MINIMAL RENAL ARTERY DIAMETER IMPROVES RISK PREDICTION OF CARDIOVASCULAR EVENTS WHEN ADDED TO STANDARD RISK FACTORS IN PATIENTS WITH ISCHEMIC HEART DISEASE AND NON-SIGNIFICANT RENAL ARTERY STENOSYS (RAS 10-70%)

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Introduction and Aim

Recently, our group reported for the first time that small renal arteries, defined by a low reference diameter (RD<5.2mm) or minimal luminal diameter (MD<2.9mm), are independently associated with low GFR and resistant hypertension. The prognostic role of renal artery diameter was never tested before.

We aimed to test whether the renal artery diameter could impact the prognosis of patients with ischemic heart disease independently of major confounders

Methods

Renal artery diameters were measured as reported in Fig.1. We used proportional hazards models to analyse the first-onset of cardiovascular events (myocardial infarction, coronary stent implantation, heart failure, stroke and cardiac death) in relation with RD in all participants (n=623; mean age, 64 years; 29% women), and RD, MD or percentage of stenosis in those (n=181) with low-to-moderate renal artery stenosis (RAS 10-70%).
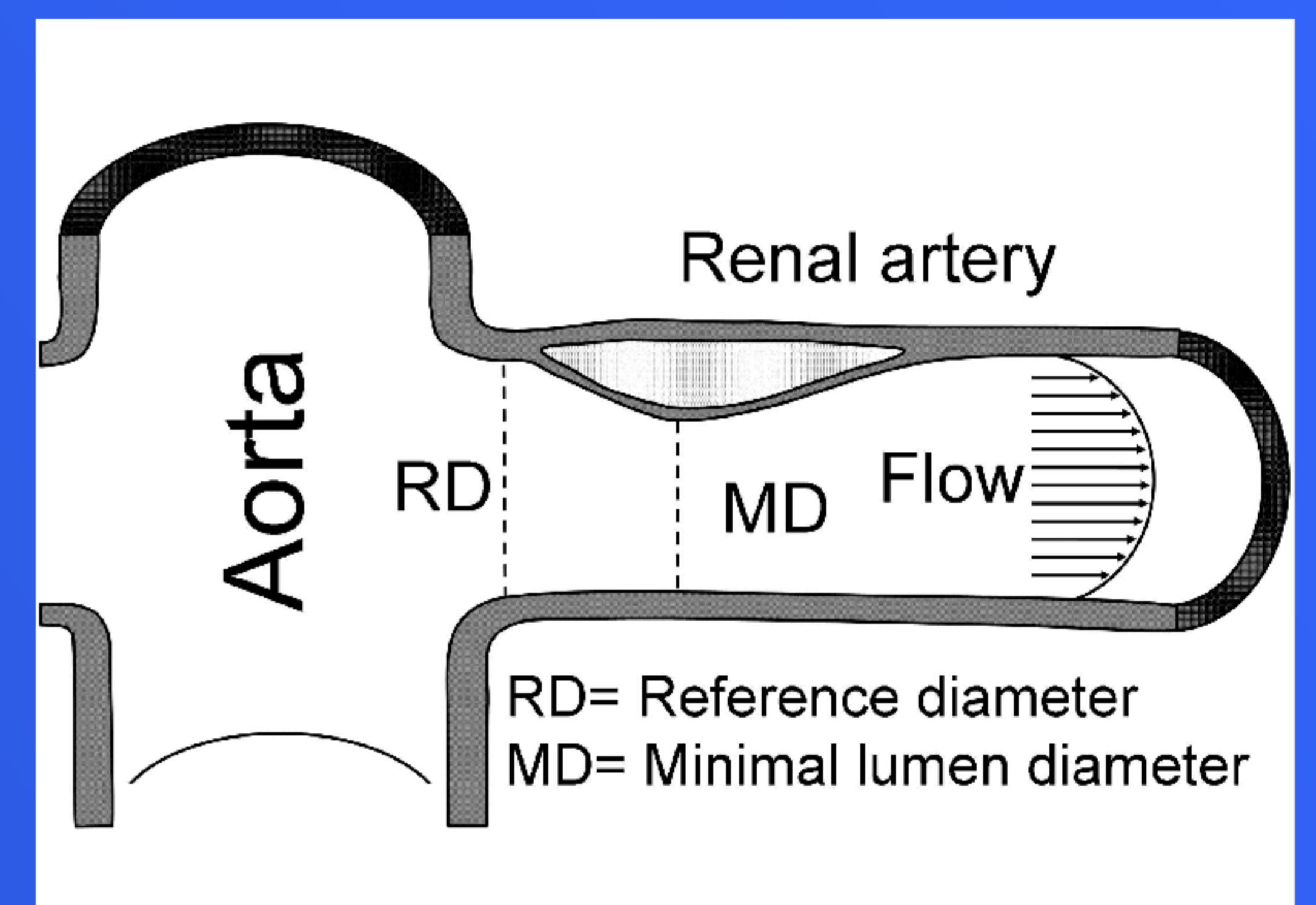

Fig.1. Renal artery diameters measurements.

RD= Reference diameter
MD= Minimal lumen diameter

Results

During median follow-up of 4.5 (range, 0.1-5) years, 27.8% participants experienced a CVD event (35.4% in those with RAS 10-70%).

In all participants, the adjusted HR for RD<5.2mm to be associated with cardiovascular events was 1.41 (95% CI: 1.01-1.47; P=0.045) (Fig.2).

In subjects with RAS 10-70%, those with MD<2.9mm were associated with higher risk of cardiovascular events (Fig.2). The adjusted HR for MD<2.9mm to be associated with cardiovascular events was 2.45 (95% CI: 1.40-4.28; P=0.002). When MD was added to a standard risk factor model, discrimination improvement was 2.2% (from 72.2% to 74.4%).

Fig.2. Panel A-E: Kaplan–Meier plot of cumulative probability of a first cardiovascular event in all subjects (n=623, Panel A-B) and in those with low-to-moderate renal artery stenosis (n=181, Panel C-E).

Panel F: Kaplan–Meier plot of cumulative probability of fatal cardiovascular event in subjects with low-to-moderate renal artery stenosis (n=181). MD, minimal renal artery diameter; RD, reference renal artery diameter; RAS, renal artery stenosis.
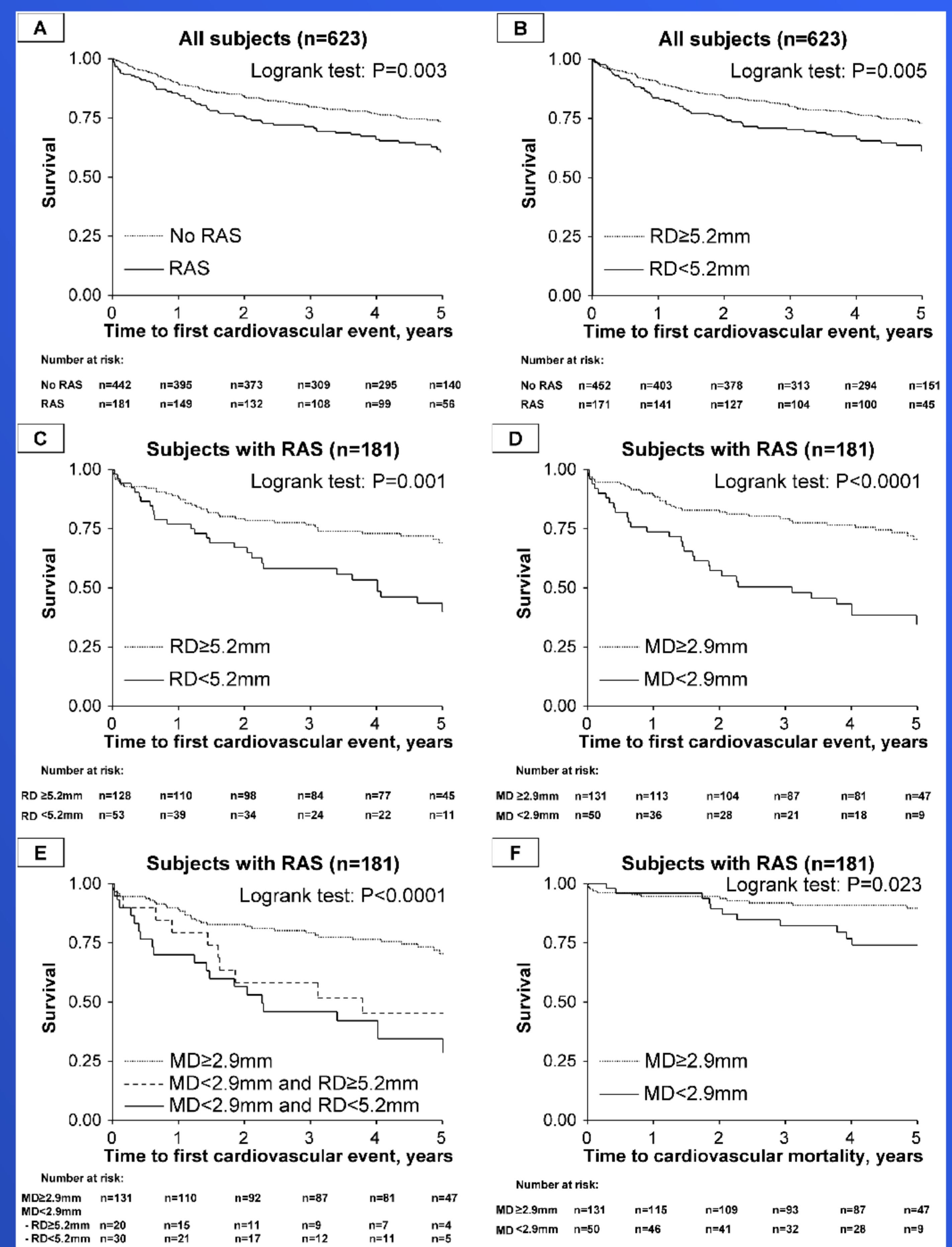
Conclusions

In patients with ischemic heart disease and RAS 10-70%, MD<2.9mm was a significant predictor of cardiovascular events, improves risk prediction and may represent a valuable biomarker of cardiovascular disease risk.

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