

## ***Evaluation of Effective Radiation Dose to the Male Gonads during High Resolution Chest Computed Tomography Examinations***

H.H.S Wickramasinghe, R.K A. Udayangani, M.G.R.S. Perera\*

*Department of Radiography/Radiotherapy, Faculty of Allied Health Sciences,  
University of Peradeniya  
\*roshani@ahs.pdn.ac.lk*

Medical radiation imaging carries vital benefits to the mankind along with its inherent inevitable radiation risks. When considering the close proximity of the region of interest to the imaging field, possible radiation exposure to the male gonads during Computed Tomography (CT) chest examinations warrants careful scrutiny of gonadal radiation dose. Hence this study aimed to evaluate the effective radiation dose to the male gonads during CT Chest examinations. This quantitative study assessed the gonadal radiation dose in HRCT chest exams with and without lead shielding, while investigating the impact of shielding on image quality. The study was carried out in the National Hospital Kandy, Sri Lanka, from August 2023 to October 2023. Gonadal dose was compared with and without 0.5mm lead shielding of 26 patients who underwent HRCT chest examinations using an electronic dosimeter. Image quality was assessed with RadiAnt DICOM Viewer, and data were analyzed using Minitab software. The study results revealed a substantial reduction in radiation dose to male gonads with lead shielding during HRCT chest examinations. Without shielding, the mean equivalent dose was 0.08104 mSv, which decreased to 0.02838 mSv with shielding. The effective dose dropped from 0.0064832 mSv to 0.0017028 mSv, aligning with ICRP recommendations. Statistical analysis confirmed significant reductions ( $p < 0.05$ ), with a 64.98% decrease in radiation dose with proper lead shielding. Also, it was confirmed that there was no proof of image deterioration caused by the lead shielding. In conclusion, there is significant effective radiation dose to male gonads during HRCT chest examinations which can be evidently reduced with the use of proper lead shielding without degrading the image quality.

**Keywords:** HRCT Chest, Gonadal Radiation Dose, Shielding, Radiation Protection