

Purpose: Establish the safety of outpatient ¹³¹I-rituximab radioimmunotherapy (RIT) by determining prospective individual radiation absorbed dose to critical normal organs in patients and by calculating the radiation exposure to hospital staff, carers, and members of the public. Determine environmental impact of radioactive urine.

Methods: Two hundred consecutive outpatients treated with ¹³¹I-rituximab radioimmunotherapy for non-Hodgkin Lymphoma with therapeutic activities between 1000 and 4500 MBq (mean 2290 MBq), predicated upon whole body radiation absorbed dose of 0.75 Gy, were studied. Their 292 family members/carers and 432 visitors wore TLD badges for the week during which the patients were confined to their home and contact with children and pregnant women was avoided. The entire urine output of the first 100 patients was collected for that week and measured.

Results: All patients received ¹³¹I-rituximab activities according to the prescribed dose of 0.75 Gy to whole body. Toxicity was limited to hematological grade 4 neutropenia in 10% of patients and thrombocytopenia in 10%. There were no episodes of bleeding or infection. The objective response rate (ORR) of 50 first-line RIT was 98% with complete remission (CR) in 78%. The ORR for 142 consecutive patients with relapsed, refractory disease was 67% with CR in 50%.

From 200 consecutive patients, radiation exposure to adult carers ranged from <0.01 mSv to 3.67 mSv (mean 0.48 mSv), to other co-residing family members was <0.01 mSv to 1.2 mSv (mean 0.23 mSv), and to visitors sharing badges was <0.01 to 0.73 mSv (mean 0.17 mSv). Excreted urinary activity was typically <25% of administered activity.

Conclusions: Outpatient ¹³¹I-rituximab radioimmunotherapy of non-Hodgkin Lymphoma is safe and effective. The median radiation exposure of carers is within the range permitted by international guidelines. Release dose rates of less than 25 uSv/h at 1 m were attained within one week of therapy.