Current optimal methods to evaluate plaque instability with asymptomatic carotid stenosis

Clark Zeebregts
Professor of Vascular Surgery
Department of Surgery
Division of Vascular Surgery
University Medical Center Groningen
Groningen, The Netherlands

Increased risk of stroke predictors in the first 14 days

- ABCD2 score of 4-7
- Presence of acute cerebral injury on CT/MRI
- Gray Scale Median (GSM) <15
- Spontaneous embolization on transcranial Doppler (TCD)
- Increased fluorodeoxyglucose (FDG) uptake in the carotid plaque on positron emission tomography (PET)

FDG uptake: correlation with early stroke recurrence

Increased risk of stroke predictors at long-term

Clinical
- Male gender
- Age > 75
- Hemispheric symptoms
- Increasing co-morbidity

Imaging
- Irregular stenoses
- Contralateral occlusion
- Increasing stenosis severity, but not subocclusion
- Tandem intracranial disease
- Failure to recruit intracranial collaterals
- Low-GSM
- MR diagnosis of intra-plaque hemorrhage
- Spontaneous embolization on TCD
- Increased FDG uptake carotid plaque on PET

Natural history of 18F-FDG uptake in plaques

FDG uptake diminished with 3 months

FDG uptake in the abdominal aortic wall

FDG uptake in the carotid plaque

FDG uptake in the carotid plaque

FDG uptake in the carotid plaque
μPET FDG: correlation with macrophages


\[ r = 0.501, \ p = 0.01 \]

99mTc-IL2-SPECT uptake in plaque


Imaging calcifications using 18F-sodium fluoride


Combined 18F-FDG-PET and high resolution MRI

Variability in scanning protocols

- 18F-FDG PET CT promising results in human, but there is need for higher spatial resolution equipment and more specific tracers.
- Improved resolution and more patho-physiological information using PET MR.
- Need for large population-based studies with uniform scanning protocols.

Conclusions

Acknowledgements

Thank you for your attention!