LOWERING PATIENT RADIATION DOSE: OUTCOMES OF A FOUR-YEAR INITIATIVE IN THE ADULT CARDIAC CATHETERIZATION LABORATORY

Poster Contributions
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Background: Managing patient radiation dose is an important aspect of quality in a cardiac catheterization laboratory. This abstract investigates methods appropriate for longitudinal assessment of dose delivered to a patient population and outcomes of a sustained radiation dose reduction initiative.

Methods: From May 2008 through July 2012, radiation dose metrics from invasive cardiovascular procedures performed in 8 laboratories were recorded in the final procedure report. Several clinical practice and x-ray system technical changes were made during a dose reduction period from May 2008 to May 2011. The period June 2011 to July 2012 was a monitoring period and represents new data. Dose metrics included air-kerma (Ka,r), air-kerma area product (PKA) and fluoroscopy time (TF). The metrics were assessed routinely during the study period and stratified by procedure type and tertiles by patient weight for retrospective analysis. Spearman correlation between the dose metrics was calculated. The variability of the metrics was calculated and used to predict the number of observations required to detect a 10% dose change using a two-tailed t-test.

Results: The total number of procedures included was 25,321. The median Ka,r decreased from 648 to 408 mGy (-37%) during the dose reduction period and remained constant throughout the monitoring period. TF increased from 11.4 to 11.9 minutes (5%). Spearman correlation of PKA and TF with Ka,r was 0.96 and 0.70, respectively. To detect change of Ka,r, the highest statistical power was achieved using all data rather than stratified data. Comparison of two groups of Ka,r values required 2,209 observations per group to detect a 10% difference (p ≤ 0.05, power 80%).

Conclusions: Radiation dose reduction can be achieved and maintained for invasive cardiovascular procedures. Straightforward statistical methods are adequate for longitudinal assessment of patient dose.