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Introduction

The pathogenesis of diabetic retinopathy is poorly understood. Neuroretinopathy is increasingly being recognized as an independent cause of vision loss in diabetes. However the temporal relationship of diabetic neuroretinopathy to vascular diabetic retinopathy (DR) is unclear. Visual field loss, as detected by frequency doubling technology (FDT)-based visual perimetry, is a sign of neuroretinopathy and occurs in early stages of DR. Here, we hypothesized that FDT visual field testing could identify patients with diabetic neuroretinopathy in the absence of clinically detectable microvascular DR.

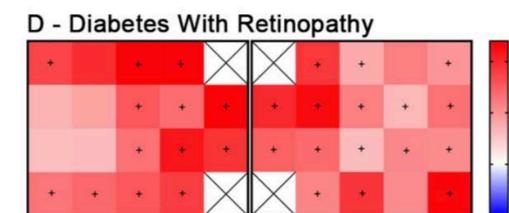
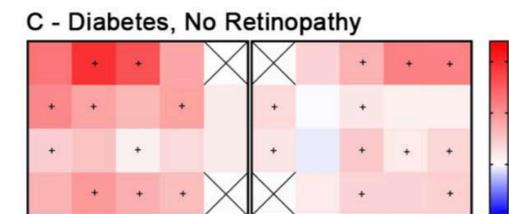
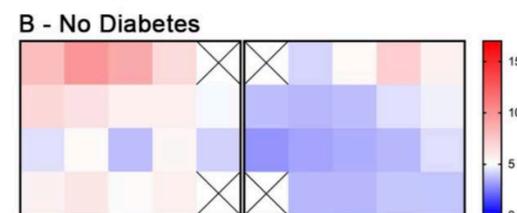
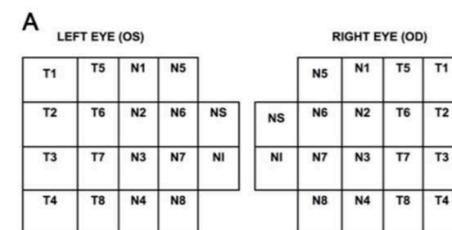
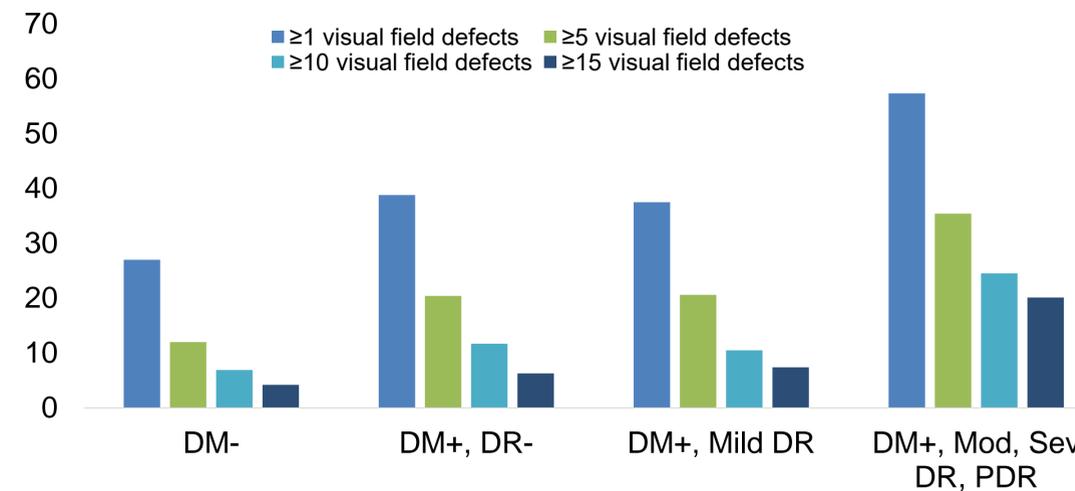
Methodology

Data were gathered from the National Health and Nutrition Examination Survey (NHANES). Patients with self-reported glaucoma, or determination of glaucoma based on disk features were excluded. Visual fields were screened using a FDT protocol in which patients underwent a 19 subfield suprathreshold test (N-30-5 Humphrey Matrix FDT, Zeiss). Patients were grouped based on reading center-based DR assessment. The number of subfield defects was tallied for each patient.

Results

	DM-	DM+, DR-	DM+, Mild NPDR	DM+, Mod, Sev NPDR, PDR	p-value
n	3297	535	148	76	
Age (years)	54.9	59.7	61.3	59.9	<0.0001
Gender	53.3% F	53.9% F	43.2% F	49.8% F	0.0669
HbA1c (%)	5.41	6.98	7.75	8.54	<0.0001
MABP	89.7	90.5	88.3	89.5	0.9393
CRP	0.41	0.68	0.51	0.67	0.0134

% of Patients with visual field defects



Discussion

This post-hoc analysis of a large-scale national population-based survey demonstrates that compared to healthy controls, FDT visual field defects occur more frequently in participants with diabetes in the absence of outright retinopathy, suggesting a sensory neuropathy associated with diabetes itself. These defects become more frequent with the onset of visible retinopathy, and worse as the retinopathy becomes more severe. Furthermore, visual field defects associated with diabetic retinopathy tend to occur in the nasal subfields. The presence of these defects in the absence of vascular retinopathy suggests that diabetic neuroretinopathy precedes microvasculopathy. Limitations of this study include the cross-sectional nature of survey data, which lacks temporal data. Longitudinal studies are required to understand the pathogenesis of diabetic neuroretinopathy in relation to classic DR.

References

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