

Definition of Institutional Diagnostic Reference Levels in Pediatric Interventional Cardiology Procedures

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Introduction: Diagnostic and interventional procedures in congenital heart disease is a rapidly developing field and transcatheter therapy of congenital lesions, where applicable, is the standard of care. At the same time, the lack of pediatric Institutional Diagnostic Reference Levels (DRLs) prohibits the identification of good practices.

Methods: This study aimed to evaluate pediatric radiation doses in a dedicated cardiology center, with the objective of characterizing patterns in dose variation. The ultimate purpose was to define DRLs for different types of paediatric cardiac interventional procedures, according to patient age.

Results: A total of 477 interventional procedures were performed during 3 consecutive years, by operators with >15 years of experience. The median values obtained for Fluoroscopy Time (FT), Number of Frames (N), and Kerma Area Product (PKa) were 3.1–15.8 min, 579-1779 and 1.0–20.8 Gy.cm² respectively. Median FT, N and PKa values analyzed by age range are depicted in the Table.

<i>Age at cath</i>	<i>Fluoroscopy Time (FT)</i>	<i>Number of Frames (N)</i>	<i>Kerma Area Product (PKa)</i>
< 1 year old	5.8 min	1322	2.0 Gy.cm ²
1-5 year old	6.5 min	1403	3.0 Gy.cm ²
5-10 year old	5.9 min	950	7.0 Gy.cm ²
10-16 year old	5.7 min	940	14.0 Gy.cm ²

Conclusions: A large range of patient dose data is observed during pediatric cardiac interventional procedures, depending greatly on procedure type and patient weight. Consequently, the definition of DRLs for pediatric cardiac interventional procedures presents challenges due to multiple clinical and technical factors affecting the outcome. A consensus is needed on interventional procedures nomenclature and grouping in order to allow common assessment and comparison of doses.