

AbstractID: 11849 Title: Late Survival Post Acute Total Body Irradiation in the Rhesus Macaque With Bone Marrow Sparing

Purpose: There are several sequelae consequent to acute high-dose radiation exposure. The sequelae, in order of occurrence, are the acute radiation syndrome (ARS) composed of the two subsyndromes responsible for early mortality, the hematopoietic and gastrointestinal, followed by delayed effects. The delayed effects expected are pneumonitis and subsequent lung fibrosis and respiratory failure. We investigate these delayed effects in rhesus macaques surviving acute total body irradiation with bone marrow (TBI-BM) sparing at 11.5 to 12 Gy.

Method and Materials: A varian 21EX linear accelerator is used to irradiate non-human primates (NHP) at 153 SSD using a 40 x 40 cm field size at isocenter. The irradiation takes place at approximately 80 cGy / min at midplane. The fields are in the AP and PA directions and sparing of the primates is achieved from the knee cap down. CT imaging is conducted at intervals of 30 days to evaluate the gut and lungs.

Results: Three survivors are obtained from a cohort of 16 NHP undergoing TBI-BM at 11.5 -12.0 Gy, in a single exposure. CT scans are evaluated for defects in the gut and lung at 30 day intervals, showing radiographical evidence of a late GI syndrome, pleural effusion, ascites and pneumonitis. The pleural effusion and ascites are associated with pericardial irradiation.

Conclusion: These result confirm that sufficient active bone marrow sparing drastically improves long term survival at doses greater than 7.5 Gy. Notably, the longest surviving NHP in this cohort has presented with ascites and pleural effusion that have led to cause of death at day 100. This result confirms an important late effect, pericardial injury as a possible cause of death in late survivors that may override other lung-injury associated mortality.

Conflict of Interest (only if applicable): None. This work supported by NIAID Contract # HHSN266200500043C