CAD-RADS 2.0

Merilin Laars
Radioloogia III aasta resident

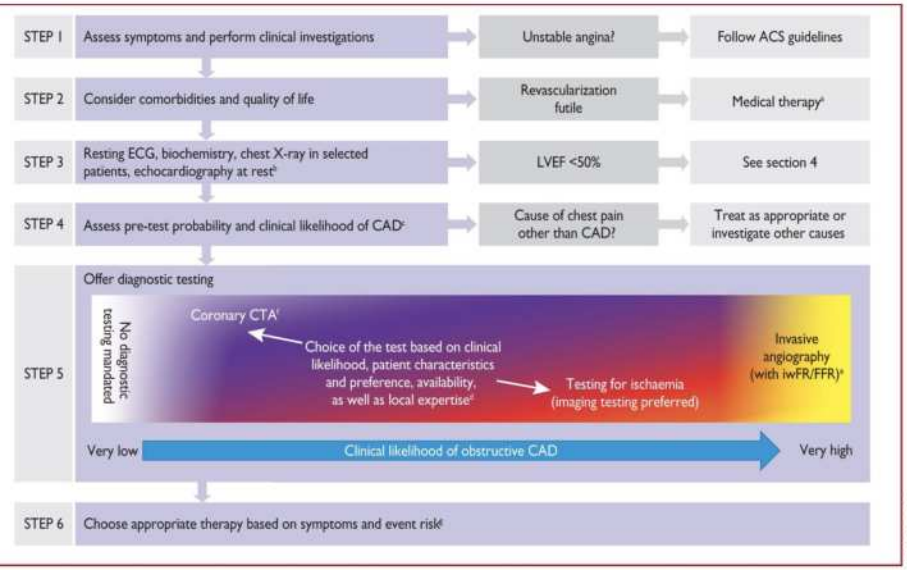
CAD-RADS 2.0 (2022)

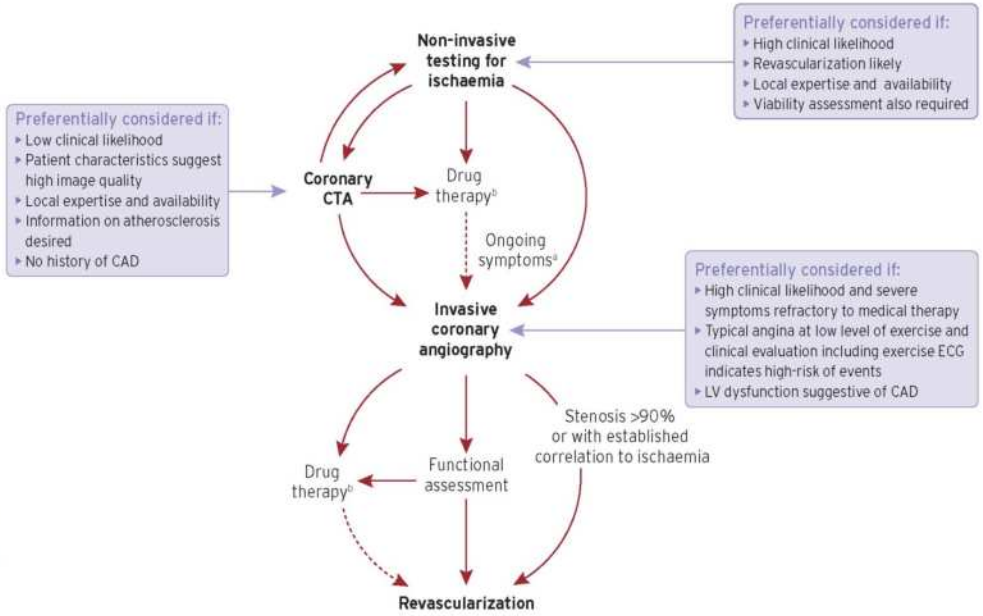
- Coronary Artery Disease Reporting and Data System (CAD-RADS) - 2016
- Koronaararterite KT-angiograafia
- Koronaararterid üle 1,5 mm diameetriga
- Stenoosi hindamine sama nagu eelmine CAD-RADS
- Lisatud naastude hulga hindamine
- Uued modifierid

Table 8: Summary of the main changes for 2022 CAD-RADS update when compared to the first version published in 2016.

	2016 CAD-RADS	2022 CAD-RADS
Stenosis grading	CAD-RADS 0, 1, 2, 3, 4A, 4B and 5	No change
Plaque burden grading	No systematic classification	New CAD-RADS category grading scale for Plaque Burden ranging from P1 to P4
Modifiers	Four modifiers were introduced to complement the CAD-RADS classification First: modifier N (non-diagnostic) Second: modifier S (stent) Third: modifier G (graft) Fourth: modifier V (vulnerability)	Addition of two new modifiers: modifier I (ischemia) and modifier E (exceptions) and replacement of modifier V (vulnerable) with HRP (high-risk plaque) First: modifier N (non-diagnostic) Second: modifier HRP (replaces V) Third: modifier I+ (ischemia), I- and I ± Fourth: modifier S (stent) Fifth: modifier G (graft) Sixth: modifier E (exceptions)

CTA näidustused stabiilse stenokardia korral





- Varasem CAD ei ole teada
- Madal/keskmine CAD tõenäosus
- Sümptomaatilised patsiendid, kellel on funktsionaalsed testid neg
- Asümptomaatilised patsiendid kellel funktsionaalsed testid ei anna vastust või ei ole võimalik teostada
- Madal tõenäosus ja CTA ei ole diagnostiline ⇒ funktsionaalsed isheemia uuringud
- Ei ole kasu ilma sümptomiteta patsientidel sõeluuringuna

ESC 2019 Guidelines on Chronic Coronary Syndromes

Teised CTA näidustused

- Bypass grafti hindamine
- Südame anatoomia hindamine
- Koronaararterite anomaaliad
- Plaanitav südameoperatsioon

CAD-RADS kategooriad

- Stenoosi hindamine

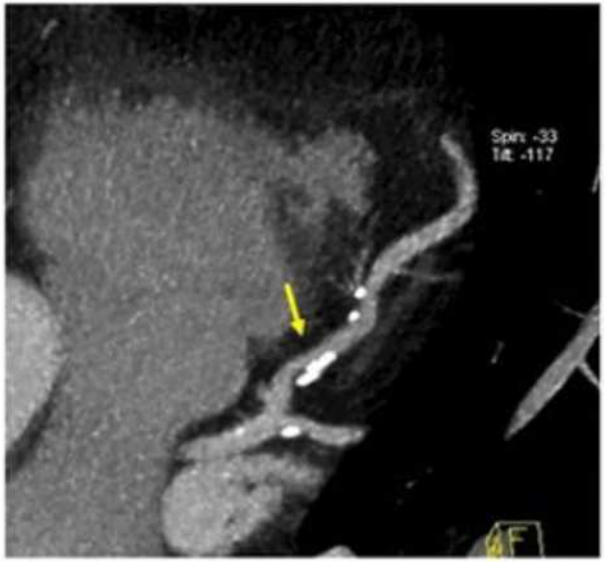
Degree of luminal diameter stenosis	Terminology
0%	No visible stenosis
1–24%	Minimal stenosis
25–49%	Mild stenosis
50–69%	Moderate stenosis
70–99%	Severe stenosis
100%	Occluded

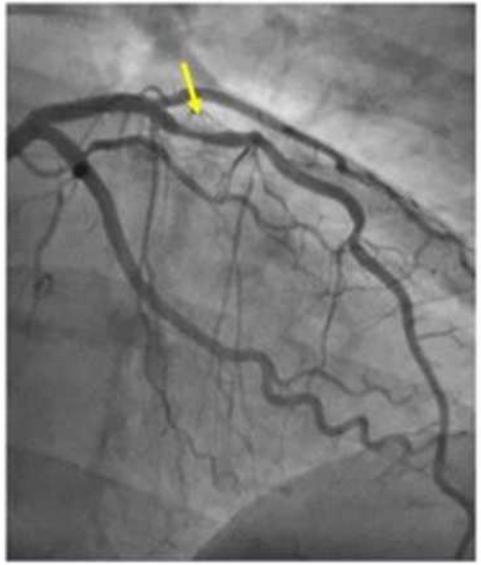
CAD-RADS 1

- Minimaalne stenoos
- 1-24%

CAD-RADS 2

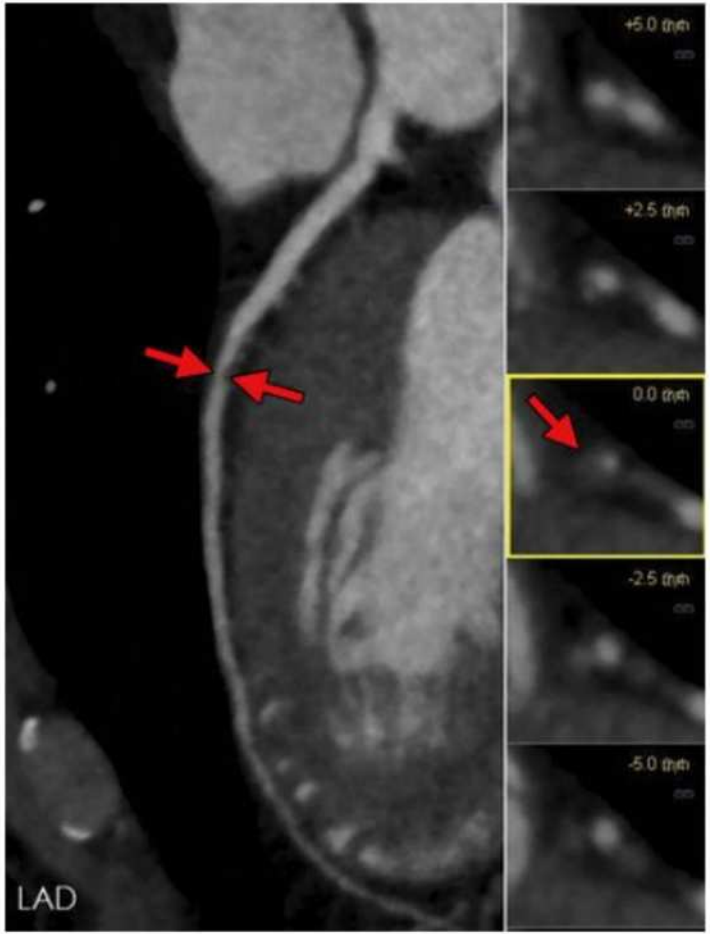
- Vähene stenoos
- 25-49%





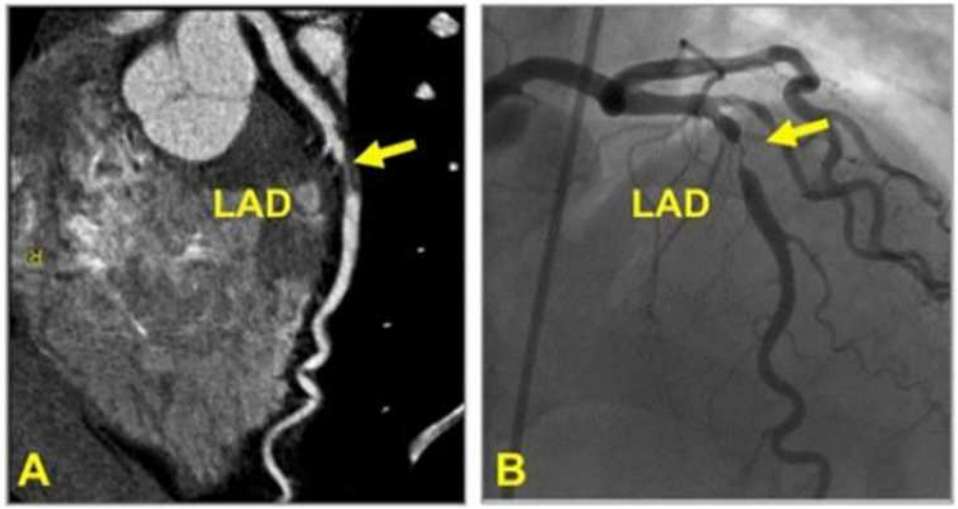
CAD-RADS 3

- Mõõdukas stenoos
- 50-69%



CAD-RADS 4A

- Raske stenoos
- 70-99% stenoos 1-2 veresoones

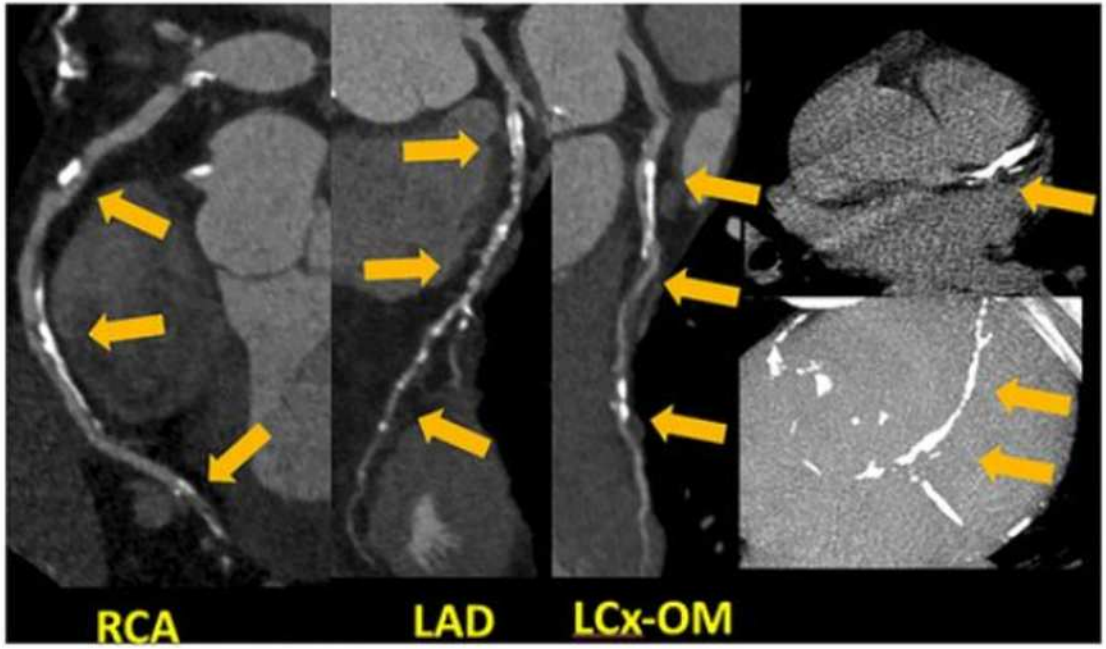


CAD-RADS 4B

- >50% stenoos vasakus peatüves

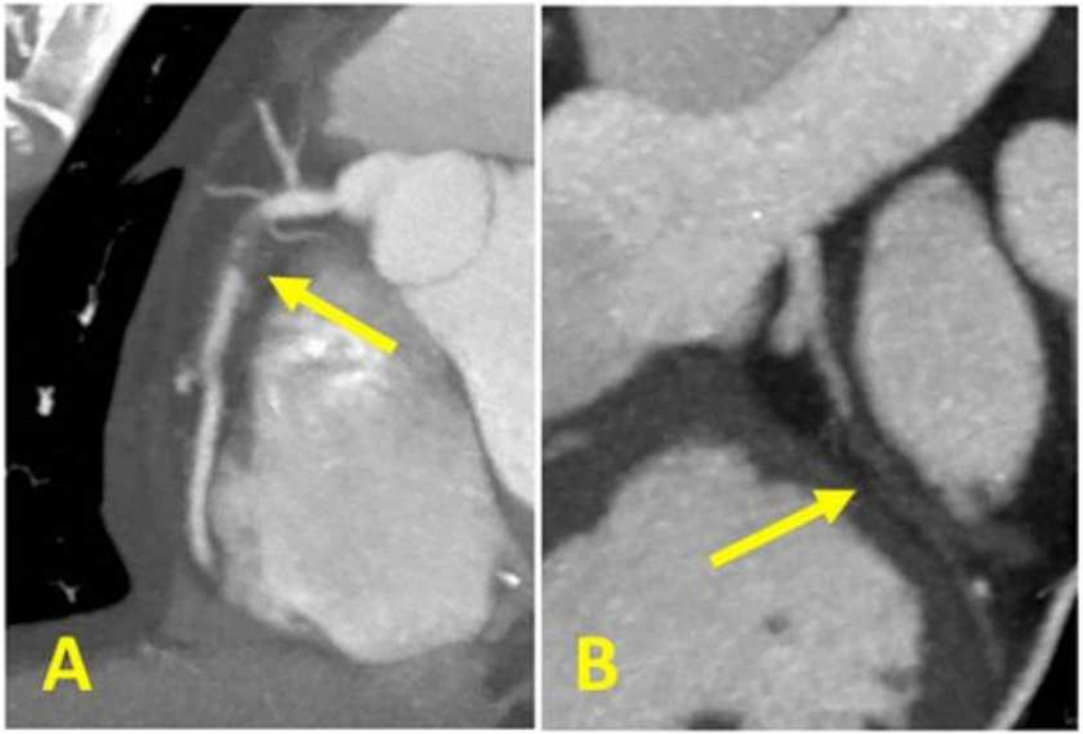
või

- >70% stenoos kolmes veresoones



CAD-RADS 5

- oklusioon

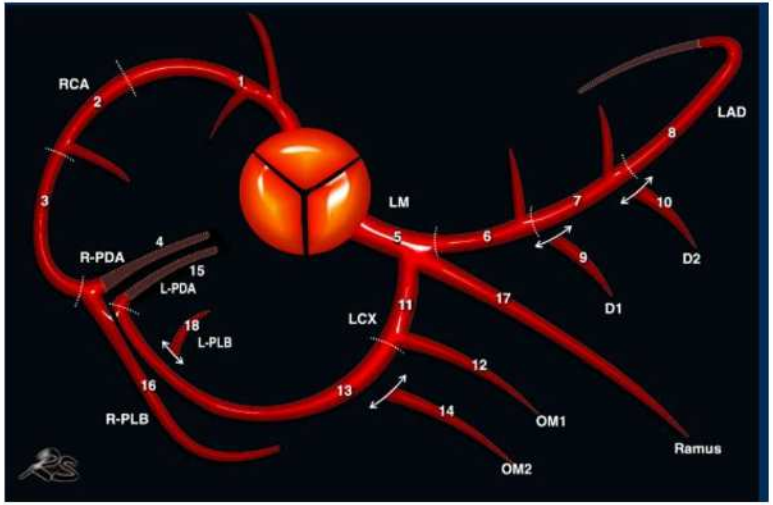


Plaque burden (P)

- Naastude hulk
- Ca-skoor
  - Ei peaks kasutama isoleeritult
  - Peaks arvestama ka pehmeid naaste
- Segment involvement score (SIS)
  - 1 punkt iga haaratud segmendi eest
- Visuaalne hindamine
  - Hinnata iga veresoont eraldi

Table 2: Different methods to categorize the overall amount of coronary plaque.

	Overall amount of coronary plaque	CAC	SIS*	Visual*
P1	Mild	1-100	≤2	1-2 vessels with mild amount of plaque
P2	Moderate	101–300	3–4	1 -2 vessels with moderate amount; 3 vessels with mild amount of plaque
P3	Severe	301–999	5–7	3 vessels with moderate amount; 1 vessel with severe amount of plaque
P4	Extensive	>1000	≥8	2-3 vessels with severe amount of plaque



Koronaararterite Ca skoor

- Hea vahend riski hindamiseks noortel täiskasvanutel (30-49 a)
- Riski hindamine patsientidel, kellel oleks madal risk koronaarhaiguseks, aga on positiivne pereanamnees
- Ca skoor 0 - tugev negatiivne riskifaktor
- Ca skoor >1000 ja/või vasaku peatüve haaratus - märkimisväärselt tõusnud risk

Modifiers

- Lisandunud on “isheemia (I)” ja “exceptions (E)”
- “Vulnerable plaque (V)” on muutunud ja on nüüd “high risk plaque (HRP)”

Modifier N - non-diagnostic study

- Uuring ei ole diagnostiline
  - Kõiki segmente, mis on üle 1,5 mm ei saa hinnata
  - Artefaktid
  - Ca blooming või metalli aftefaktid
- Kui uuring ei ole diagnostiline, aga esineb üle 50% stenoos diagnostilises segmendis, tuleb stenoos hinnata lisaks N-le (nt CAD-RADS 3/P2/N)
- Kui esineb vähemalt üks mittediagnostiline segment ja mujal stenoos alla 50%, tuleb panna CAD-RADS N

Modifier S - stent

- Vähemalt ühe stendi olemasolu
- Kui stent ei ole hinnatav, siis tuleb hinnata CAD-RADS N/S, kui ei ole mujal ahenemist üle 50%

CAD-RADS 4A/P3/S

Modifier G - graft

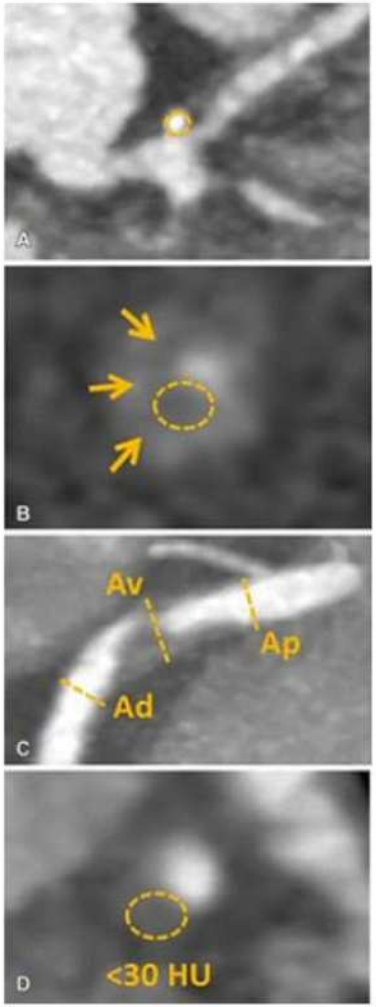
- Vähemalt üks koronaararteri bypass graft
- Stenoos, mille tõttu on tehtud bypass ei kuulu arvestamisele CAD-RADSi järgi

HRP - high risk plaque

- Kasutatakse kui naastul on 2 või enam kõrge riski tunnust
- Suurem risk naastu ruptuuriks/tromboosiks:

1. Täpjad kaltsifikaadid
2. Napkin-ring sign
   - Keskel madala tihedusega naast
   - Perifeersel tihedam ääris
3. Positiivne remodelleerumine
   - Naastu kohal veresoone diameeter üle 1,1 korda suurem
4. Madala tihedusega naast (alla 30 HU)

- Vajab agresiivsemat ravi (isegi CAD-RADS 1 ja 2)



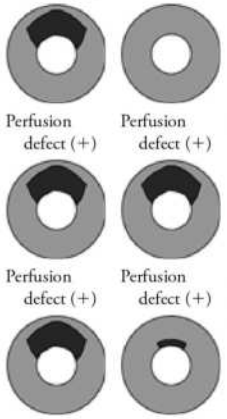
I - Isheemia

- Tähendab, et isheemia test on tehtud
  - CT-FFR (fractional flow reserve) või
  - stress CT-perfusioon
- CT-perfusioon
  - Kasutatakse et hinnata kas stenoos 50-90% on hemodünaamiliselt oluline
  - CAD-RADS 2 korral kui proksimaalne naast ja stenoos üle 40% või kõrge riski naast
  - I+ müokardi isheemia või peri-infarct isheemia (stressil suurem perfusioonidefekt kui rahuoleku perfusioonidefekt
  - I- perfusioonidefekti ei ole või varasem fikseeritud müokardiinfarkt
  - I+- piiripealne

Grading scale for Ischemia detection:

Terminology	Meaning
Modifier I	Indicates that CT Ischemia test was performed either with CT-FFR or myocardial CTP
I+	Indicates that CT-FFR or CTP demonstrates lesion-specific ischemia or reversible perfusion defect
I−	Indicates that CT-FFR or CTP is negative for lesion specific ischemia or reversible ischemia[a]
I ±	Indicates that CT-FFR or CTP is borderline

Stress CTP	Rest CTP	Interpretation
Perfusion defect (+)	Negative (−)	Myocardial ischemia in a defined coronary territory CAD-RADS 3 or 4/I+
Perfusion defect (+)	Perfusion defect (+)	Myocardial infarct or no evidence of ischemia in a defined coronary territory CAD-RADS 3 or 4/I−
Perfusion defect (+)	Perfusion defect (+)	Peri-infarct ischemia in a defined coronary territory CAD-RADS 3 or 4/I+

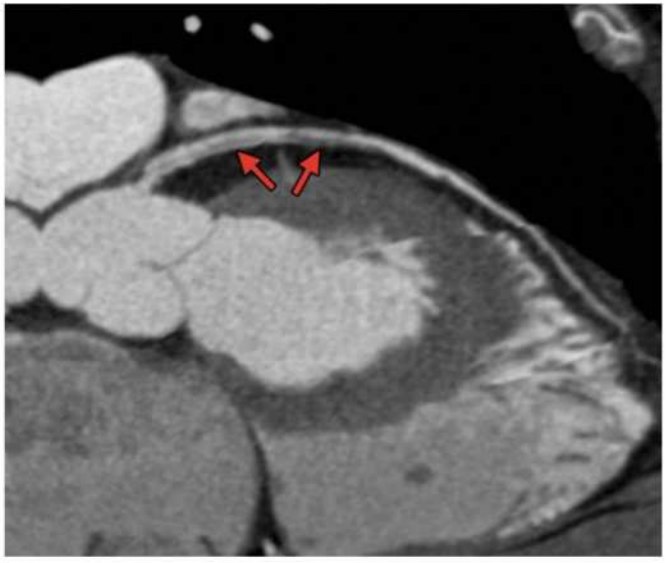


E - exceptions

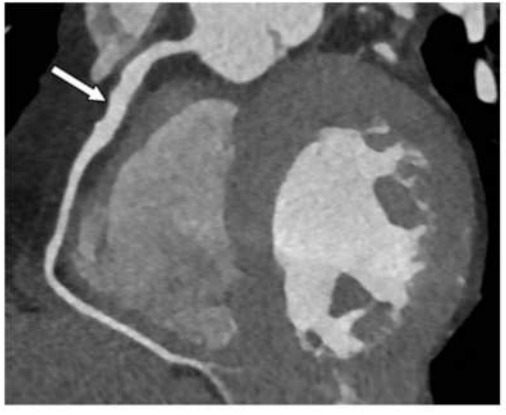
- Erandid
- Harvemad koronaararterite stenoosi põhjused

Table 3: Examples of non-atherosclerotic causes of coronary abnormalities to be included in Modifier "E" = Exceptions. Please note that this is not a comprehensive list.

Coronary dissection
Anomalous origin of the coronary arteries
Coronary artery aneurysm or pseudoaneurysm
Vasculitis
Coronary artery fistula
Extrinsic coronary artery compression
Arterio-venous malformation
Other causes



LAD dissektsioon ja mõõdukas valendiku ahenemine



Koronaararteri aneurüsm

Stabiilse rindkerevaluga patsient

Table 4: CAD-RADS Reporting and Data System for patients presenting with stable chest pain.

Category	Degree of maximal coronary stenosis	Interpretation	Further Cardiac Investigation	Management considerations
CAD-RADS 0	0% (No plaque or stenosis)	Absence of CAD[a]	None	Reassurance. Consider non-atherosclerotic causes of symptoms
CAD-RADS 1	1–24% (Minimal stenosis or plaque with no stenosis[b]	Minimal non-obstructive CAD[b]	None	- Consider non-atherosclerotic causes of symptoms - P1: Consider risk factor modification and preventive pharmacotherapy - P2: Risk factor modification and preventive pharmacotherapy - P3 or P4: Aggressive risk factor modification and preventive pharmacotherapy
CAD-RADS 2	25–49% (Mild stenosis)	Mild non-obstructive CAD	None	- Consider non-atherosclerotic causes of symptoms - P1 or P2: Risk factor modification and preventive pharmacotherapy - P3 or P4: Aggressive risk factor modification and preventive pharmacotherapy
CAD-RADS 3	50–69% (Moderate stenosis)	Moderate stenosis	Consider functional assessment[c]	-P1, P2, P3 or P4: Aggressive risk factor modification and preventive pharmacotherapy - Other treatments (including anti-anginal therapy) should be considered per guideline directed care[d] - When modifier I+, consider ICA, especially if frequent symptoms persist after guideline-directed medical therapy
CAD-RADS 4	A - 70–99% stenosis or B - Left main ≥50% or 3-vessel obstructive (≥70%) disease	Severe stenosis	A: Consider ICA[e] or functional assessment B: ICA is recommended	-P1, P2, P3 or P4: Aggressive risk factor modification and preventive pharmacotherapy. - Other treatments (including anti-anginal therapy and options of revascularization) should be considered per guideline directed care[e]
CAD-RADS 5	100% (total occlusion)	Total coronary occlusion or sub-total occlusion	Consider ICA, functional and/or viability assessment	P1, P2, P3 or P4: Aggressive risk factor modification and preventive pharmacotherapy. - Other treatments (including anti-anginal therapy and options of revascularization) should be considered per guideline directed care[e]
CAD-RADS N	Non-diagnostic study	Obstructive CAD cannot be excluded	Additional/alternative evaluation may be needed	

Table 4:

Kokkuvõte

- CAD-RADS 2.0 täiendused
- Üldine põhimõte sama
- Ei asenda radioloogilist kirjeldust

Kasutatud kirjandus

1. Cury R, Blankstein R, Leipsic J et al. CAD-RADS™ 2.0 - 2022 Coronary Artery Disease - Reporting and Data System an Expert Consensus Document of the Society of Cardiovascular Computed Tomography (SCCT), the American College of Cardiology (ACC), the American College of Radiology (ACR) and the North America Society of Cardiovascular Imaging (NASCI). J Cardiovasc Comput Tomogr. 2022 https://pubs.rsna.org/doi/10.1148/ryct.220183
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3. 2019 Guidelines on Chronic Coronary Syndromes. ESC Clinical Practice Guidelines.
4. Canan A, Ranganath P et al. CAD-RADS: Pushing the LimitsCAD-RADS: Pushing the Limits. Radiographics. 2020. https://pubs.rsna.org/doi/10.1148/rg.2020190164

Tänan kuulamast!