

AGE Reader™ Publication List

Simple noninvasive measurement of skin autofluorescence.

Meerwaldt R, et al.

Ann N Y Acad Sci. 2005;1043:290-298.

Instrumentation for the measurement of autofluorescence in the human skin

Graaff R et al,

Proc. of SPIE Vol. 5692 (SPIE, Bellingham, WA, 2005). pp. 111-118.

Skin autofluorescence is a strong predictor of cardiac mortality in diabetes

Meerwaldt R, et al.

Diabetes Care 2007, 30: 107-112

Skin autofluorescence, a measure of cumulative metabolic stress and advanced glycation endproducts, predicts mortality in hemodialysis patients.

Meerwaldt R, et al.

J Am Soc Nephrol 2005;16:3687-93.

Advanced glycation endproducts in kidney transplant patients: a putative role in the development of chronic renal transplant dysfunction.

Hartog J. et al.

Am J Kidn Dis 2004; 43:966-975

Skin Autofluorescence, a Novel Marker for Glycation and Oxidative Stress derived Advanced Glycation Endproducts. An Overview of Current Clinical Studies, Evidence and Limitations.

Mulder DJ, et al.

Diabetes Technology and Therapeutics 2006, in press.

Skin Autofluorescence is a Non-invasive Marker for Inflammatory Stress in Stable Coronary Artery Disease

Mulder DJ. et al.

Atherosclerosis 2007, in press.

Skin Autofluorescence is an independent marker for Acute Myocardial Infarction

Mulder DJ, et al.

Circulation, AHA 2005 abstract.

Risk factors for chronic transplant dysfunction and cardiovascular disease are related to accumulation of advanced glycation end-products in renal transplant recipients.

Hartog JW, et al.

Nephrol Dial Transpl 2006;epub.

Skin autofluorescence as a noninvasive marker of vascular damage in patients with type 2 diabetes.

Lutgers H, et al.

Diabetes Care. 2006 Dec;29(12):2654-9

Increased accumulation of skin advanced glycation end-products precedes and correlates with clinical manifestation of diabetic neuropathy.

Meerwaldt R, et al.

Diabetologia. 2005;48:1637-44.

Simple non-invasive assessment of advanced glycation endproducts accumulation

Meerwaldt R et al,

Diabetologia 2004; 47:1324-1330

Skin autofluorescence as a non-invasive marker of vascular damage in patients with type 2 diabetes

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Diabetes Care, 2006 Dec; 29(12):2654-9.

OBJECTIVE:

Advanced glycation end products (AGEs) are thought to have a role in the pathogenesis of diabetes complications. We recently reported the association between skin autofluorescence, as a measure of tissue AGE accumulation, and diabetic neuropathy in a selected diabetic population.

In this study, we investigated the relation between skin autofluorescence and clinical variables including micro- and macrovascular complications in a type 2 diabetes primary care population.

RESEARCH DESIGN AND METHODS:

Clinical data and skin autofluorescence were obtained in the type 2 diabetes group (n = 973) and in a control group (n = 231). Skin autofluorescence was assessed by illumination of the lower arm with a fluorescent tube (peak intensity approximately 370 nm).

RESULTS:

Skin autofluorescence was significantly higher in type 2 diabetic patients compared with control subjects in each age category. Multiple regression analysis showed significant correlation of skin autofluorescence with age, sex, diabetes duration, BMI, smoking, HbA1c, plasma creatinine, HDL cholesterol, and albumin-to-creatinine ratio in the type 2 diabetes group (R² = 25%) and with age and smoking in the control group (R² = 46%).

Skin autofluorescence was significantly higher in the type 2 diabetes group, with both micro- and macrovascular disease, compared with the group without complications and the group with only microvascular complications.

CONCLUSIONS:

This study confirms in a large group of type 2 diabetic patients that skin autofluorescence is higher compared with age-matched control subjects and is associated with the severity of diabetes-related complications.

Skin autofluorescence reflecting vascular damage might be a rapid and helpful tool in the diabetes outpatient clinic for identifying diabetic patients who are at risk for developing complications.

Skin Autofluorescence, a Measure of Cumulative Metabolic Stress and Advanced Glycation End Products, Predicts Mortality in Hemodialysis Patients

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Tissue advanced glycation end products (AGE) are a measure of cumulative metabolic stress and trigger cytokines driven inflammatory reactions. AGE are thought to contribute to the chronic complications of diabetes and ESRD. Tissue autofluorescence is related to the accumulation of AGE. Therefore, skin autofluorescence (AF) may provide prognostic information on mortality in hemodialysis (HD) patients. Skin AF was measured noninvasively with an AF reader at baseline in 109 HD patients. Overall and cardiovascular mortality was monitored prospectively during a period of 3 yr. The AF reader was validated against AGE contents in skin biopsies from 29 dialysis patients. Forty-two of the 109 (38.5%) HD patients died. Cox regression analysis showed that AF was an independent predictor of overall and cardiovascular mortality (for overall mortality odds ratio [OR] 3.9), as were pre-existing cardiovascular disease (CVD; OR 3.1), C-reactive protein (OR 1.1), and serum albumin (OR 0.3). Multivariate analysis revealed that 65% of the variance in AF could be attributed to the independent effects of age, dialysis and renal failure duration, presence of diabetes, triglycerides levels, and C-reactive protein. AF was also independently linked to the presence of CVD at baseline (OR 8.8; $P < 0.001$). AF correlated with collagen-linked fluorescence ($r = 0.71$, $P < 0.001$), pentosidine ($r = 0.75$, $P < 0.001$), and carboxy(m)ethyllysine (both $r = 0.45$, $P < 0.01$). Skin AF is a strong and independent predictor of mortality in ESRD. This supports a role for AGE as a contributor to mortality and CVD and warrants interventions specifically aimed at AGE accumulation.

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