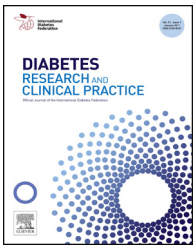
Contents available at Sciverse ScienceDirect

Diabetes Research and Clinical Practice

journal homepage: www.elsevier.com/locate/diabres

International Diabetes Federation



Euglycemic progression: Worsening of diabetic retinopathy in poorly controlled type 2 diabetes in minorities

A. Shurter, P. Genter, D. Ouyang, E. Ipp *

Department of Medicine, Los Angeles Biomedical Research Institute at Harbor-UCLA Medical Center, United States

ARTICLE INFO

Article history:
Received 17 November 2012
Received in revised form
13 February 2013
Accepted 6 March 2013
Published on line 6 April 2013

Keywords:
Diabetic retinopathy
Intensified glycemic control
Case management
Euglycemia
Minority populations

ABSTRACT

Aims: In type 2 diabetes, early effects of strict near-normalization of glucose control on macrovascular and microvascular disease are still uncertain. We evaluated the effects of early dramatic improvement in glycemia on retinal disease in poorly controlled diabetes.
Methods: A retrospective, case–control study in public hospital patients with type 2 diabetes, who had annual retinal imaging as part of a case management program or standard diabetes care. Patients included had ≥2 two retinal images ≥1 one year apart, and at least 3 HbA1C measurements. Retinal images were graded using a modified Scottish Diabetic Retinopathy grading scheme. An 'intensive' group ($n = 34$) with HbA1C decrease >1.5% was compared with randomly chosen patients ($n = 34$) with minimal HbA1C changes.
Results: Mean HbA1 C (±SEM) over two years was similar in intensive ($8.5 \pm 0.21\%$) and control groups ($8.1 \pm 0.28\%$, p = NS). However, the intensive group had higher baseline HbA1C and a mean maximal decrease of $4.0 \pm 0.41\%$ in contrast to the control group ($0.2 \pm 0.11\%$). Retinopathy grade progressed $+0.7 \pm 0.25$ units from baseline in the intensive group ($p = 0.015$), a 22.6% worsening. The control group changed minimally from baseline (0.03 ± 0.14 units, p = NS). Change in retinopathy grade was significantly different between groups ($p = 0.02$). More eyes worsened by ≥1 retinal grade ($p = 0.0025$) and developed sight-threatening retinopathy ($p = 0.003$) in the intensive group. Visual acuity was unchanged.
Conclusions: Diabetic retinopathy significantly worsened in poorly controlled type 2 diabetes after early intensification of glycemic control and dramatic HbA1C change. Retinal status should be part of risk-factor evaluation in patients likely to experience marked reductions in HbA1C in poorly controlled diabetes.

© 2013 Elsevier Ireland Ltd. All rights reserved.

Excellent glycemic control is a major clinical target for patients with diabetes since the first unequivocal evidence for its efficacy in delaying and preventing microvascular disease [1,2]. Recommendations for improving glycemic control are based on evidence of its beneficial effect, limited only by the risks of hypoglycemia, which are increased with tight glycemic control [3]. Evidence to the contrary, i.e., that introducing tight glycemic control may also have deleterious effects, was also recognized in early trials, and evidence suggested this was a transient phenomenon [4]. An initial deterioration in retinal findings during intensive therapy in the diabetes control and complications trial (DCCT) was observed in Type 1 patients with

* *Corresponding author at*: David Geffen School of Medicine at UCLA, Section of Diabetes and Metabolism, Harbor-UCLA Medical Center, Box 16, 1000 West Carson Street, Torrance, CA 90509, United States. Tel.: +1 310 222 2503; fax: +1 310 533 6972.
E-mail address: ipp@labiomed.org (E. Ipp).

Abbreviations: HbA1C, hemoglobin A1c; DCCT, diabetes control and complications trial; CVD, cardiovascular disease; UKPDS, United Kingdom Prospective Diabetes Study; ACCORD, Action to Control Cardiovascular Risk in Diabetes.

Abbreviations: I, intensive group; C, control group; mos, months.

0168-8227/$ – see front matter © 2013 Elsevier Ireland Ltd. All rights reserved.
http://dx.doi.org/10.1016/j.diabres.2013.03.018

pre-existing retinopathy, but this improved if tight glycemic control was maintained over time [4].

Less is known about the possible deleterious effect of the induction of tight glycemic control in type 2 diabetes; especially with respect to the effect of rapid lowering of HbA1C. Retinopathy may progress [5] and a recent report indicated that patients with pre-existing cardiovascular disease (CVD)may respond poorly to the imposition of tight glycemic control [6]. The ACCORD study of type 2 diabetic patients with, or at-risk for, CVD was halted prematurely in response to increased cardiac mortality associated with near-normalization of HbA1C [6,7]. Thus, accumulating data support the contention that some patients with type 1 and type 2 diabetes are potentially at risk for worsening of diabetes complications when intensive glycemic control is initiated [8].

This phenomenon may be of particular concern in patients with poor glycemic control in whom large changes in HbA1C can occur during induction of tight control regimens, even if target values are not achieved. This setting is common in minority and indigent populations with poor access to medical care, where elevated HbA1C levels are common and micro and/or macro vascular complications of diabetes in patients with long-standing disease is frequently observed [9,10]. The feasibility of initiating and maintaining glycemic control in these populations has been demonstrated [11–13], raising the possibility that these patients may be at risk for an initial 'euglycemic progression' of complications when rapid and substantial improvement in glycemic control is successful. We tested this hypothesis in a group of predominantly minority patients with poor control entered into a successful case management program [11,12] in a public hospital setting.

1. Research design and methods

This is a retrospective study of retinal images in patients who participate in the Diabetes Program at Harbor-UCLA Medical Center. All patients with diabetes are offered annual retinal screening using photography, as part of their standard diabetes management. In addition, many of these patients are offered access to a Diabetes Case Management Program designed to assist patients in achieving their glycemic and other management goals [11,12]. Subjects for this study were patients who participated in the Diabetes Program and who had retinal images during the period studied, and many of whom participated in the Case Management Program as well. This project was part of a protocol approved by the Institutional Review Board at the LA Biomedical Research Institute.

1.1. Inclusion and exclusion criteria

Patients were included in the study if they fulfilled the following criteria: (1) diagnosis of type 2 diabetes, (2) age of at least 18 years, (3) documentation of at least two sets of retinal images at least one year apart, (4) measurement of HbA1C at the time of each set of retinal images (±3 months) and (5) documentation of at least one additional HbA1C measurement between the first and last retinal images. Exclusion criteria included (1) diagnosis of type 1 diabetes, (2) lack of at least two sets of retinal images, (3) lack of HbA1C close to either set of images and/or one between, (4) patient follow-up of less than one year. Patients with bilateral ungradeable retinal images were also excluded from this study.

1.2. Study design

We selected patients from our Case Management Program who met criteria for the study based on available image sets, presence of corresponding HbA1C measurements and minimum length of follow-up. In addition, we required that patients either achieve HbA1C $\leq$ 7.5% or demonstrate a decrement >1.5% in HbA1C levels in response to case management. This group was called the intensive therapy group; thirty-four patients fulfilled entrance criteria as well as the additional criterion for improved glycemic control.

A control group was derived from patients in our standard Diabetes Program who had been referred for retinal imaging between September 2005 and August 2007. We reviewed the records of 1106 patients who had retinal images in order to find 34 controls that met the entrance criteria listed above as well as an additional criterion that limited the maximum HbA1C decrement between images to <1.5%. This was designed to limit overlap between the intervention and control groups.

We also obtained information regarding blood pressure, serum creatinine, and serum lipids. The lipid panel consisted of total serum cholesterol, LDL cholesterol, HDL cholesterol and triglycerides obtained after a 10 h fast. The data was obtained within a 3-month window before or after the baseline retinal image and again around the time of the second set of retinal images.

1.3. Retinal imaging

All patients included in this study had at least two sets of retinal images. These are single-field images that capture the disc and the area of the retina lateral to it, including the macula. Bilateral images were obtained using a 45° Canon non-mydriatic digital retinal camera (Canon CR6-45NM, Japan). Four patients (of a total of 68 patients in both groups) had images obtained using a Polaroid retinal camera (Canon CR4-45NM). All images were obtained under dilated conditions. Each image was analyzed and graded in a blinded fashion by an independent reader using a modified Scottish Diabetic Retinopathy Grading Scheme [14,15]. The grading scale was quantified using units assigned to each eye based on level of retinal disease present, as follows: no detectable retinopathy – 1 unit; minimal retinopathy – 2 units; moderate retinopathy – 3 units; severe retinopathy – 4 units; proliferative retinopathy or clinically significant macular edema – 5 units. A maximum of 5 units could be assigned per eye and each eye was assigned a grade dependent on the highest scoring pathology present in that eye. The assigned grade for each eye was combined to provide a composite score with a maximum of 10 units. The independent reader was unaware of any identifying information pertaining to each set of images and was also unaware of assignment to intensive or standard-control groups.

Download English Version:

https://daneshyari.com/en/article/2796755

Download Persian Version:

https://daneshyari.com/article/2796755

Daneshyari.com