

Radial or Femoral?

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Femoral Essentials

- Safe and easy puncture > 1 min = beginner
- Atraumatic advancement of catheter (10% hydrophylic wire, 1% 0.0014 wire)
- Appropriate manual compression (in Cathlab) given that ACT < 200, RR < 160
- Pressure bandage according to rules
- For obese: Closure device

Why did Felix invent the radial approach in 1992 ?

- Bailout stenting: Heparin, Coumadine, ASS, Dextrane, Persantin
- Severe bleeding complications 10%
- Acute Stentthrombosis 15 %
- i.e. Odyssey between Skyilla and Carybdis





**ESC 2015:
Radial access,
recommended
over the
transfemoral
Access in ACS**

The 11th commandment: Thou shalt not use the femoral access

What are the facts?

4 RCT in ACS

- RIVAL
- RIFLE-STEACS
- STEMI RADIAL
- MATRIX

RIVAL n = 7021 ACS

- PE: MI+Stroke+severe bleeding
3.7% vs 4.0% (n.s.)
- SEP: Death+MI+Stroke
3.2% vs 3.2%
- Major bleeding 0.7% vs 0.9%
- Access failure radial 7% vs 0.9%

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Lancet (2011)

RIVAL Concl.

- „Radial and femoral both safe and effective, however lower rate of local vascular complications (0.1% vs 0.3%) may be a reason to use the radial approach“
- *Radial occlusion not reported*

RIFLE-STEACS: 1001 STEMI

- PE: NACE 13.6 vs 21.0 % ($p < 0.003$)
- Bleeding ARC > 2:
7.8% vs 12.2 % ($p = 0.026$)

=bleeding requiring intervention by health care professional or increased level of care or prompting evaluation

- SE: Card. mortality 5.2 % vs 9.2 %
($p = 0.02$) (underpowered)

RIFLE-STEACS

- Hb-drop ≥ 3 g% 6.0 vs. 9.8%
- Maj TIMI-bleeding: 1.8% vs 2.8% (n.s.)
- Sheath size ≥ 7 F 9.2% vs 18.6%
($p < 0.001$)
- 8% preinterventional thrombolysis
- 69% IIbIIIa Inhibitor
- 9.6 % cross over radial to femoral

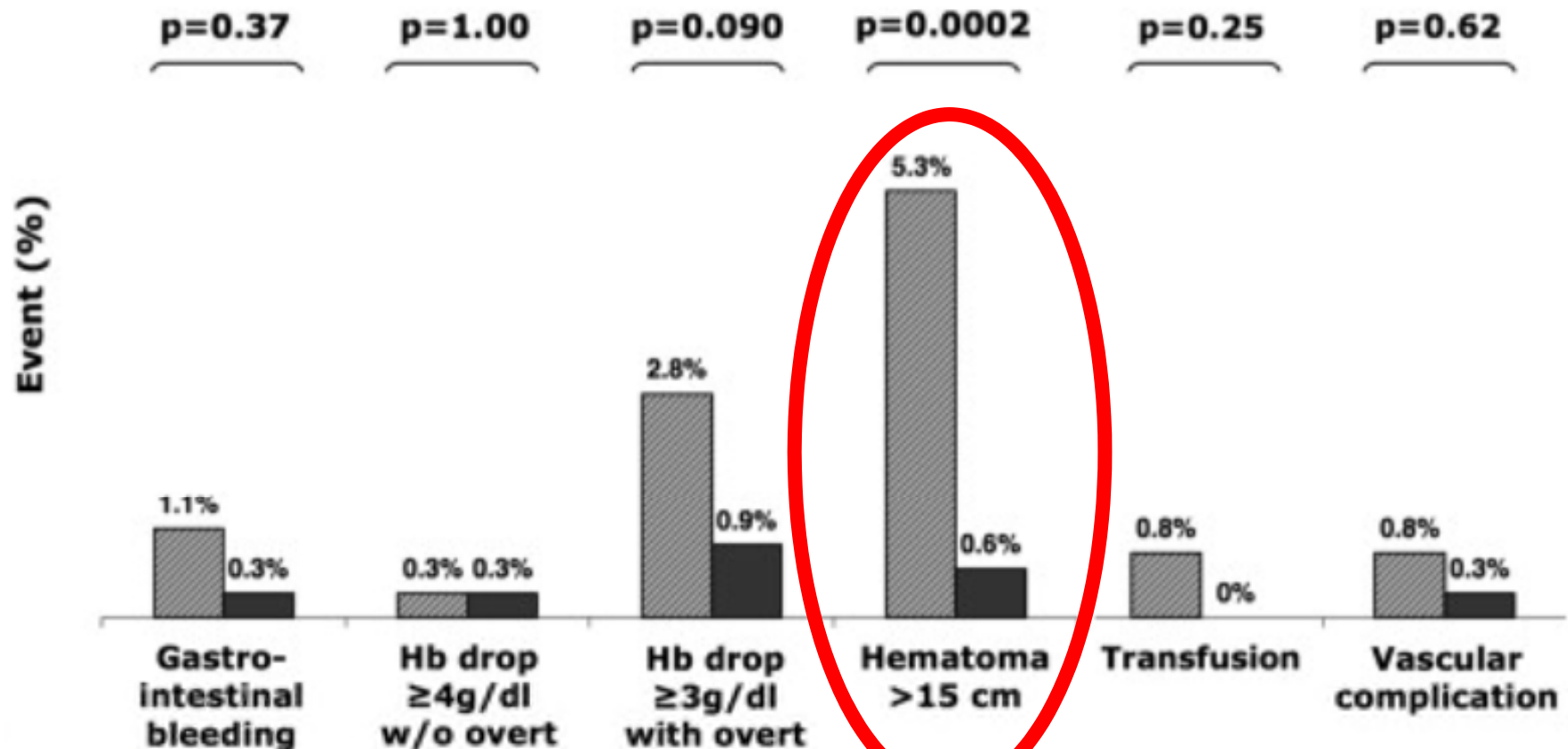
RIFLE STEACS: not convincing

- Less bleeding and lower mortality but...
- Sample size too low for mortality
- Biased comparison (larger sheath size)
- 70% IIbIIIa and 8% thrombolysis
- 10% crossover to femoral

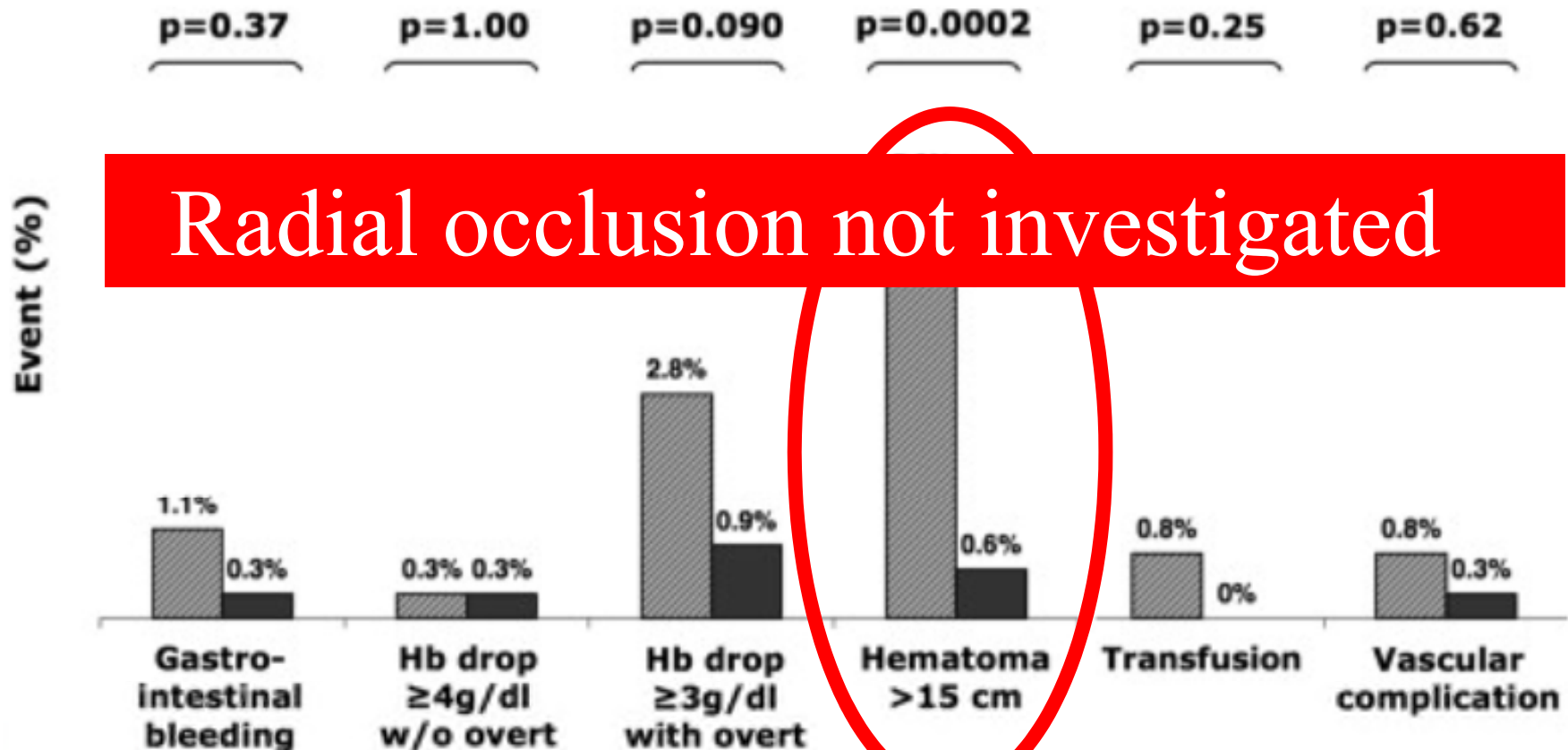
STEMI-RADIAL n=707

- PE: Maj bleed/Access site complication
- 1.4 % vs 7.2 % (HORIZON-Def. *)
- NACE:
(death/MI/stroke/maj.bleed/vask.cpl)
4.6% vs 11.0%

STEMI-RADIAL : „esthetic“ Problem



STEMI-RADIAL : „esthetic“ Problem



MATRIX 8404 ACS

- 30d death+MI+Stroke 8.8% vs 10.3% (n.s.)
- Sheath removal&compression not described - left to center

Bleeding complications:

GUSTO, TIMI no difference,

BARC 3 /5 **0.8%** i.e. < 1/100

- Surgical intervention: 0.1% vs 0.4%

MATRIX

- All cause mortality 1.6% vs 2.2 %
i.e. 0.6% (p = 0.045)*
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- * *Level of Significance for MACE
set at $p < 0.025$*



Metaanalysis 2016 $n = 22843$

855 publications 39 RCT,
24 considered (1997-
2015)

The authors calculated radial to reduce:

- Mortality - 29 %
- MACE - 16 %
- Sev. Bleeding - 27%
- Vasc Cpl. - 77%

Radial Versus Femoral Access for Coronary Interventions Across the Entire Spectrum of Patients With Coronary Artery Disease

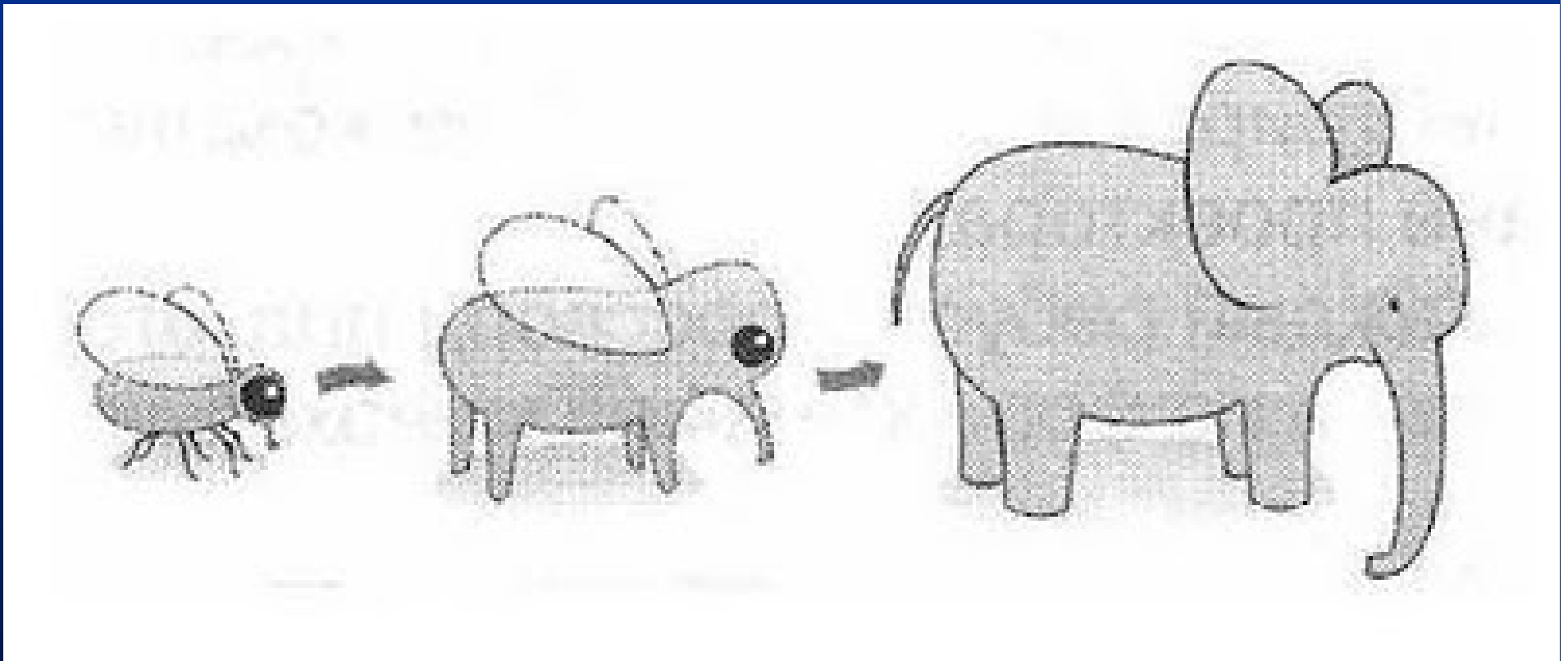
A Meta-Analysis of Randomized Trials

Giuseppe Ferrante, MD, PhD,^a Sunil V. Rao, MD,^b Peter ...
Bernhard Reimers, MD,^a Gianluigi Condorelli, MD, PhD,^c ... MSc,^g
Olivier F. Bertrand, MD, PhD,^d ... MD, PhDⁱ

Radial occlusion not mentioned

M...	70
M... mentioned	16 %
Schw. Blutung	27%
Vasc Cpl.	77%

How to turn a flea into an elephant?



Calculate relative risk, i.e. Percent of Percent

4 th grade of elementary school: Percentage calculation

$$\frac{\textit{part}}{\textit{whole}} \times 100 = \%$$

Metaanalysis

- Death all cause: 1.6% vs 2.2 % (p=0.001)
- MACE: 5.6% vs 6.7% (p=0.002)
- Maj. Bleed : 1.07% vs 2.07 % (p<0.001)
- Maj. Vasc.Cpl.*: 0.24% vs 1.12 % (<0.001)

*hematoma >5 cm or pseudoaneurysm

JACC 2016

Radial vs Femoral Reduktion :

• Mortalität	- 29 %	- 0.6%
• MACE	- 16 %	- 1.1%
• Schw. Blutung	- 27%	- 1.0%
• Vasc Cpl.	- 77%	- 0.9%

The authors calculated radial to reduce:

- Mortality - 29 %
- MACE - 16 %
- Sev. Bleeding - 27%
- Vasc Cpl. - 77%

Metaanalysis

Radial vs femoral < 1% less severe
bleeding

Mortality - 0.6%

femoral access unlikely to be the
cause

*hematoma >5 cm or pseudoaneurysm

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Impact of Bleeding on Mortality After Percutaneous Coronary Intervention

Results From a Patient-Level Pooled Analysis of the REPLACE-2 (Randomized Evaluation of PCI Linking Angiomax to Reduced Clinical Events), ACUITY (Acute Catheterization and Urgent Intervention Triage Strategy), and HORIZONS-AMI (Harmonizing Outcomes With Revascularization and Stents in Acute Myocardial Infarction) Trials

Roxana Mehran, MD,* Stuart Pocock, PhD,¶ Eugenia Nikolsky, MD, PhD,*

17,034 patients undergoing PCI from 3 large, randomized trials

Helen Parise, PhD,* Alexandra J. Lansky, MD,* A. Michael Lincoff, MD,||

Gregg W. Stone, MD*

“Isolated hematomas were not predictive of subsequent mortality”



Up to 10% - not mentioned as vascular complications in the comparison trials

Radial Artery Injury after PCI

- 75% malfunctioning after 2 weeks (n=191)
- 7.3% occluded (Doppler)



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The company that will develop a device for opening up occluded radial arteries, that's a lucky company in the future.

Ferdinand Kiemeneij

Radial, my view:

- Safe and comfortable for the patient., but femoral is not less safe
- Not good for complex procedures (7F)
- More radiation for operators
- Up to 10% severe radial injury (not reported in the trials)
- Up to 10% crossover to femoral (dangerous in STEMI)

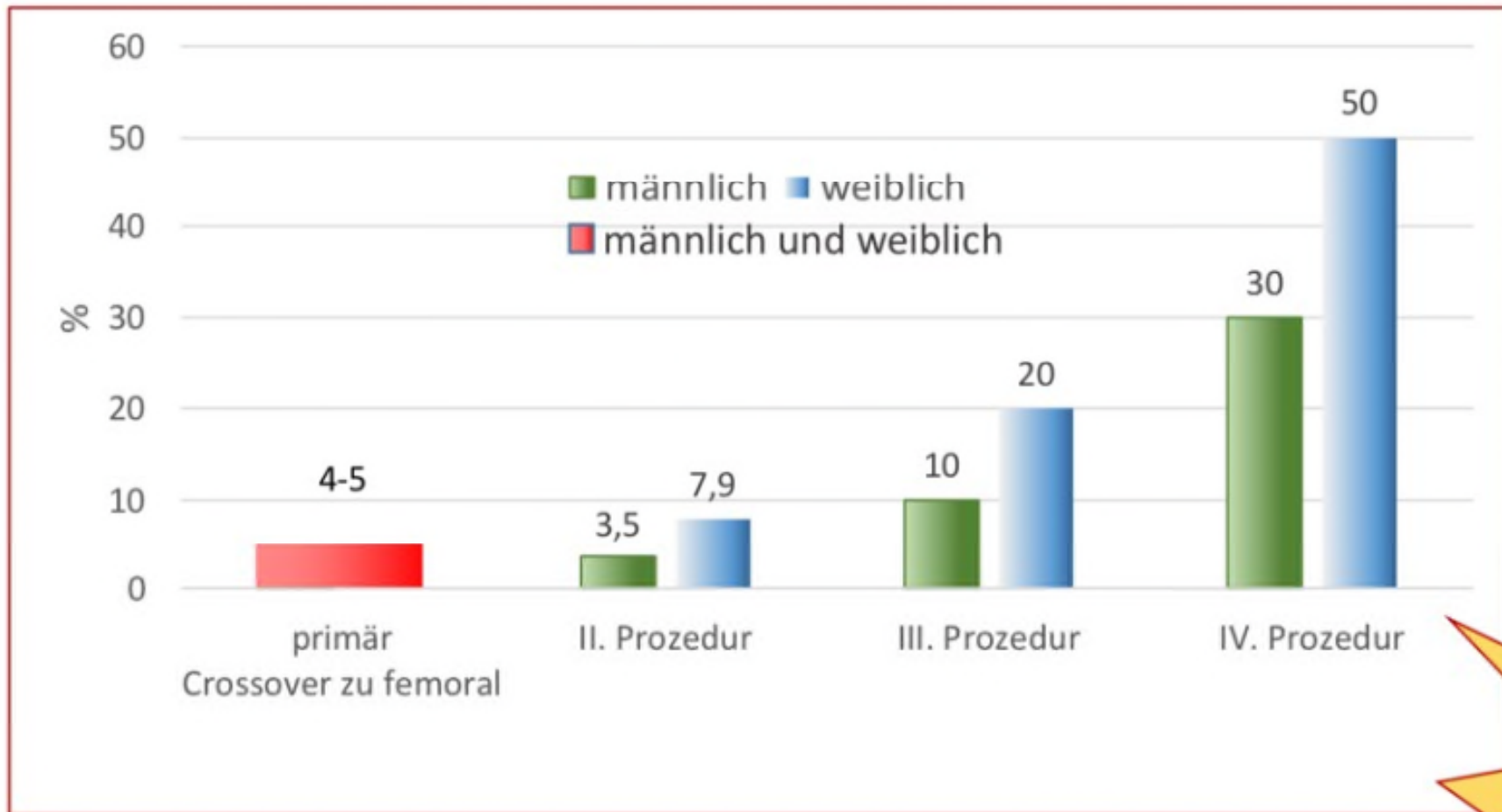


The 11th Commandment: You may use the radial artery if you are sure that the patient does not need it in the future



5-10% Radial-Okklusion nach 1.Prozedur*

n=1539 Prozeduren
2-7 Prozeduren/Patient



Sakai 2001/*Steinberg 2015

Strahlenbelastung Operateur

- 297 Pat randomisiert
- Coro: DL 2.8 min vs 1.7 min
- PCI: 11.4 min vs 10.4 min
- Operateur:
- Coro: 64 vs 32 microSv (= + **100%**)
- PCI : 166 vs 110 microSv (= + **51%**)