Editorial

Corneal confocal microscopy for the assessment of diabetic neuropathy and beyond in Brazil

Microscopia confocal da córnea para a avaliação de neuropatia diabética no Brasil

Rayaz A. Malik¹,²

¹Weill Cornell Medicine-Qatar, Education City, Qatar Foundation, Doha, Qatar.
²University of Manchester, Division of Cardiovascular Sciences, Manchester, United Kingdom.


The study by Pupe et al.¹ is the first paper from Brazil and indeed South America showing that corneal confocal microscopy (CCM) can identify small nerve fiber damage and increased Langerhans cells in patients with diabetic neuropathy. Despite the inclusion of only 35 patients with diabetes and overall good glycemic control, corneal nerve loss was evident in patients with ‘mild neuropathy’ based on symptoms and nerve conduction, which progressively worsened with increasing severity of the diabetic neuropathy. Furthermore, corneal nerve fiber loss correlated with the severity of neuropathy assessed using NDS and fibular nerve conduction velocity.

Our pioneering study² published in 2003 in Manchester, United Kingdom, also showed that CCM could be used to identify early nerve damage in subclinical diabetic neuropathy, which presented a progressive worsening in patients with moderate and severe diabetic neuropathy. A Web of Science search on June 30th, 2022, with corneal confocal microscopy and diabetic neuropathy as the primary terms, returned 470 publications from Europe, Canada, Australia, Japan, China and now Brazil. We have recently undertaken a systematic review and metaanalysis³ including 38 studies and over 4,000 patients with diabetes which showed that CCM identifies corneal nerve fiber loss in patients with subclinical and clinical diabetic neuropathy.

We have previously shown that corneal nerve loss has a diagnostic utility comparable to that of intraepidermal nerve fiber density in patients with diabetic neuropathy.⁴ In a large multi-center study funded by the National Institutes of Health (NIH), we con

consistent with the study by Pupe et al.,³ early subclinical corneal nerve loss has been shown in children with type-1 diabetes,⁷ and subjects with impaired glucose tolerance⁸ and recently-diagnosed type-2 diabetes.⁹ Normative values for corneal nerves have been established, and they show a small age-dependent decrease but no impact of height, weight, or body mass index (BMI).¹⁰ This is reassuring, as the study by Pupe et al.¹ showed corneal nerve loss in patients with diabetic neuropathy, despite the controls being significantly older. In our recent study¹¹ of 490 participants with diabetes, corneal nerve loss was associated with low-density lipoprotein (LDL) cholesterol and triglycerides values in type-1 diabetes, and with age, weight and hemoglobin A1c (HbA1c) in type-2 diabetes. This suggests that treating these modifiable risk factors may lead to nerve regeneration.

We have shown that simultaneous pancreas and kidney (SPK) transplantation in patients with type-1 diabetes normalized HbA1c and was associated with corneal nerve regeneration after 6 months, with an improvement in neuropathic symptoms after 24 months and nerve conduction after 36 months.¹² We have also shown evidence of corneal nerve regeneration after bariatric surgery in obese subjects with¹³ and without¹⁴ diabetes. In a randomized clinical trial,¹⁵ a weekly glucagon-like peptide-1 (GLP-1) agonist with pioglitazone or basal bolus insulin led to an ~ 3% improvement in HbA1c and was associated with corneal nerve regeneration over 12 months, but with no change in vibration perception or sudomotor function. Two recent trials¹⁶,¹⁷ with omega-3 fatty acid in patients with type-1 diabetes have demonstrated corneal nerve regeneration...
Corneal confocal microscopy for the assessment of diabetic neuropathy and beyond in Brazil


Conflict of Interest
The author has no conflict of interests to declare.

References