it eliminates the radiation dose contributed by CT and would help to minimize the risk of SPM in survivors. However, to observe the long term outcome of these collective efforts would need large prospective studies upon the survivors.

We consider that in current era, every treatment naïve childhood cancer with better survival, demands a harmony among treating oncologists and imaging physicians to discuss potential risk of treatment related second primary malignancy (like chemotherapy, radiotherapy and diagnostic radiation dose) and risk of achieving optimal tumor control.

REFERENCE:

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