TITLE

‘PATIENT RADIATION DOSE DURING ATRIAL SEPTAL DEFECT OCCLUDER’

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Introduction

- Atrial septal defect (ASD) is an abnormal opening in the wall between the two atrias of the heart.
- A catheter-based treatment in a heamodynamic room is a well established procedure.
- International literature has extremely limited data on related radiation dose levels.

Purpose

- To determine radiation dose (RD) fluoroscopy time (FT) and Number of images (I) in ASD treatment in both paediatric and adult patients in a major cardiosurgery center in Greece.

Materials and Methods

- A sample of 161 patients were included in the study, divided in the following age categories: 1) 5-10y, 2) 10-15y, 3) 15-18y and 4) >18y.
- Various clinical (weight, BMI, BSA etc) and radiation related data (Kerma Area Product (KAP), fluoroscopy time (T) and number of images (I)) were recorded.

Results (5-10y)

	Mean	Median	min	max	Third quartile (75%)
Fluoroscopy Time (min)	6.9	6.6	1.9	18.9	7.4
KAP (Gy·cm^2)	11.8	8.0	2.0	58.0	15.0
Age (years)	7.5	7.4	5.1	9.6	8.5
Frames	689.7	639	82	1475	947.5
Body Surface Area (m^2)	1.0	1.0	0.7	1.5	1.1
BMI (kg/m^2)	16.4	15.5	10.5	30.3	7.4

Correlation KAP-Frames	0.27
Correlation KAP-Fluoroscopy Time	0.71
Correlation KAP-BMI	0.22
Correlation KAP-BSA	0.54

Results (10-15y)

	Mean	Median	min	max	Third quartile (75%)
Fluoroscopy Time (min)	5.1	4.6	2.6	9.3	5.9
KAP (Gy·cm^2)	13.3	11.0	3.0	43.0	16.0
Age (years)	12.5	12.4	10.3	14.9	13.9
Frames	507.1	409.0	177.0	1181.0	633.3
Body Surface Area (m^2)	1.4	1.5	1.0	1.9	1.6
BMI (kg/m^2)	19.7	21.5	8.8	26.0	23.4

Correlation KAP-Frames	-0.03
Correlation KAP-Fluoroscopy Time	-0.04
Correlation KAP-BMI	0.36
Correlation KAP-BSA	0.39

Results (15-18y)

	Mean	Median	min	max	Third quartile (75%)
Fluoroscopy Time (min)	6.2	5.7	3.5	11.9	6.2
KAP (Gy·cm^2)	14.8	14.0	6.0	25.0	22.0
Age (years)	16.1	15.7	15.1	17.2	16.9
Frames	695.3	575	276	1321	866
Body Surface Area (m^2)	1.7	1.6	1.6	1.9	1.7
BMI (kg/m^2)	21.2	21.2	19.6	23.1	21.9

Correlation KAP-Frames	0.85
Correlation KAP-Fluoroscopy Time	0.87
Correlation KAP-BMI	0.90
Correlation KAP-BSA	0.31

Results (>18y)

	Mean	Median	min	max	Third quartile (75%)
Fluoroscopy Time (min)	6.2	3.2	1.9	14.8	6.9
KAP (Gy·cm^2)	38.5	7.0	1.0	151.0	54.0
Age (years)	41.7	19.5	18.3	78.0	50.4
Frames	771.4	305.0	146.0	3441.0	906.5
Body Surface Area (m^2)	4.0	1.7	0.9	163	2.0
BMI (kg/m^2)	24.6	19.5	1.3	37.5	27.1

Correlation KAP-Frames	0.19
Correlation KAP-Fluoroscopy Time	0.41
Correlation KAP-BMI	0.25
Correlation KAP-BSA	0.20

Conclusion

- This study reveals that there is a great variation of radiation dose. Taking into account the radiosensitivity of paediatric patients, optimisation of radiation protection measures and establishment of diagnostic reference levels are highly encouraged.

- Apart from fluoroscopy time (except from the 10-15y group), there was no other factor that significantly correlated with radiation dose.

- Fluoroscopy time or number of images are not adequate measures for monitoring radiation exposure. These values will be used as baseline for our future research on the subject.