

# Direct diagnostic and prognostic comparison of carotid plaques (Total Plaque Area) with coronary calcifications (Agatston Score).



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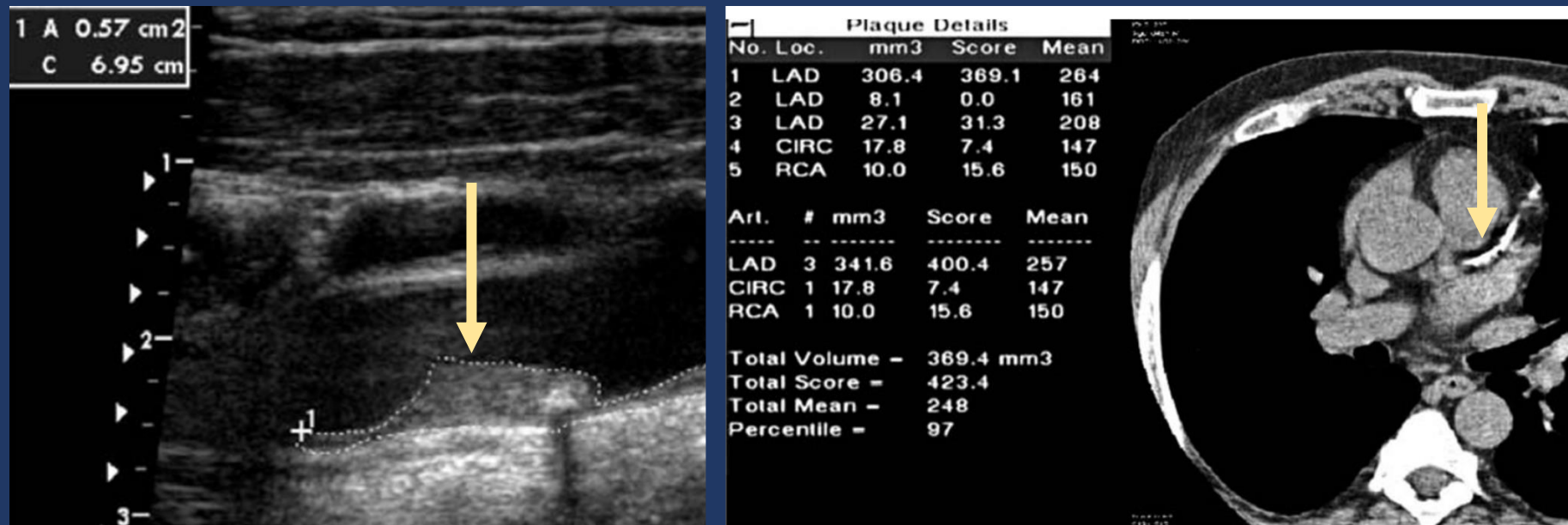
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# Comparison of carotid plaques (Total Plaque Area) with coronary calcifications (Agatston Score).

## Background:

- Cardiovascular Risk Prediction is enhanced with atherosclerosis imaging
- Carotid TPA > 21 mm<sup>2</sup> or Agatston Score > 10 define elevated cardiovascular risk
- Few studies compare carotid plaque with coronary calcifications directly
- Few studies assessed sex differences



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## Methods:

- Practice based data collection 2002-2022 (Kardiolog und B.A.D. Zentrum)
- Carotid Imaging with Ultrasound (longitudinal plaques surfaces summed)
- Multislice computed tomography, ECG-Triggering, Agatston Scores (Scilimage, GE)
- Follow-up by recall, clinical records from treating physicians and hospitals.
- Compare SCORE2, presence of plaque, plaque posttest risk (Bayes theorem)
- Statistical: ROC, Cox proportional hazard functions, Kaplan-Meier survival analysis.

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## Results (1):

- Patients characteristics: N=942, age 22-89 (x=59), 32% women, 84% primary prevention
- Distribution of Plaques
  - TPA<22mm<sup>2</sup> and CAC=0: 22% women and 12% men (p=0.0001)
  - TPA>21mm<sup>2</sup> and CAC=0: 24% women and 16% men (p=0.002)
  - TPA<22mm<sup>2</sup> and CAC>0: 11% women and 15% men (p=NS)

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## Results (2): Single Risk Factors Prediction of ASCVD (no lipids, no SCORE2/-OP)

- Follow-up 1-20 (x=10) years: N=463, age 36-89 (x=58), 30% women, 100% primary prevention
  - 50 events (14 stents or CABG, 10 AMI, 5 strokes, 21 deaths of any cause)
  - COX Regression: TPA (p=0.046), DMII (p=0.002) and age (p=0.013)  
p=NS: CAC, smoking, blood pressure, family history of ASCVD.
  - AUC analysis: : TPA 0,62 (95%CI: 0,57 to 0,66)  
CAC 0,69 (95%CI: 0,64 to 0,73, p for difference NS).

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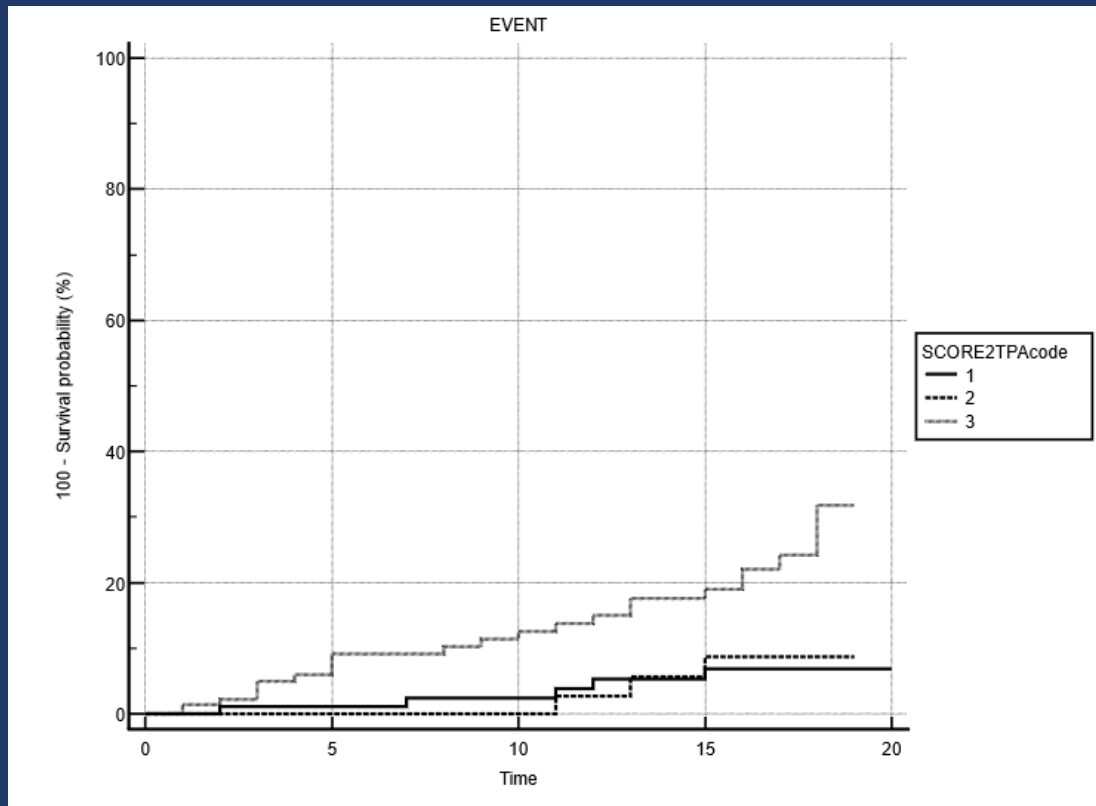
## Results (3): SCORE2, posttest risks TPA/CAC ASCVD risk prediction

- Follow-up 1-20 (x=11) years: N=302, age 38-81 (x=58), 29% women, 100% primary prevention
  - 31 events (9 stents or CABG, 7 AMI, 2 strokes, 13 deaths of any cause)
  - COX Regression: DMII (p=0.013), SCORE2\_TPA (p=0.011), SCORE2\_CAC (p=0.013)  
p=NS: SCORE2, sex, smoking, blood pressure, lipids, family history of ASCVD.
  - AUC analysis: SCORE2: 0,59 (95%CI: 0,53 to 0,65)  
SCORE2\_TPA: 0,65 (95%CI: 0,59 to 0,70)  
SCORE2\_CAC: 0,66 (95%CI: 0,61 to 0,72, for all p=NS).

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## Results (3): Percent events in high risk categories,

- Events in high risk category:      SCORE2:            6/31      (19%)  
   SCORE2\_TPA:      23/31      (74%)  
   SCORE2\_CAC:      13/31      (42%)





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## Conclusions

- Atherosclerotic plaque are frequent in cardiology practice (about 85%)
- Significant carotid plaque and no coronary calcifications in 24% women (19% of subjects).
- TPA was non-inferior to CAC regarding presence of significant atherosclerosis
- TPA was non-inferior to CAC regarding ASCVD outcome in practice-based patients.
- Atherosclerosis imaging adds significantly to SCORE2 risk information
- Further research is needed regarding outcome and imaging in women

## References

### Outcome of TPA:

Romanens M., Adams A., Sudano I., et al. Prediction of cardiovascular events with traditional risk equations and total plaque area of carotid atherosclerosis. Preventive Medicine 2021;147:106525. Doi: 10.1016/j.ypmed.2021.106525.

### Cost-effectiveness of TPA:

[smw.ch/article/doi/smw.2021.20498](https://www.smw.ch/article/doi/smw.2021.20498)

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