



Coronary CT Angiography – Minimal Standards and Requirements for the **DISCHARGE** Trial

Dr. med. Georg Schütz
Department of Radiology



Why?

- Ensure high diagnostic accuracy of CTA for comparison with ICA
- Ensure overall quality and safety of study
- Homogeneity of data for analysis and publications

≥64-slice CT

- At all clinical sites
- Necessary to ensure high diagnostic accuracy^{1,2} in DISCHARGE
- Use same scanner with the same scan protocol



¹Schuetz GM, Ann Intern Med, 2010

²von Ballmoos MW, Ann Intern Med, 2011

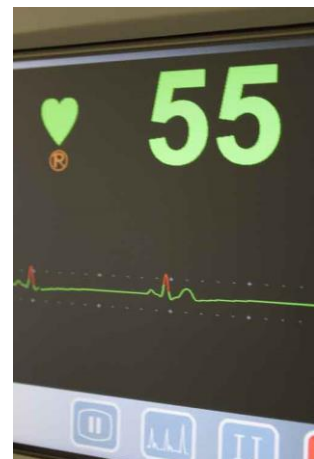
Patient Preparation

Threshold and target heart rate

- Threshold for beta blocker administration: >50 bpm

Discussion

- Target heart rate: <60 bpm



Heart rate control

- Betablocker administration:
oral and i.v.



- Ivabradine – only in patients with
asthma, COPD

Discussion



Nitroglycerin

- Vessel diameter↑
- Facilitates image interpretation
- Facilitates comparability with ICA



Examination

Calcium scan

- CACS >400 is part of DISCHARGE patient management decisions!
- CTA size determination (radiation exposure↓)

Tube parameter adjustments

- I Tube current and voltage – adjusted to individual patients (weight or BMI)

CAD-Man Trial* (rotation time 0.275 s):

BMI		♂ (mA)	♀	BMI		♂ (mA)	♀
≤ 17	80 kV	730	670	> 23 ≤ 25	120 kV	380	310
> 17 ≤ 19	100 kV	440	380	> 25 ≤ 30	120 kV	440	380
> 19 ≤ 21	100 kV	500	440	> 30 ≤ 35	120 kV	500	440
> 21 ≤ 23	100 kV	570	500				

*Schoenhagen P, JACC CVI, 2011

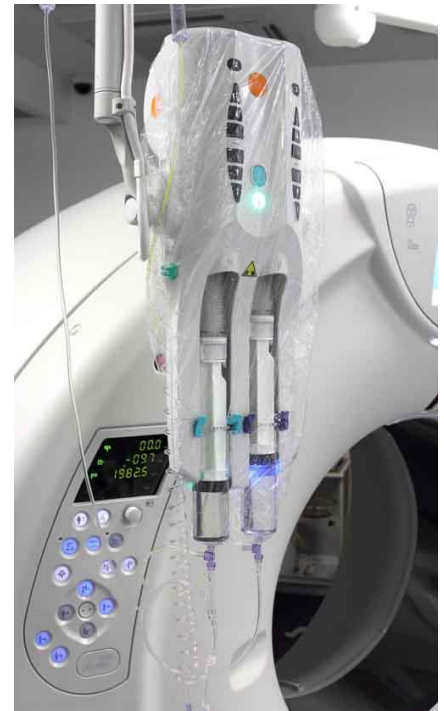
Prospective scanning

- Should be applied (up to ≤ 65 bpm)

Discussion

Contrast agent

- 320 mg/ml (minimal) → flow: ≥ 5 ml/s
- ≥ 350 mg/ml → flow: ≥ 4 ml/s
- Flow and amount adjusted (weight or BMI)
- Saline chaser after contrast agent



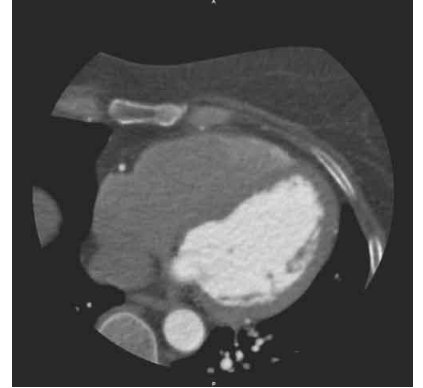
DON'Ts

- CT perfusion or FFR – DISCHARGE is about coronary CT angiography!
- Consider chest pain patients for other studies!

Reconstruction

Reconstruction - CTA

- Slice thickness ≤ 0.75 mm
- Slice increment ≤ 0.5 mm
- Use of a small FOV ≤ 20 cm
- Phases of the RR interval \rightarrow defined by motion map approach ("auto best systole and diastole") + acquisition window in 5% intervals



Reconstruction – noncardiac

- Evaluation of noncardiac structures on larger FOVs is part of DISCHARGE patient management decisions!



Reading, reporting and image storage

Experience of CTA readers

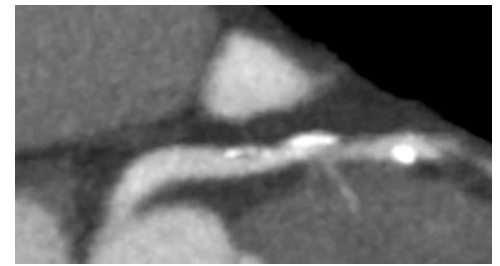
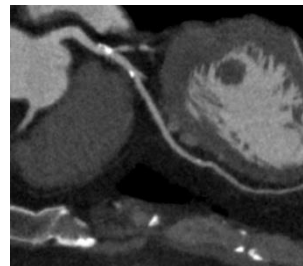
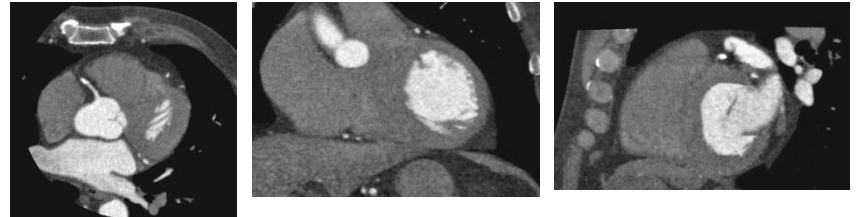
- At least one SCCT Level III (or equivalent) reader per site
- Readers need to have SCCT Level II (or equivalent) certification!
- Level II CTA Training – Berlin, Charité, March 17–28, 2014
- Only one participant per clinical site

Reading of CTA

- Use a workstation that can automatically generate curved MPRs!
- For interpretation use:
 - axial, coronal, sagittal source images

→ curved MPRs

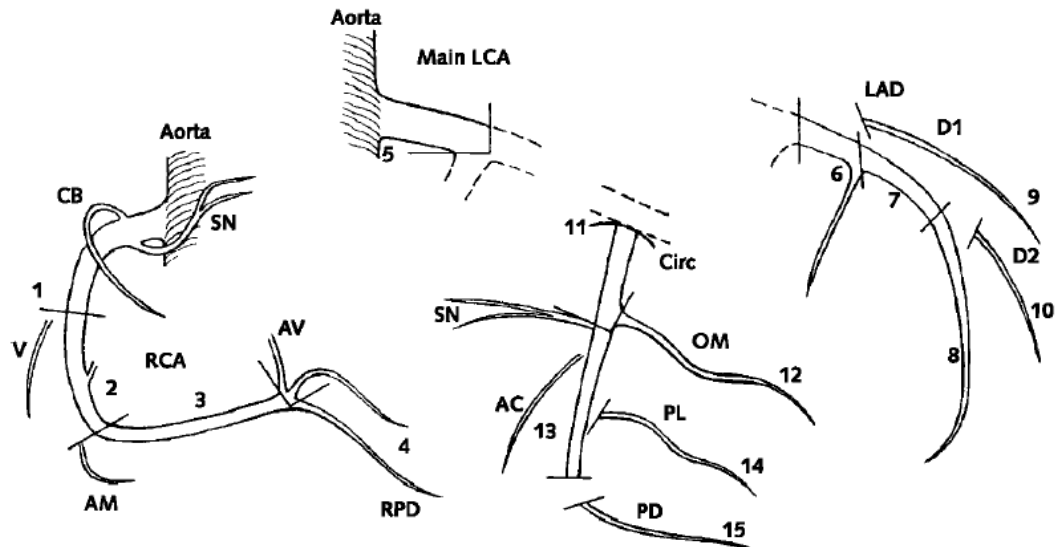
→ thin-slice MIPs



Reporting of CTA

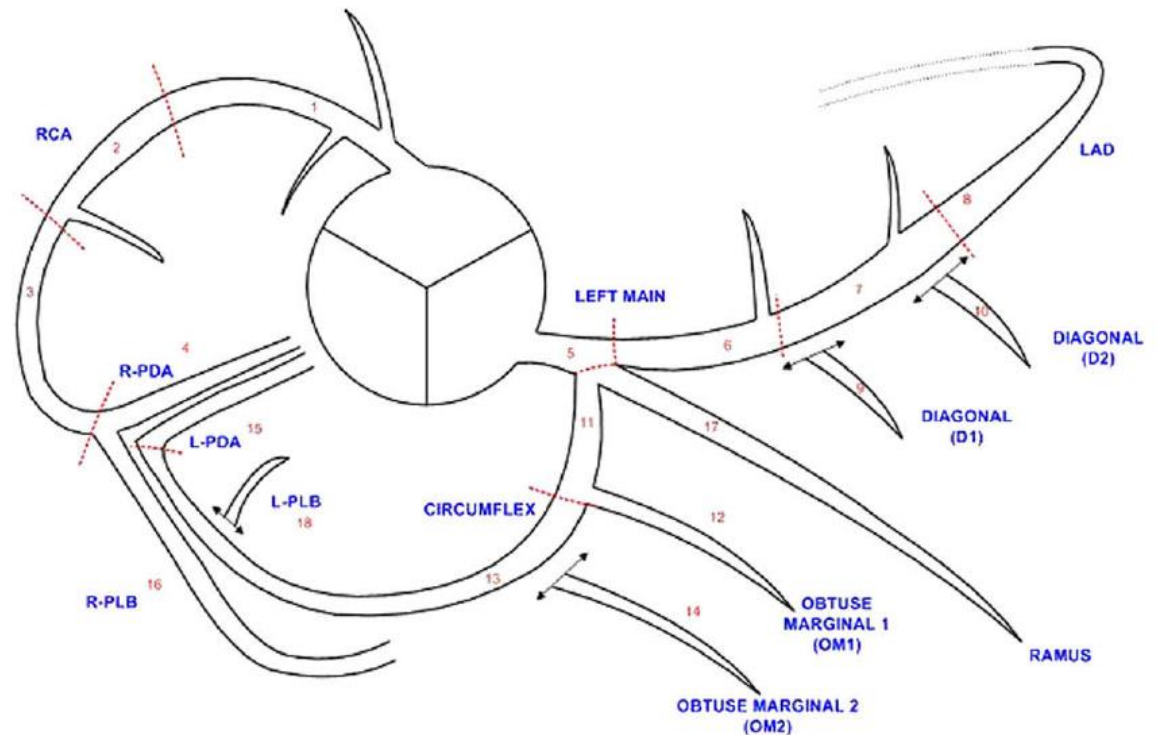
- AHA 17-Segment Model
(will be implemented in the CTA and ICA eCRFs, plaque and stenoses)

Discussion



Reporting of CTA

- SCCT Coronary Segmentation Model*



*Raff GL, J Cardiovasc Comput Tomogr, 2009

Image storage

- All images obtained have to be stored!
(study patients)
- Local storage → either PACS or dedicated server
- Phases used for interpretation + noncardiac reconstructions
(pseudonymized) →
Charité corelab

Discussion

- What do you think about these minimal requirements for CTA?
- Specific points to discuss:
 - » Threshold β -blocker administration >50 bpm
 - » Use of ivabradine mandatory?
 - » Prospective scanning (up to ≤ 65 bpm)?
Available at all clinical sites?
 - » CTA reporting – AHA 17-segment model?