# CBCT: Do we need it and what are the risks?

Nuno V. Dias Associate Professor



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### Cone Beam CT (Dyna CT)

- 5-8 sec C-arm rotation
- 200 degress
- 256-398 images

Reconstructed to 3D

#### Cone Beam CT (Dyna CT)



#### Cone Beam CT



#### Cone Beam CT in EVAR

	n	EVAR	CBCT run	Contrast (I mg/ml)	New Findings
Biasi et al.	80	80 Infrarenal	8 sec	96 ml, 150 mg/ml	5/80 (6.2%) EL Type I, III and Limb
Dijkstra et al	19	2 Infrarenal 4 FEVAR 8 BEVAR 5 Tx EL of FEVAR	2x8 sec (DSA)	100 ml	8/19 (42.1%) EL type I, II and III
Hertault et al	54	29 Infrarenal 10 FEVAR 15 BEVAR	5 sec	70 ml, 175 mg/ml	18/54 (33.3%) EL Type I, III, target vessel
<b>103 ml, 140 mg l /ml</b> (Dias et al, JVS 2016)					Biasi et al, JVS 2009 Dijkstra et al, JVS 2011 Hertault et al, EJVES 2015

#### Cone Beam CT in EVAR

#### CBCT in 51 infrarenal EVAR (44 with contrast)



Completion DSA + plain CBCT

#### Cone Beam CT



Törqvist et al, EJVES 2015



4:36:14



igen

4:36:14

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### Cone Beam CT in complex EVAR <u>1 mo CT</u>



:36:18

TA POSTOP GFR >45

## Cone Beam CT in complex EVAR1 mo CTA1 yr CTA







#### Post operative CTA

12-10-15 08:44:13

2-10-15 08:44:13 12-10-15 08:44:13 isation 64 nsation 64 t: 0,75 mm tt: 0,75 mm VIVK\_MJUK\_TIDART\_075 A\_IVK\_MJUK\_TIDART\_075 trast ntrast CTA\_Bukaorta\_80kV\_PostOp\_Spi\_4D CTA\_Bukaorta\_80kV\_PostOp\_Spi\_4D 3 mAs mAs <V k٧

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#### Reintervention



#### Cone Beam CT @ reintervention



#### Radiation of CBCT in relation to CT?

- CBCT: 5 s + 8 s
- CTA (3 phase): 16 and 128 (dual energy) multislice
- 30 patients with CBCT and 1 mo CTA
- In vitro phantom



Törnqvist et al, submitted

#### Radiation of CBCT in relation to CT?

- CBCT 30 patients
  - DAP 66,0 Gycm<sup>-2</sup> (37,1-94,4)
  - Compared to CT
    - CBCT 5s *vs* CT 16-slice 33 %
    - CBCT 8s *vs* CT 128-slice 87 %
- CBCT phantom
  - Compared to CT
    - CBCT 5s *vs* CT 16-slice 44 %
    - CBCT 8s vs CT 128-slice

Törnqvist et al, submitted

98 %

#### Radiaction CBCT for the patients



BEIR VII report, Nat Acad Press 2006

#### Radiaction CBCT for the staff

#### Radiaction CBCT for the <u>staff</u>



# Summary: CBCT – do we need it and what are the risks?

- Cone Beam CT has a high diagnostic value
  - Even without contrast when combined with DSA
  - Can avoid reinterventions and adverse events
- Associated with a significant radiation exposure
  - One time exposure
  - Risks to patients are limited and avoidable to staff

#### Yes, we need it and the risks are acceptable