

A comparison of Dose Area Product from different angiography procedures

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1. Introduction

- Significant increase of Interventional Radiology (IR) techniques during the last decade
- &
- Extended fluoroscopy time during IR procedures



- ✓ high radiation dose to patients
- ✓ serious concerns about exposure to ionizing radiation



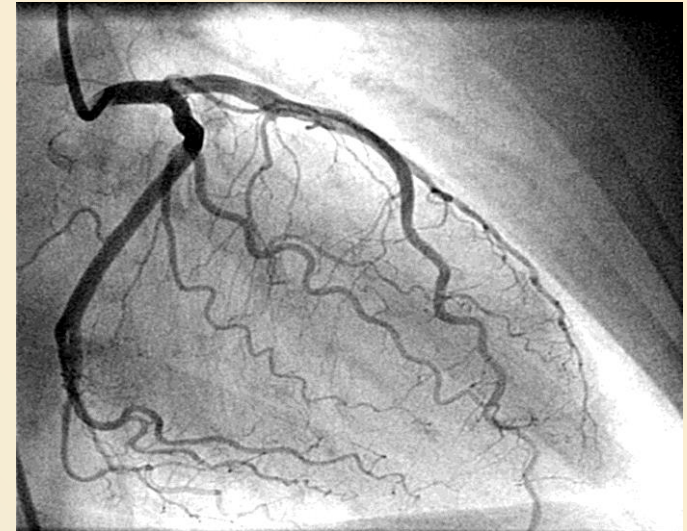
1. Introduction

Dose Area Product
(DAP)

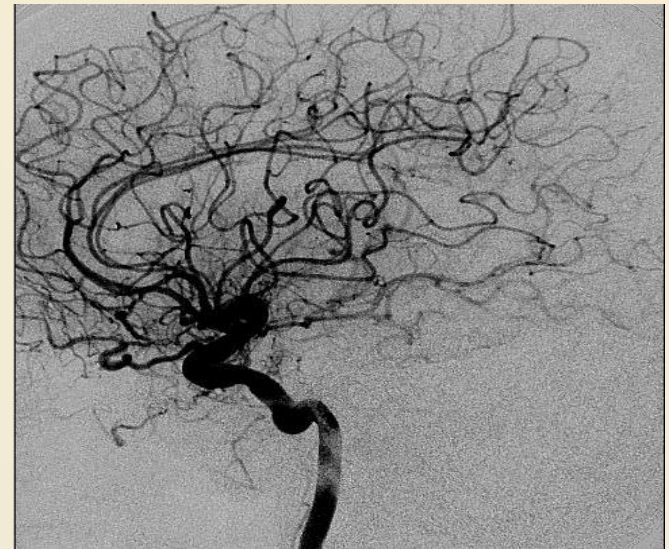
+

Fluoroscopy time
(t_f)

Evaluation of radiation
exposure to patients



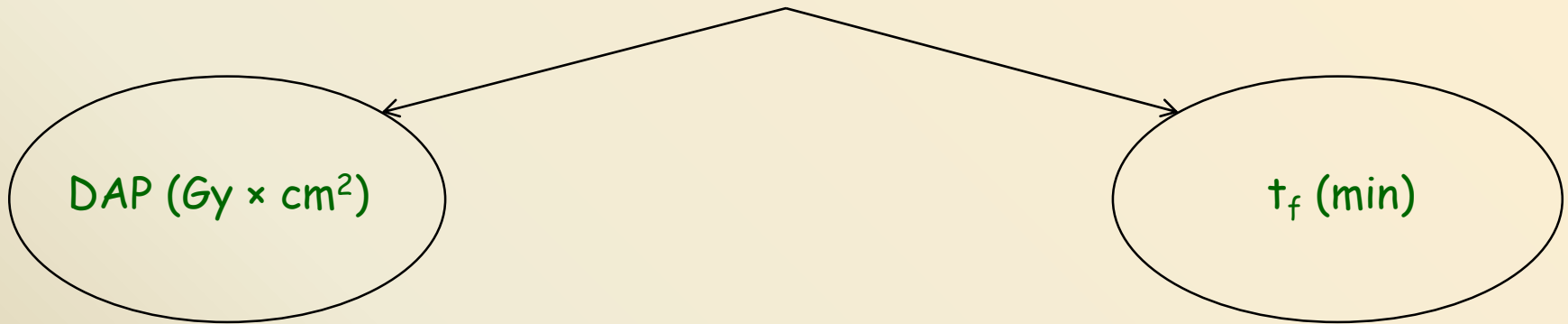
Coronary angiography projection



Cerebral angiography projection

2. Methods

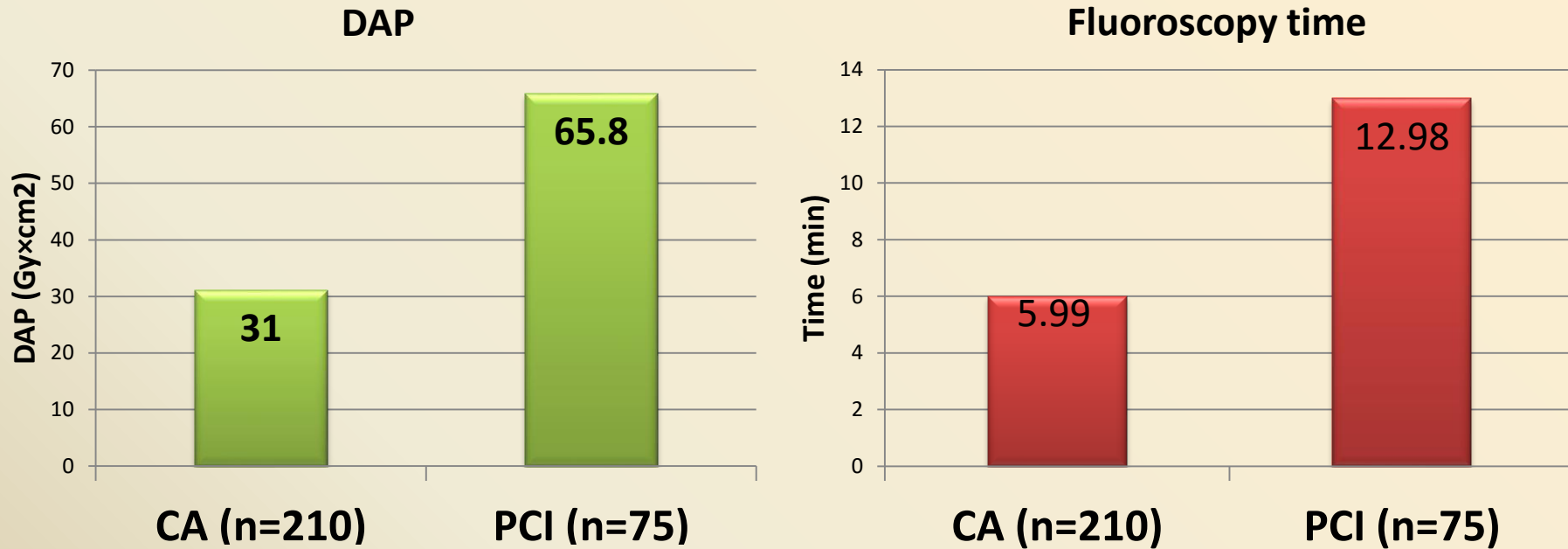
333 interventional
procedures



- Coronary Angiography (CA)
- Percutaneous Coronary Intervention (PCI)
- Cerebral Digital Subtraction Angiography (C DSA)
- Lower Limbs Digital Subtraction Angiography (LL DSA)

3. Results

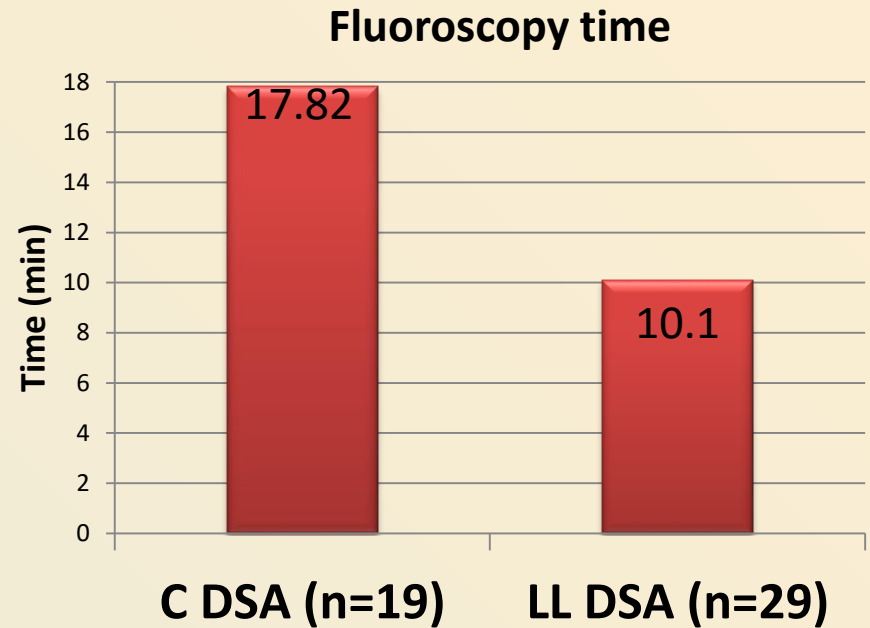
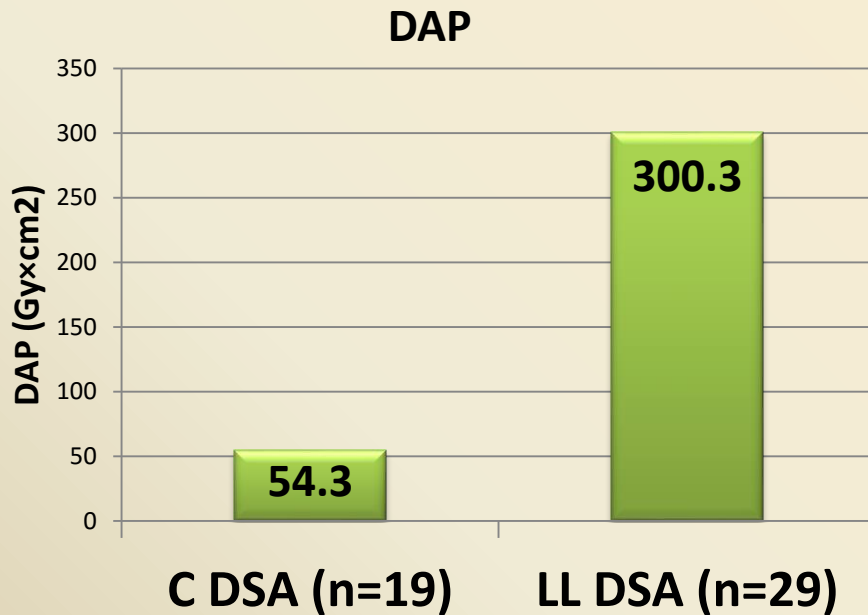
3.1 DAP and t_f in CA & PCI



	DAP	TIME
CA vs. PCI	<i>Statistically significant differences</i> <i>p < 0.05</i>	

3. Results

3.2 DAP and t_f in Cerebral and Lower Limbs DSA



	DAP	TIME
C DSA vs. LL DSA	Statistically significant differences $p < 0.03$	

3. Results

3.3 Comparison CA & PCI with literature

	DAP range (Gy × cm ²)				
IR procedure	<i>Our study</i>	<i>Stratis et al. 2008</i>	<i>Benini et al. 2009</i>	<i>Domieniek et al. 2010</i>	<i>Seiffert et al. 2015</i>
CA	2.6 - 253.9	1.4 - 350			
PCI	13.3 - 182.8	25 - 450			

➤ Consistency with literature

3. Results

3.4 Comparison of C DSA & LL DSA with literature

	DAP range (Gy × cm ²)			
IR procedure	<i>Our study</i>	<i>United Nations Scientific Committee on the Effects of Atomic Radiation 2000</i>	<i>Juskat et al. 2009</i>	<i>Zhu et al. 2012</i>
C DSA	6.5 - 148	14.4 - 210		
LL DSA	10.4 - 1387.3	9 - 306		

➤ DAP values for C DSA consistent with literature

➤ In case of LL DSA:
 excluding two DAP outliers → approach literature values

4. Conclusion

Wide range in DAP values:

- among the same procedure
- among published studies



- Complexity of modern IR techniques
- Different operator's experience → fluoroscopy time
- Different angiography system technology

4. Conclusion

Suggestions:

- A systematic recording of
DAP values &
fluoroscopy time
&
• Efforts and Techniques for the minimization of
radiation dose to patients

Medical
physicists

Operators