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Patient Radiation Dose during Transcatheter Atrial Septal Defect Occlusion

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Introduction: Transcatheter atrial septal defect (ASD) occlusion is the procedure of choice for eligible patients with ASD compared to surgical occlusion. Despite the worldwide use of the procedure, international literature has extremely limited data on related radiation dose levels. The purpose of this study was to determine radiation dose, fluoroscopy time (FT) and Number of images (I) in transcatheter ASD occlusion in both paediatric and adult patients.

Methods: Patients were divided according to age in groups, 5-10y, 10-15y, 15-18y and >18y. Various clinical (weight, BMI, BSA etc) and radiation related data, Kerma Area Product (KAP), fluoroscopy time (FT) and number of images (N)) were recorded.

Results: A total of 161 patients were included in the study. The median values obtained for Fluoroscopy Time (FT), Number of Frames (N), and Kerma Area Product (KAP) analyzed by age group are depicted in the Table.

Age at occlusion	*Fluoroscopy Time (FT)*	*Frames (N)*	Kerma Area Product (KAP)	*Correlation KAP-FT*
5-10 year old	6.6 min	639	8.0 $Gy.cm^2$	0.71
10-15 year old	4.6 min	409	11.0 $Gy.cm^2$	-0.04
15-18 year old	5.7 min	575	14.0 $Gy.cm^2$	0.87
>18 year old	3.2 min	305	7.0 $Gy.cm^2$	0.41

Conclusions: Radiation dose varies greatly during transcatheter ASD occlusion according to age. Fluoroscopy time and number of frames are not adequate measures for radiation exposure monitoring, and only fluoroscopy time (except in the 10-15y group) significantly correlated with radiation dose. Given the radiosensitivity of paediatric patients, optimisation of radiation protection measures and establishment of diagnostic reference levels should be encouraged.