Purpose: Systemic endothelial dysfunction is a postulated pathogenic mechanism in diabetic retinopathy (DR). The aim of this study was to determine associations between diabetic retinopathy (DR), and systemic vascular endothelial function measured using reactive hyperemia peripheral arterial tonometry. Methods: This was a prospective observational clinical study. Subjects with diabetes were recruited and DR was graded from retinal photographs. Systemic endothelial function and peripheral arterial stiffness were measured using reactive hyperemia peripheral arterial tonometry (EndoPAT) and expressed as the Reactive Hyperemia Index (RHI) and Augmentation Index (AI) respectively. Results: In total, 164 eyes of 82 Chinese patients with DR were evaluated. The mean age of the subjects was 60.8±8.5 years and the majority were male (78%). The mean duration of diabetes was 13.9±10.3 years and the mean HbA1c level was 7.7±1.4%. In age-gender adjusted models, increasing severity of DR was associated with an increasing trend of mean RHI (p = 0.001) and mean AI (p=0.001). In multivariate adjusted models with smoking, mean diabetes duration, HbA1c, hypertension and hyperlipidemia as covariates, the association with RHI was no longer statistically significant (p = 0.06) but persisted for AI (p = 0.004). AI but not RHI was a significant predictor of vision threatening DR(p=0.006). Conclusion: Subjects with more severe DR demonstrated a trend of higher peripheral reactive hyperemic responses and greater peripheral arterial stiffness. Our findings suggest that the severity of DR may be associated with measurable differences in systemic endothelial function, supporting a role for the latter in the pathogenesis of DR.