MEDIZINISCHE UNIVERSITÄT WIEN

Inflammation and Carotid Artery Risk for Atherosclerosis Study

I C A R A S

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Presenter Disclosure Information

Name: Minar Erich

Nothing to disclose

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Background

Stroke is the third-leading cause of death and the most common cause of permanent disability.

Large-artery thromboembolism originating from atherosclerosis in the carotid arteries accounts for 30% of these events.

Recently, a substantially increased risk for neurological events was noted in patients with rapid progression of atherosclerotic lesions in the carotid arteries, with 2-year stroke rates exceeding 10%
(*Bertges et al; Arch Intern Med 2003;163:2285***).**

Prediction of the risk for progression of carotid atherosclerosis, however, remains a major unresolved issue.

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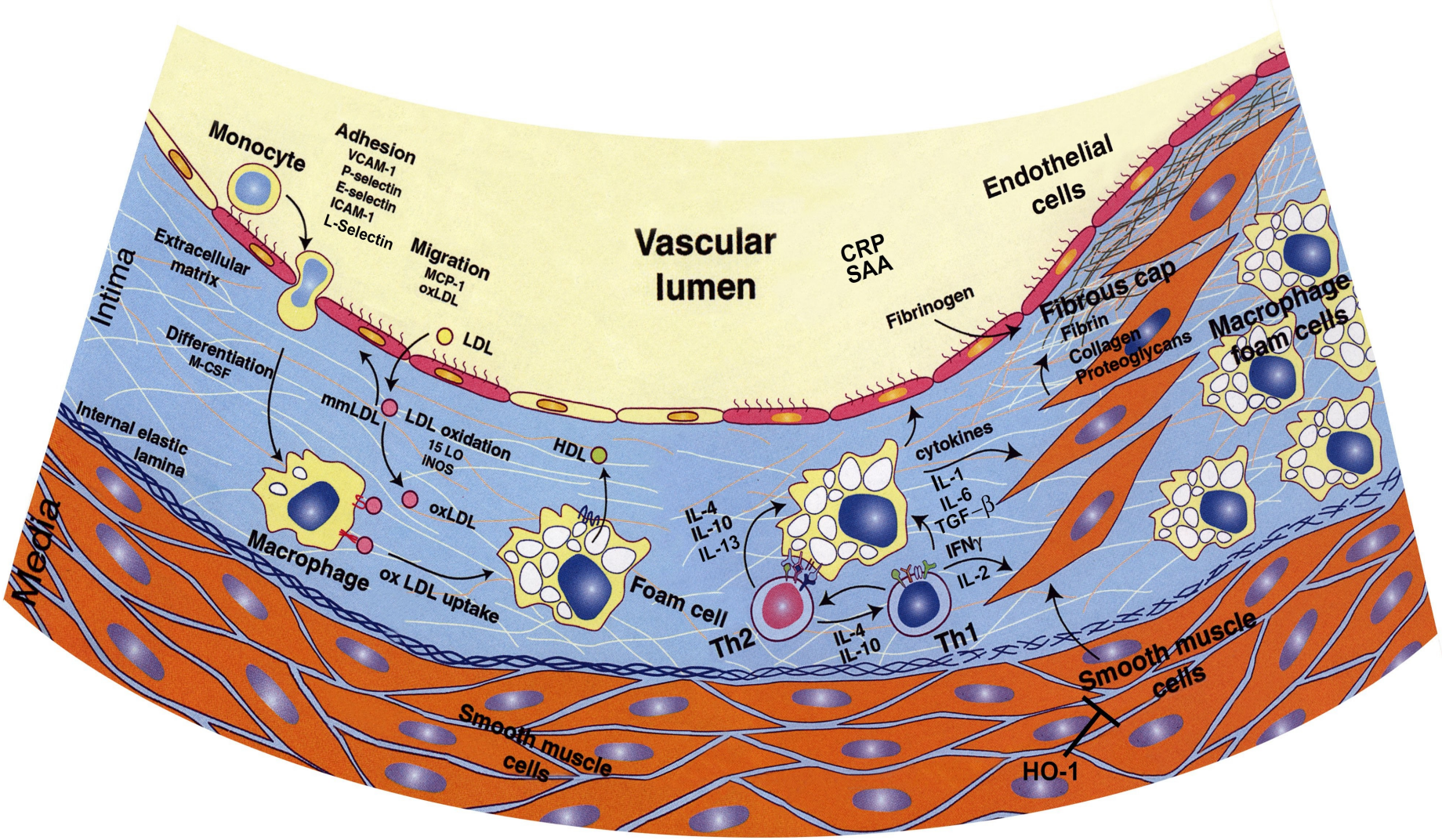
Background and Hypothesis



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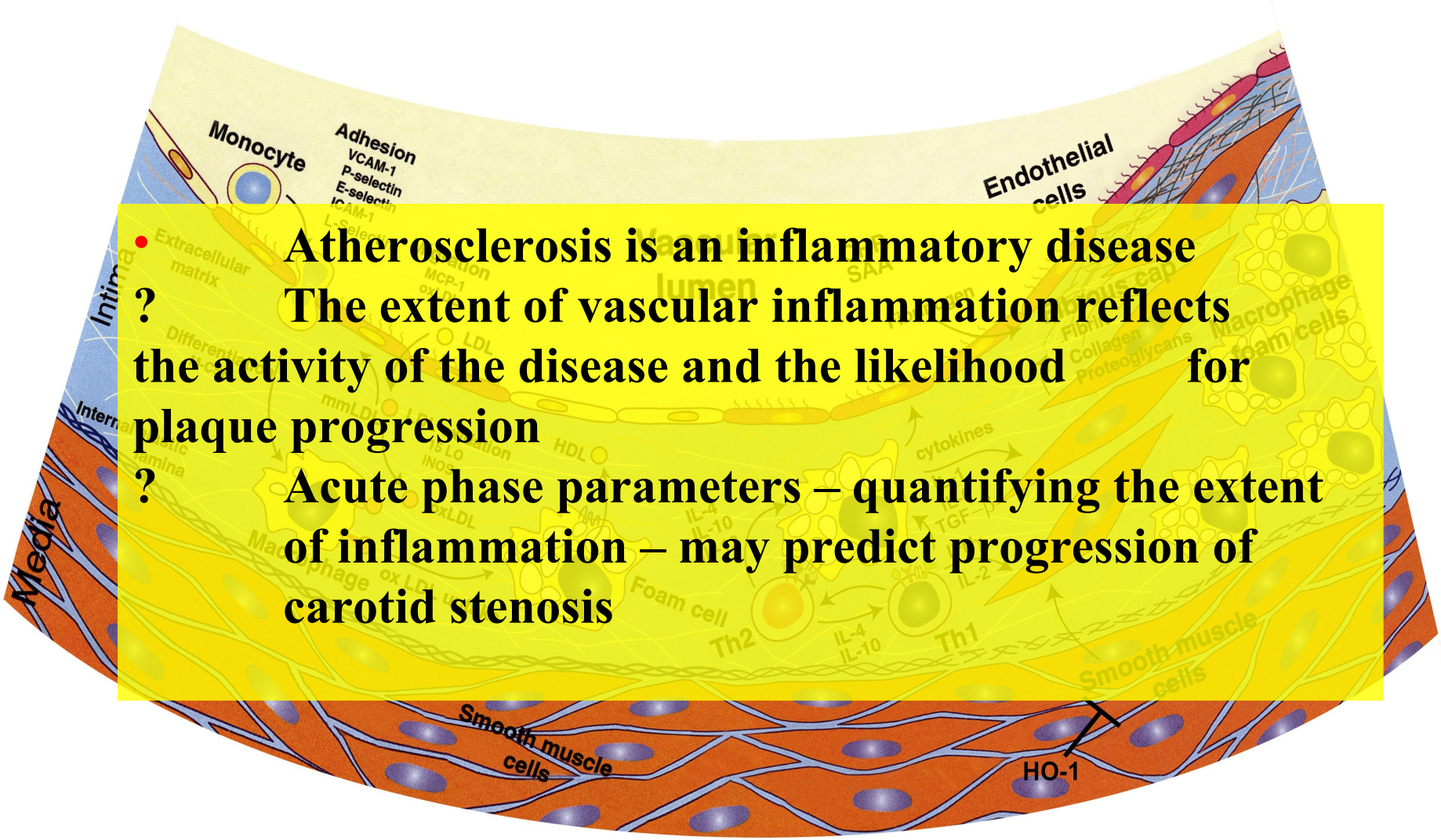
Background and Hypothesis



- Atherosclerosis is an inflammatory disease

? The extent of vascular inflammation reflects the activity of the disease and the likelihood for plaque progression

? Acute phase parameters – quantifying the extent of inflammation – may predict progression of carotid stenosis

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Study Aims

- To determine whether the extent of inflammation measured by acute phase parameters shows a temporal association with morphological progression of carotid atherosclerosis.
- To determine whether inflammation and progression of carotid disease predict cerebrovascular events.

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Study Endpoints

Morphological endpoint.

- **Progression of atherosclerosis by ultrasound**
  - **increase >20%**
  - **change of PSV baseline – follow-up**

Clinical endpoints.

- **Ipsilateral neurological events (TIA, any stroke)**

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Database

- Prospective cohort study 03/2002 – 03/2003
- 1268 consecutive patients undergoing DUS for suspected ICA atherosclerosis
  - carotid bruit
  - atherosclerotic disease in other vessel areas (coronary, peripheral)
  - scheduled for major cardiac surgery
- Cardiovascular risk factors / comorbidities
- Follow-up at 6-9 months:
  - repeated carotid ultrasound
  - evaluation of neurological events

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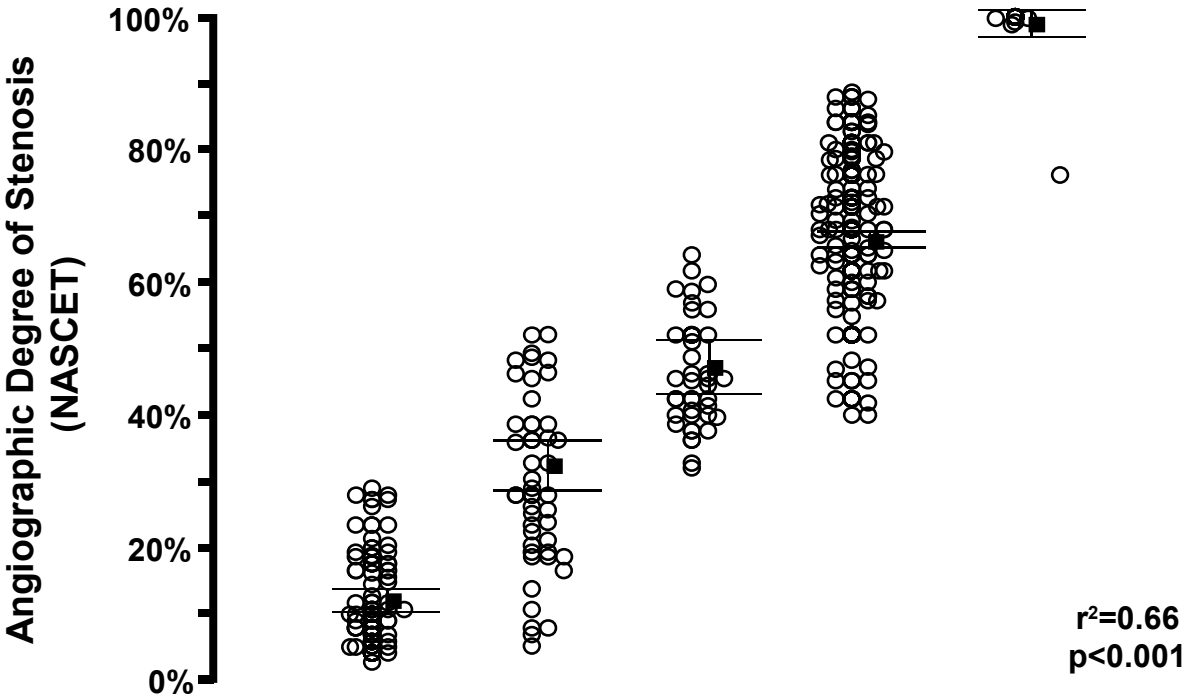
Agreement DUS vs. Angiography



Radiology 2004; 232: 431-439

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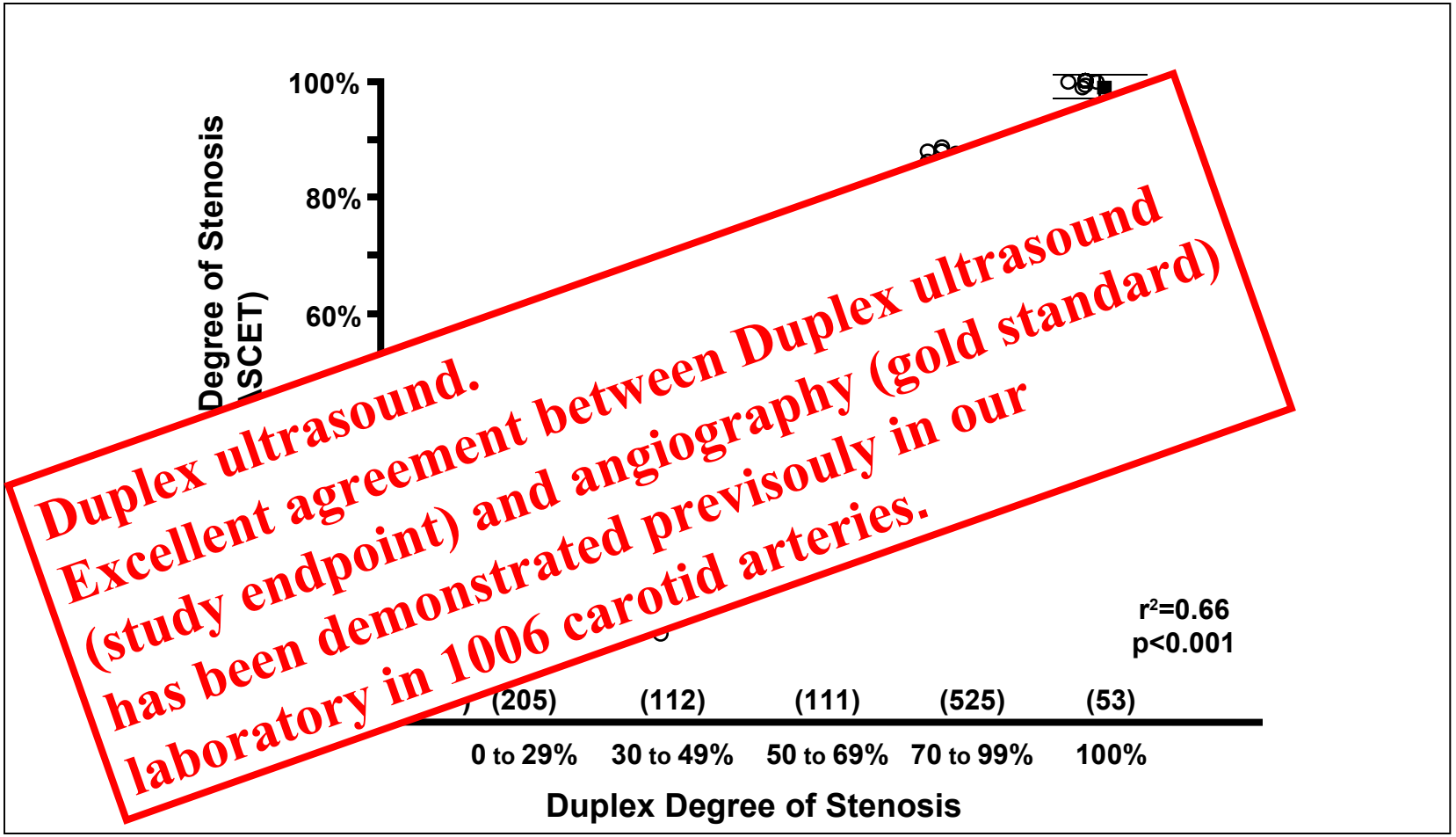
Agreement DUS vs. Angiography



Duplex ultrasound.
Excellent agreement between Duplex ultrasound (study endpoint) and angiography (gold standard) has been demonstrated previsouly in our laboratory in 1006 carotid arteries.

Radiology 2004; 232: 431-439

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Events

	Follow up (x 7.5 [6-9] months)
Stenosis progression	103 (8.1%)
De-novo occlusion	8 (0.6%)
Neuro-events	15 (1.2%)

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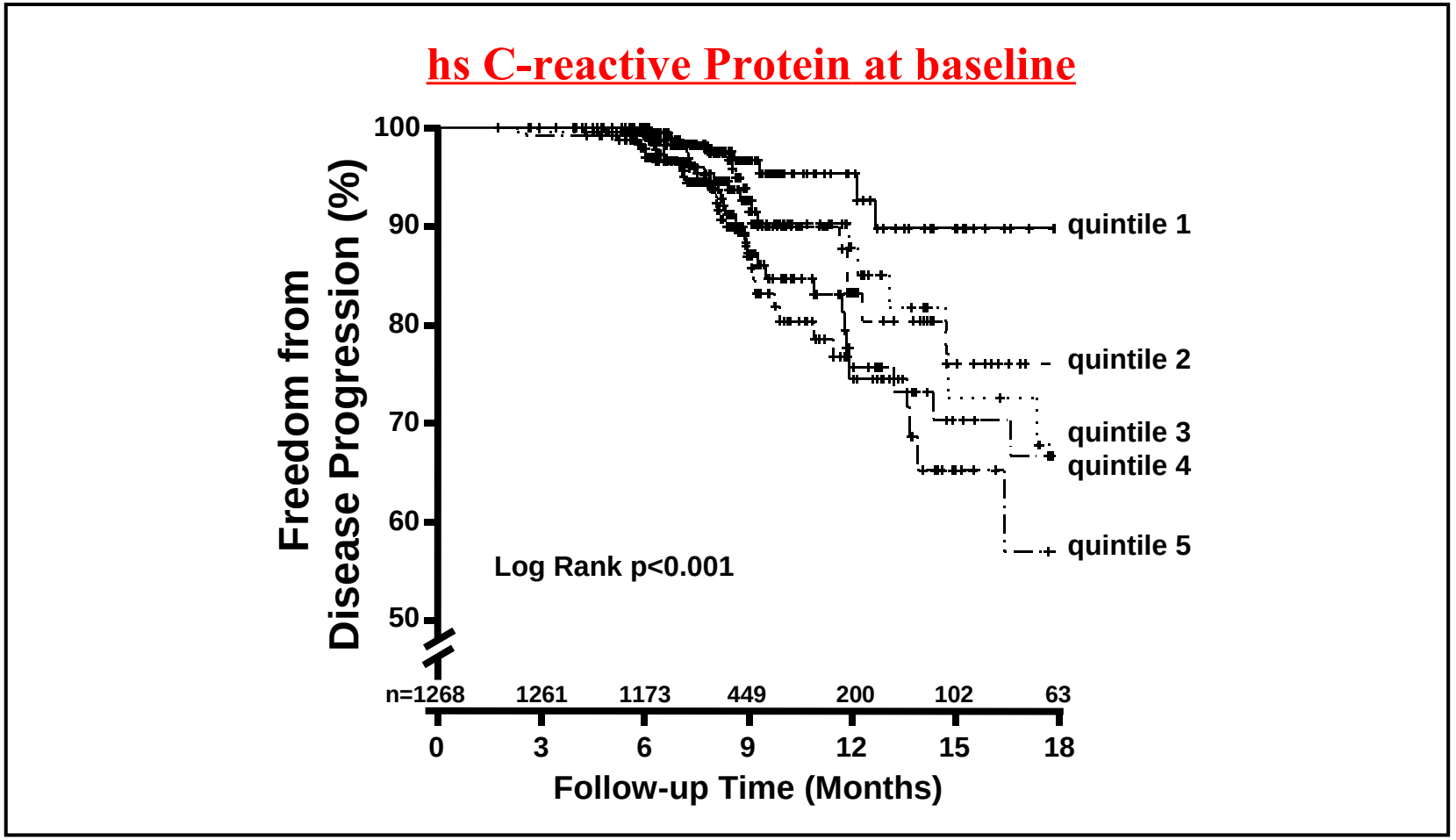
Inflammation and Disease Progression



Circulation 2005;111: 2203-09

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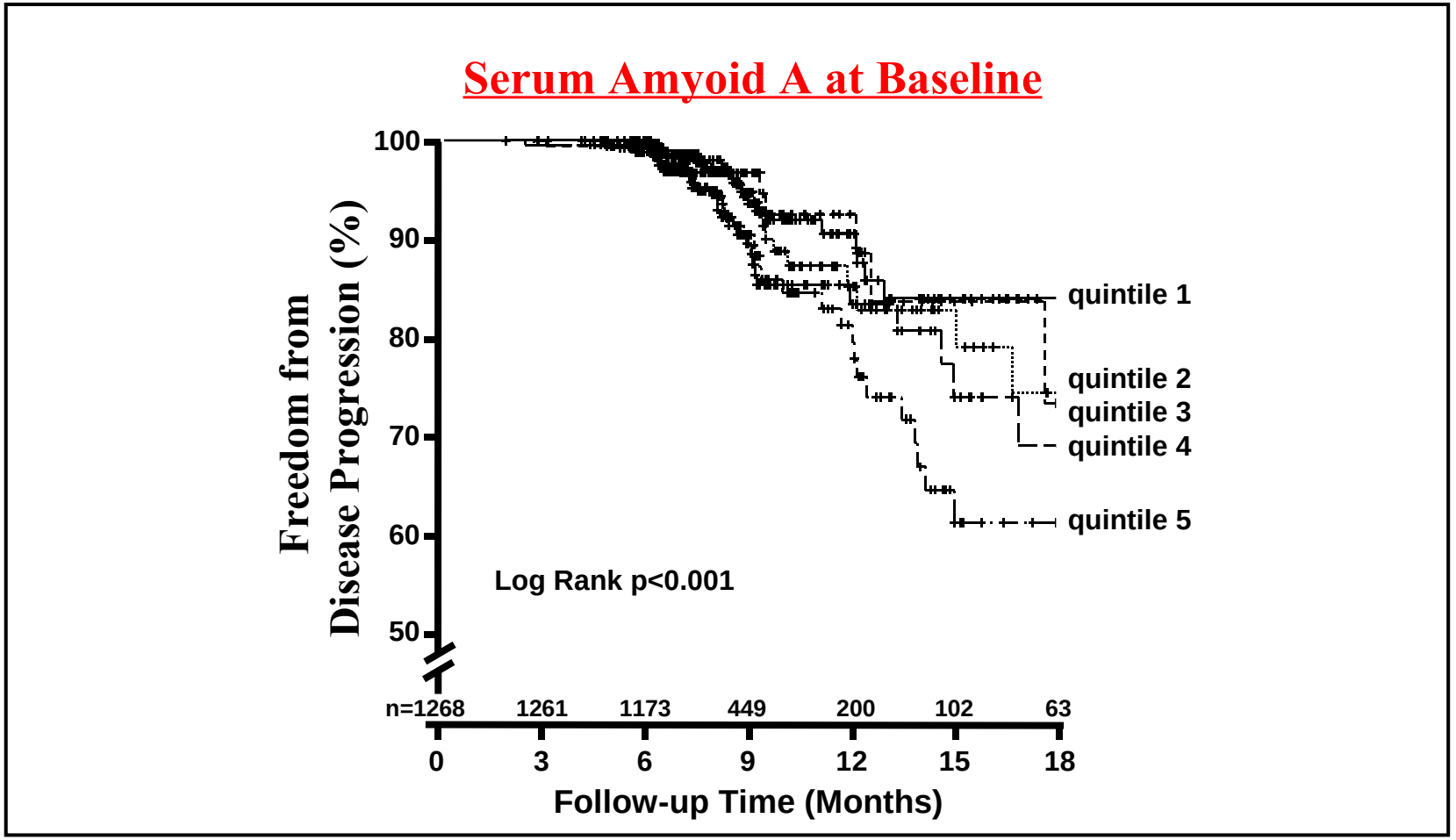
Inflammation and Disease Progression



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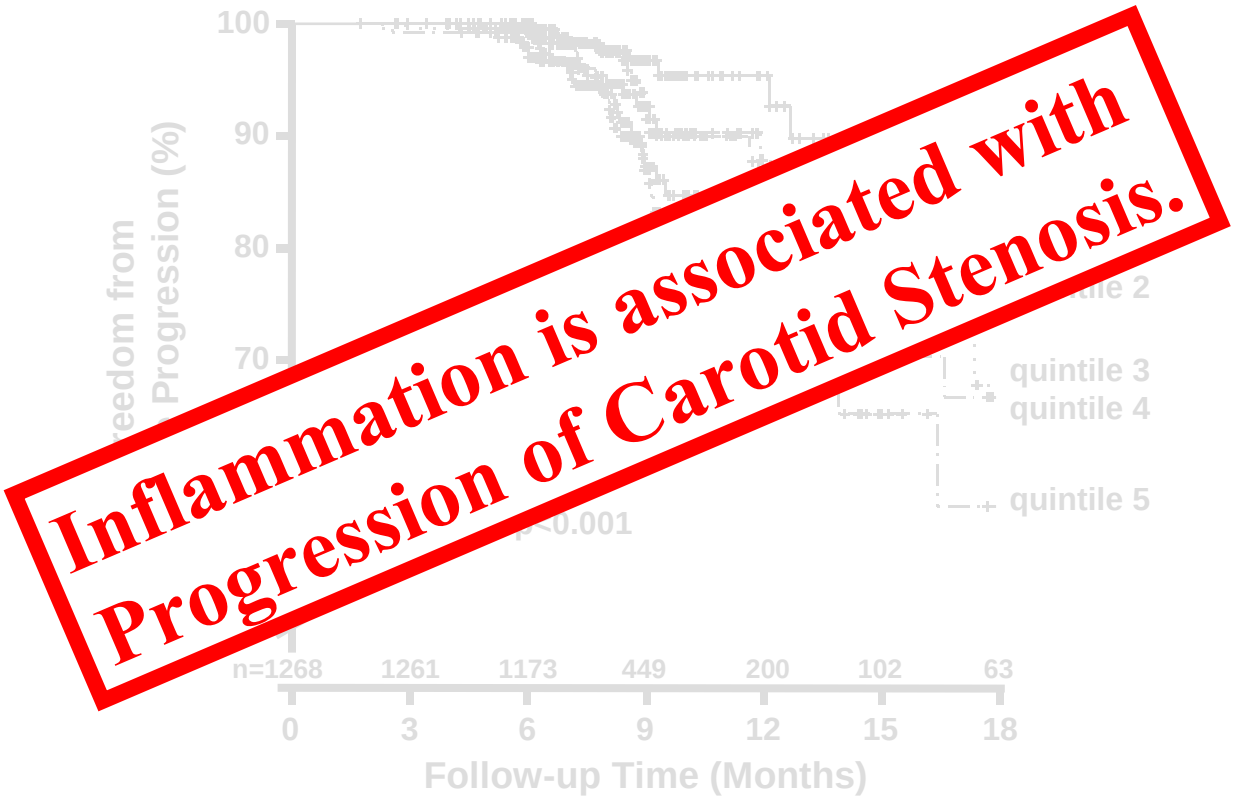
Inflammation and Disease Progression



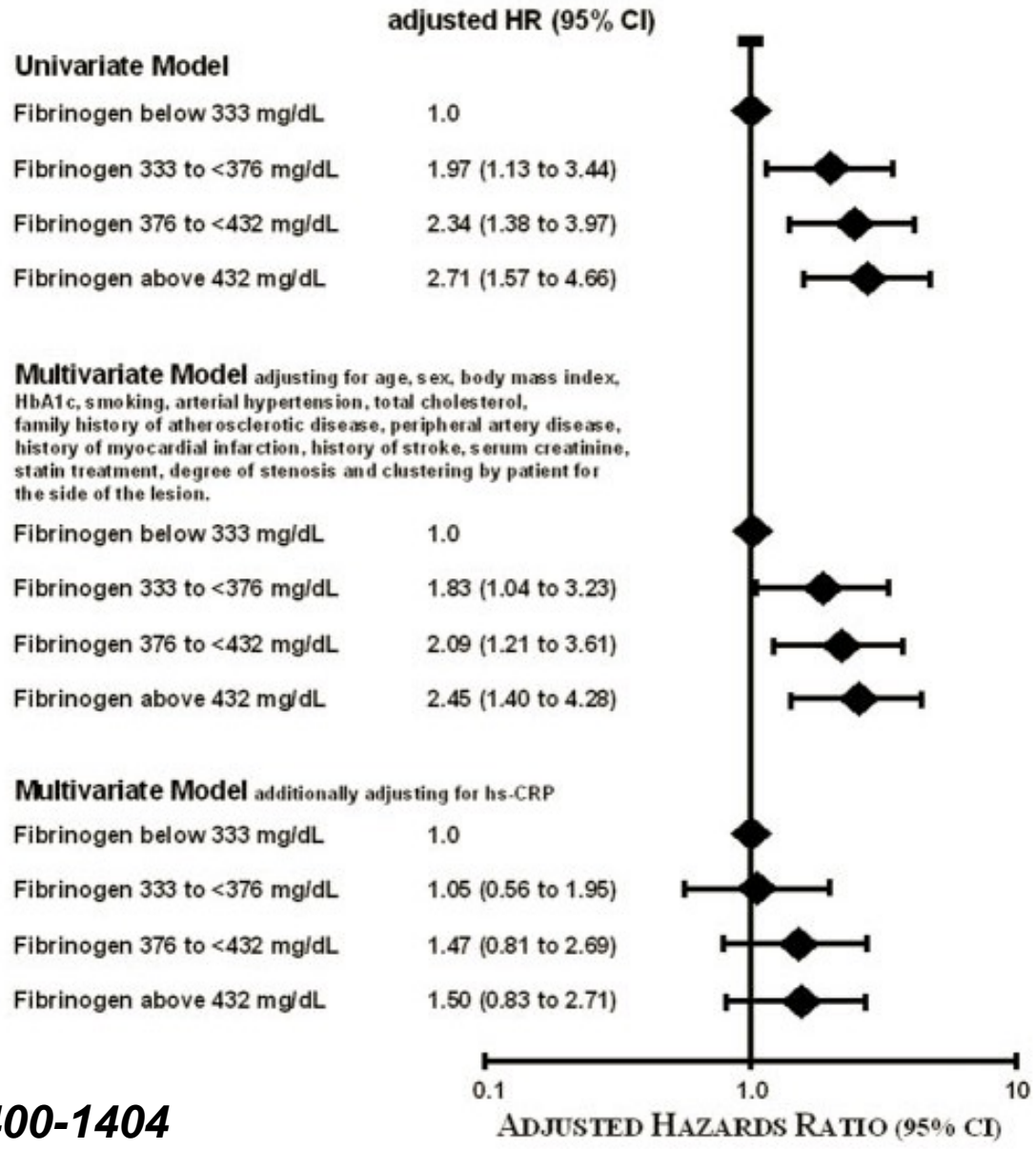
Fibrinogen

Fibrinogen plays a pivotal role in the initial phase and the advanced stages of atherosclerosis.

Large population-based studies such as the Copenhagen city study (N=8755) and the Gothenburg Study (N=792) unequivocally demonstrated an increasing risk for future stroke with increasing levels of fibrinogen,

Plaque composition of patients with elevated fibrinogen levels is characterized by the presence of a high number of inflammatory cells localized mainly in the shoulder and in the cap of the plaque.
(*Mauriello et al; Circulation 2000;101:744 –750***)**

Risk for Progression of Carotid Atherosclerosis



Stroke 2005;36:1400-1404

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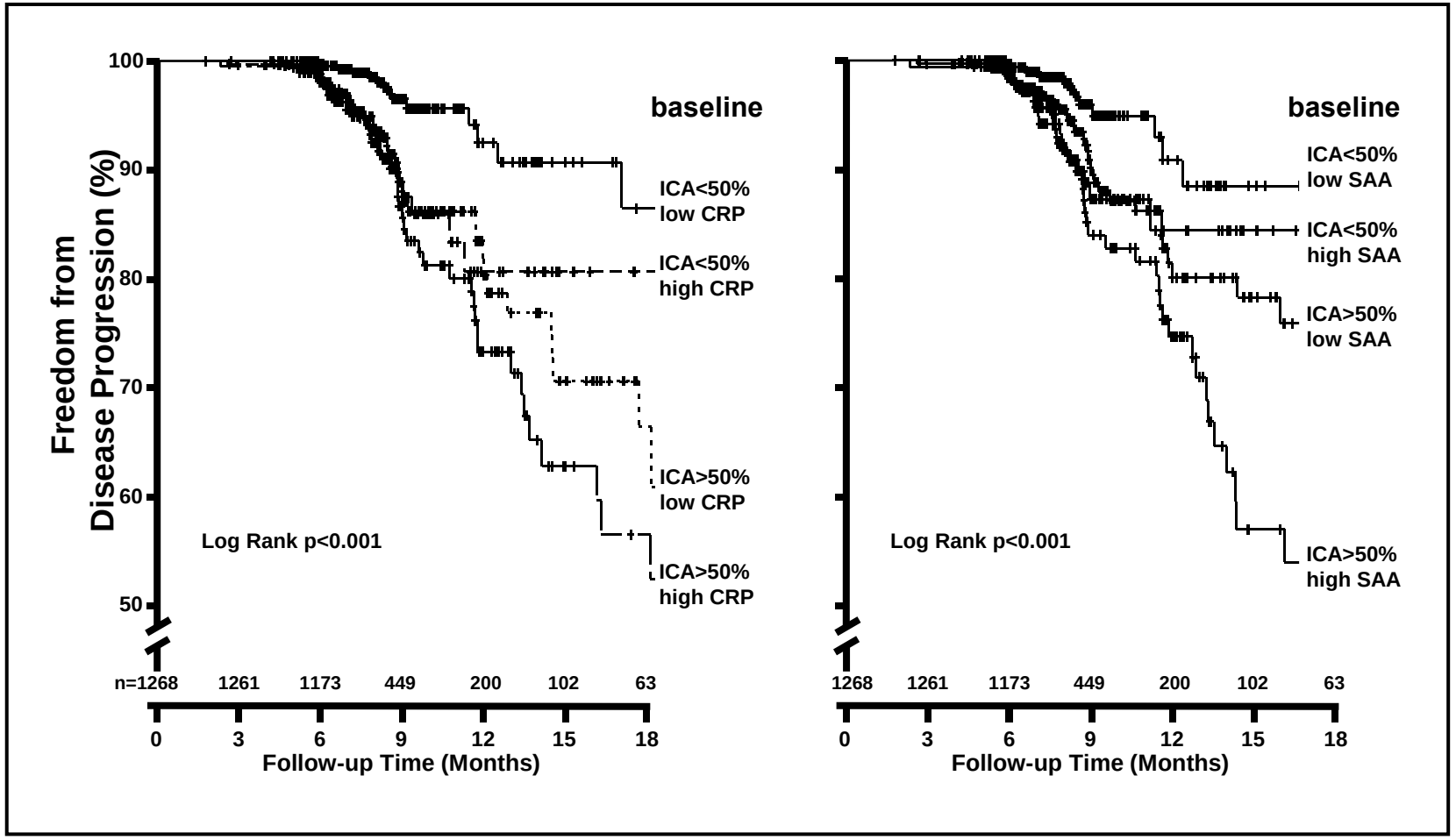
Inflammation, Degree of Stenosis and Disease Progression



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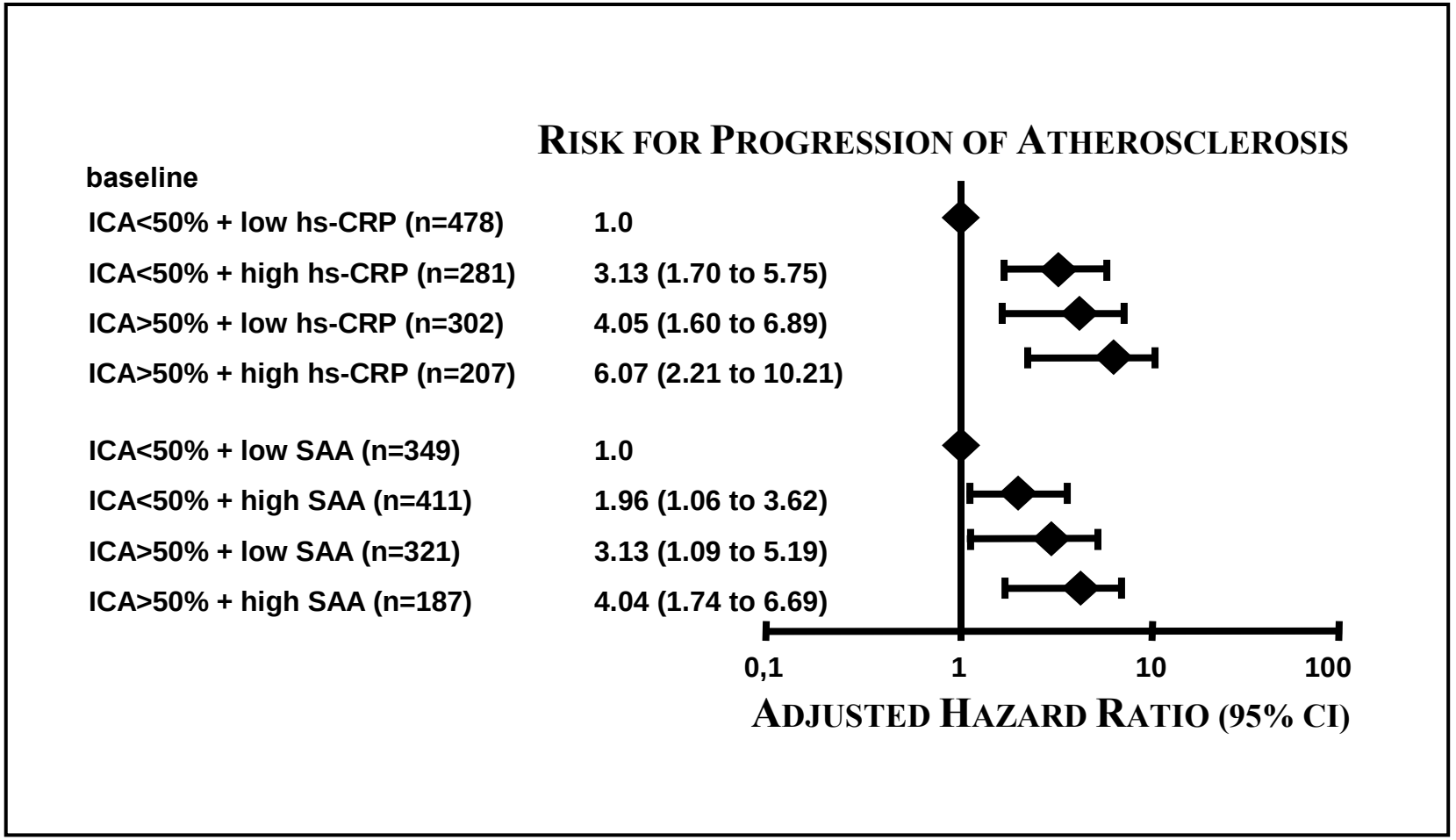

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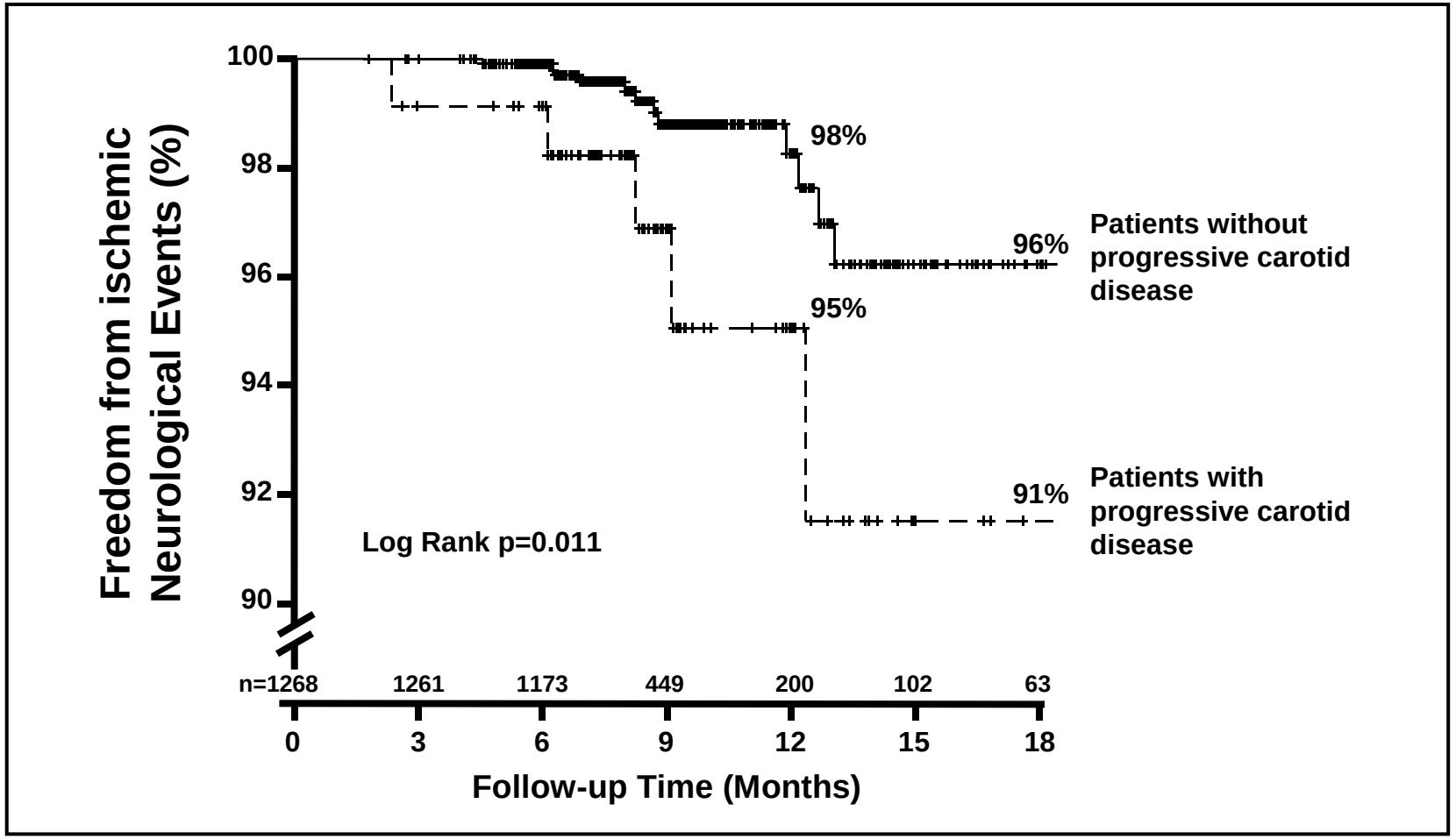
Neurological Events



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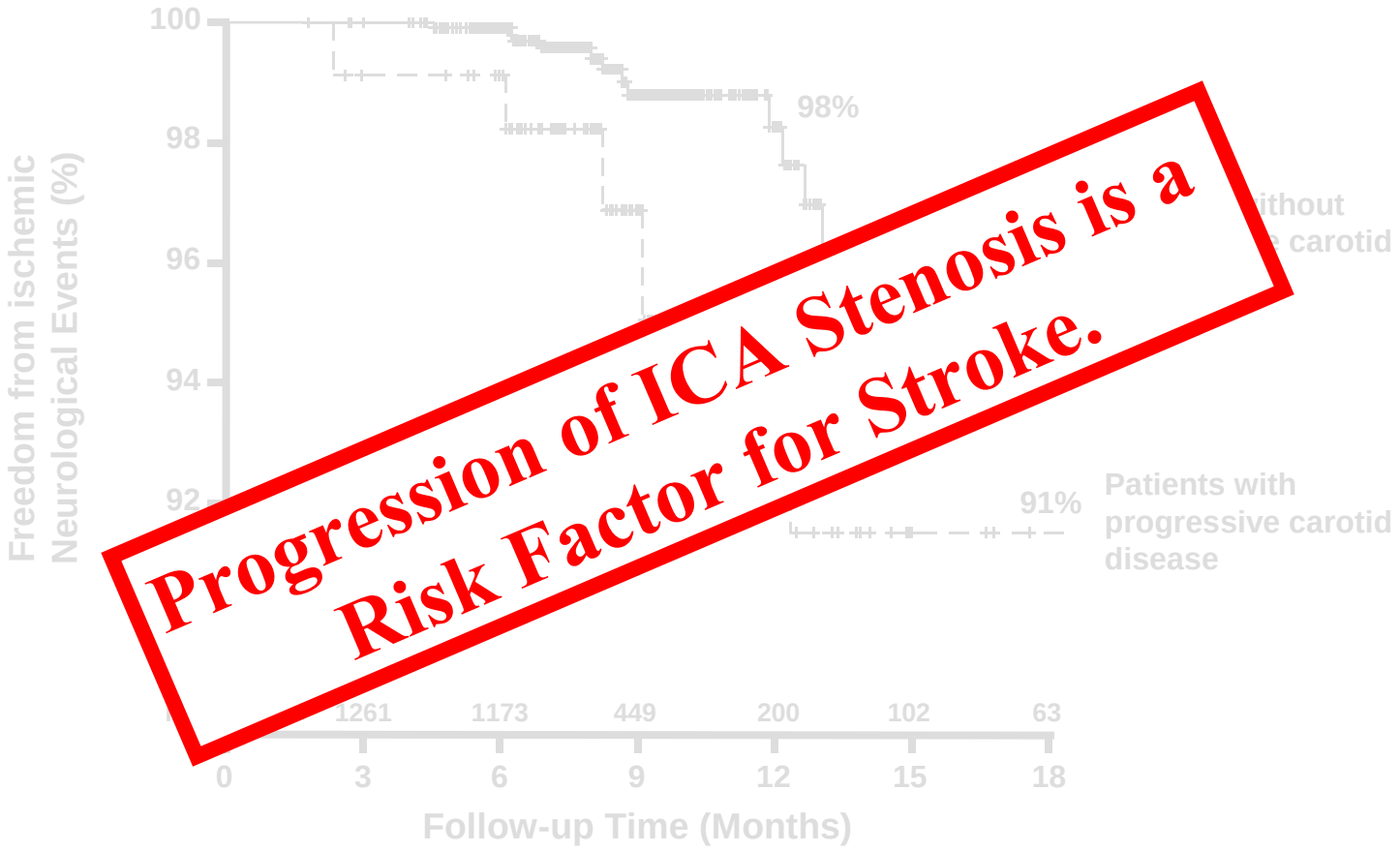

Progression of ICA Stenosis is a Risk Factor for Stroke.

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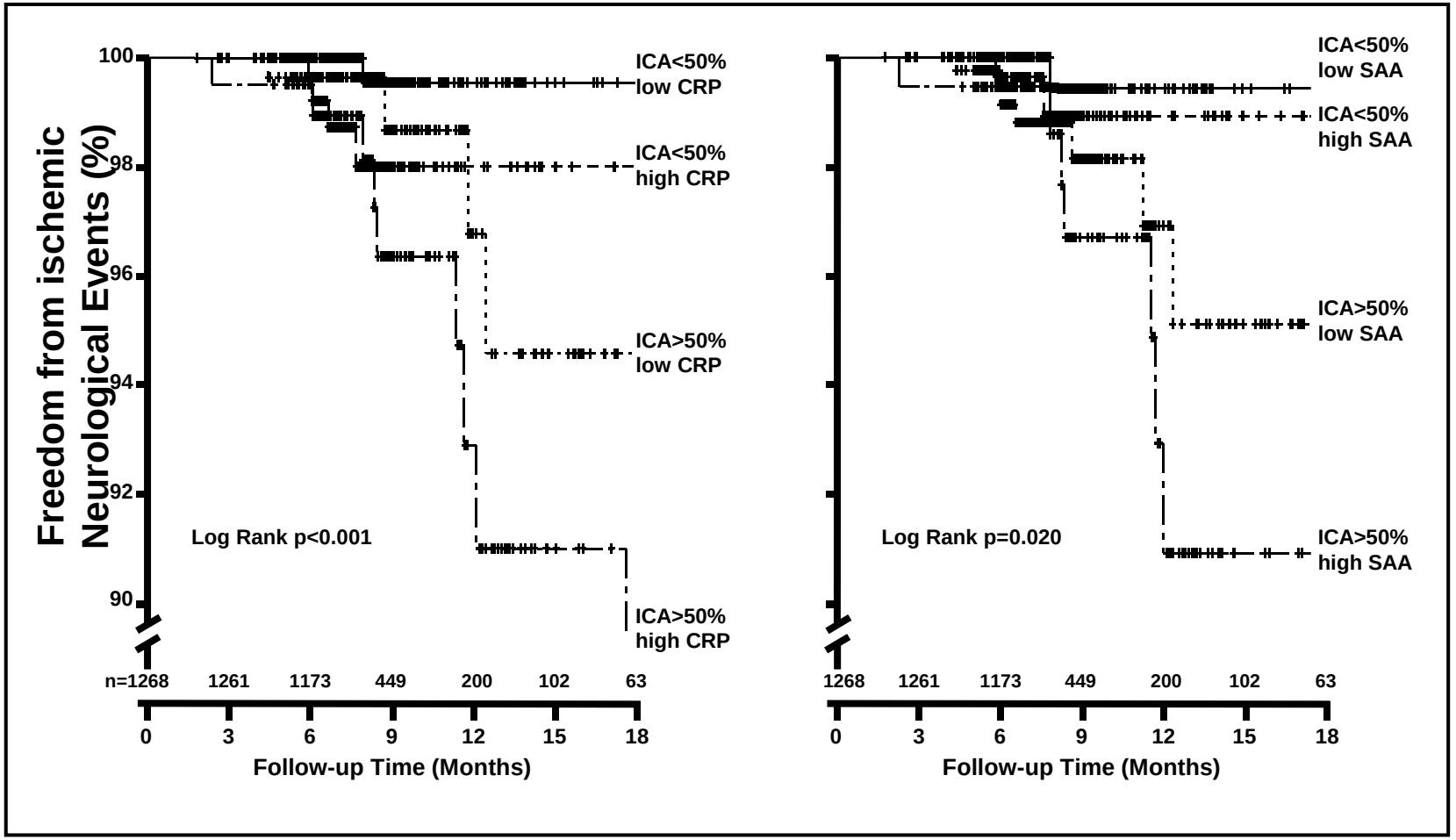
Inflammation, Degree of Stenosis and Neurological Events



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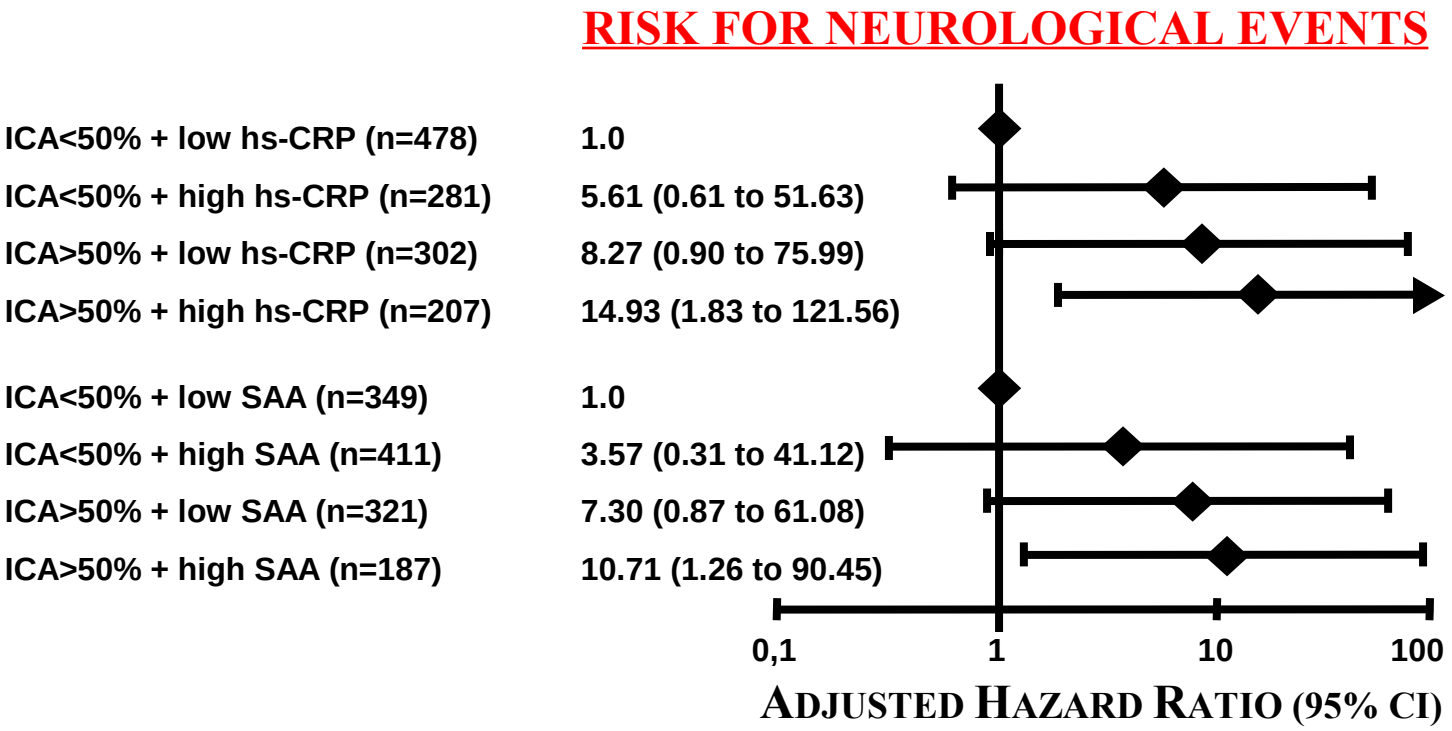

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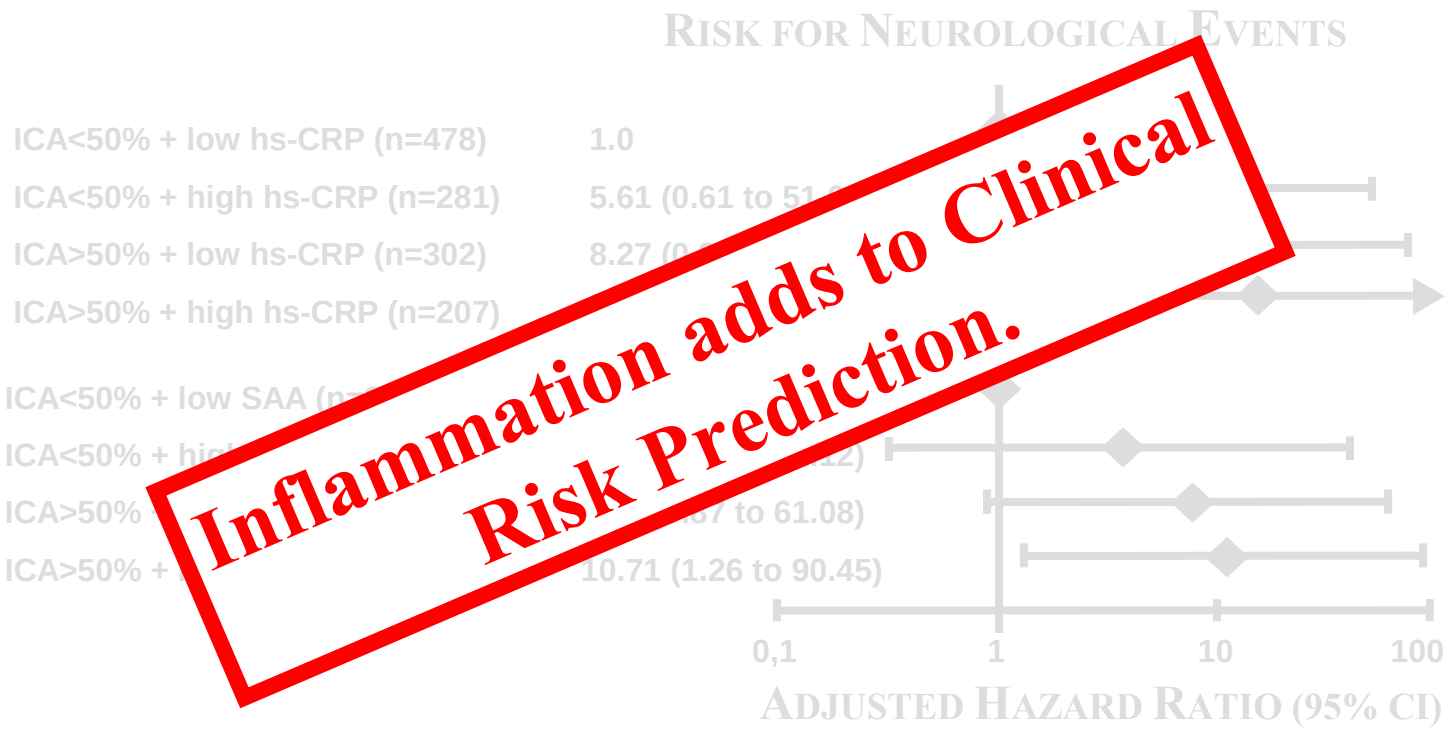

Inflammation adds to Clinical Risk Prediction.

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Conclusions

- ✓ **Inflammation is associated with disease progression in atherosclerotic carotid arteries.**
- ✓ **Inflammation adds to clinical risk prediction for neurological events.**