

How can I reduce X-Ray exposure?

A. Hertault, T. Martin-Gonzalez, R. Spear, R. Clough, R. Azzaoui, J. Sobocinski, S. Haulon



With Good

Practices



With support of new technologies

« As Low As Reasonably Achievable »



Peach, Eur J Vasc Endovasc Surg, 2012

Avoid DSA runs





1 DSA image ~ 500 fluoro images

Avoid DSA runs

 \sim



1 DSA image



500 fluoro images



Use Fluoro Loops

Avoid Magnification

Maintain Image Quality







Maurel, J Card Thor Surg, 2014

mag 0



Some facts : Switching from FOV 30cm to FOV 16cm increases dose rate by ~2

Avoid Magnification



Use Collimation





Some facts :



On a bifurcated EVAR exam of 30 Gy.cm², 18 Gy.cm² can be saved just by using collimation

DAPtot = 30 Gy.cm² (non-collimated) DAPtot x (1-0,6) = 12 Gy.cm² (60% collimated) DAPsaved = 18 Gy.cm² (dose savings)

In Lille, Baseline for bifurcated EVAR is 12Gy.cm² an in average image is collimated by 60%.

Hertault EJVES 2014

Use Collimation







Virtual Collimation





Avoid extreme angulations



Plan procedure on a workstation

Optimize system Geometry



High Detector / Low Table



Air Kerma at patient skin





Low Detector / Low Table





Low Detector / High Table







Optimize system Geometry





Air Kerma Dose Reduction by up to 25%

Support of New Technologies (Others)

Set up your equipment





IQ+

Normal

15fps

RDL+

Normal

15fps

15fps

IQ+

Normal

30fps



7.5fps

3.75fps

Use Flat Panel Detector



In the long Term: Gain awereness



Watch Dosimeter reports

PITAL DES

ALCORD OF

Evaluate your practice Compare your results to the literature

REVIEW

Editor's Choice — Minimizing Radiation Exposure During Endovascular Procedures: Basic Knowledge, Literature Review, and Reporting Standards

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WHAT THIS PAPER ADDS

Objective/Background: This review intends to provide basic knowledge about X-ray physics, biological risks, dose metrics, and radiation protection. It proposes standard nomenclature to measure, estimate, and report dose in order to perform accurate comparisons between publications and practices. A literature review per common procedure type with reference levels is also proposed to allow physicians to evaluate their daily practice.

In the long Term: Gain awereness

Real-Time Active Dosimeters





Skin Dose Monitoring



Adjust your practice in real time



Spot adverse events and behaviours

Vano Radiation Measurements 2011

Take Home Message

- More Endo More complex
 - = Dose is a real issue
- Follow ALARA
- Gain awereness Evaluate your results Train your trainees & yourself
- Get the support of new technologies



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