

# Biological relevance and prognostic significance of radial artery intima-media thickness

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## ABSTRACT

Cardiovascular disease (CVD) is the major cause of death both in Sweden and globally. Atherosclerotic vascular changes are considered the major underlying pathology leading to clinical manifestations of CVD, e.g. myocardial infarction and stroke. Hyperlipidemia and chronic subclinical inflammation have been identified as major pathophysiological mechanisms driving atherosclerosis, which is a life-long vascular disease. Inflammatory diseases such as rheumatoid arthritis (RA) are known to be associated with increased risk of CVD. To be able to detect and follow atherosclerosis from its subclinical phase to its clinical stage, we are in great need of novel high-sensitive imaging tools to characterize functional and morphological vascular changes. Our group has successfully used very high frequency ultrasound to follow atherosclerosis in genetically modified mice models. In the current thesis, we adopted this technique to patients and evaluated biological relevance and prognostic significance of high-frequency ultrasound-measured radial artery intima-media thickness (rIMT) in patients with suspected myocardial ischemia. Further, rIMT and coronary flow reserve (CFR) in relationship to systemic inflammation were explored in a group of recent diagnosed RA patients.

Clinical correlates and prognostic values of rIMT were evaluated in 416 patients with suspected myocardial ischemia undergoing myocardial perfusion imaging. Relationship between rIMT, CFR and systemic inflammatory status was explored in patients with recent-onset RA, immediately following diagnosis and four months after standard anti-rheumatic treatment.

Radial artery IMT correlated with conventional cardiovascular (CV) risk factors. Presence of myocardial ischemia and significant coronary artery narrowing, as verified by myocardial perfusion scintigram respectively coronary angiogram, were associated with increased rIMT. Increased rIMT was seen in patients with CV events compared to those without events. Further, rIMT values above the median indicated an independent two-fold increased risk of CV events after multivariate adjustment. At RA onset, CFR correlated with rIMT, number of swollen joints and systemic inflammation. A reduced number of swollen joints after four months treatment were associated with improvement in CFR.

In conclusion, rIMT can be accurately measured with good feasibility and reproducibility. Radial artery IMT is related to multiple CV risk factors and confers prognostic information in patients with suspected myocardial ischemia. Potential use of this vascular surrogate marker to follow atherosclerotic vascular changes and response to treatment warrants further studies

**Keywords:** radial artery, intima-media thickness, atherosclerosis, cardiovascular disease, high-frequency, ultrasound, rheumatoid arthritis

ISBN: 978-91-628-8898-5

<http://hdl.handle.net/2077/34833>

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Akademisk avhandling

Som för avläggande av medicine doktorsexamen vid Sahlgrenska Akademin vid  
Göteborgs universitet kommer att offentligens försvaras i  
hörsal Arvid Carlsson, Medicinaregatan 3, Göteborg

Fredagen den 4 april 2014 kl.13.00

av

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Fakultetsopponent: Professor **Ulf Hedin**  
Department of Vascular Surgery Research  
Karolinska Institutet

Avhandlingen baseras på följande delarbeten:

- I. **High-resolution radial artery intima-media thickness and cardiovascular risk factors in patients with suspected coronary artery disease – comparison with common carotid artery intima-media thickness**  
Eklund C, Friberg P, Gan LM. *Atherosclerosis* 2012; 221: 118-123
- II. **Radial artery intima-media thickness predicts major cardiovascular events in patients with suspected coronary artery disease**  
Eklund C, Omerovic E, Haraldsson I, Friberg P, Gan LM.  
*Eur Heart J Cardiovasc Imaging*. 2014 Jan 26. PMID: 24469155  
(Epub ahead of print)
- III. **Cardiovascular status in patients with recent-onset rheumatoid arthritis**  
Eklund C, Gjertsson I, Larsson K, Wähländer K, Friberg P, Gan, LM.  
*In manuscript*



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