Multifocal Electroretinogram and Multifocal Visual Evoked Potential Studies as Early Detectors of Diabetic Retinopathy in Type I Diabetes Mellitus

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بِسْمِ اللهِ الرَّحْمنِ الرَّحِيمِ

وَيَسْأَلُونَكَ عَنِ الرُّوحِ ۖ قُلِ الرُّوحُ مِنْ أَمْرِ رَبِّي وَمَا أُوتِيتُم مِّنَ الْعِلْمِ إِلَّا قَلِيلًا

[سورة الإسراء - 85]

Abstract

Aim: to detect preclinical stage of diabetic retinopathy in type I Diabetic children using the mfERG and mfVEP tests.

Method: 60 eyes of 30 diabetic child and 40 eyes of matched age and sex 20 healthy children were examined and confirmed with no diabetic retinopathy by ophthalmological examinations and flouroscein angiography. The diabetic patients with at least 10 years duration type I DM.

mfERG and mfVEP were recorded using the RETi scan system (Roland consult,Wiesbaden ,Germany). Quadrants analysis of the amplitude and implicit time of P1 wave of the mfERG and also quadrant analysis of the amplitude and implicit time of P wave in mfVEP were used to compare between patient groups and controls.

Result: The P1wave amplitude showed statistically significant reduction in all quadrants in both mfERG and mfVEP tests, with no statistical significant difference concerning the peak time except in the lower temporal and lower nasal quadrants in mfVEP tests. The results were statistically correlated with the duration, age and HbA1c level.

Conclusion

The mfERG and mfVEP reduction in amplitude may be used as a predictor for the development of diabetic retinopathy in the inner layers of the retina in subclinical cases.

Key words

Type I DM; Preclinical DR detection; mfERG; mfVEP; Quadrant analysis.

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Dedication

To my dear husband, my life
rosette Ingy, my unbelievable
twins and my caring parents
and sisters
who have
"la plus grande aptitude a` la
patience et la comprehension"

I have followed many of the paths they took

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List of Abbreviations

AGEs: advanced glycation end products

AIDS: Acquired Immune Deficiency Syndrome

ATP: Adenosine triphosphate

CRT: cathode ray tubes

DAG, diacylglycerol

DEMPU : The Diabetes Endocrine and Metabolism Paediatric Unit .

DHAP: dihydroxyacetonephosphate

DM: Diabetes Mellitus

DR: Diabetic Retinopathy

GAPDH: glyceraldehyde 3-phosphate dehydrogenase

HBA1c: glycosylated haemoglobin

HDL: High density lipoprotein

HVF: hemifield visual loss

IRMA : intra-retinal microvascular abnormalities

ISCEV: the International Society for clinical Electrophysiology of vision

ITs: implicit times

LCD: liquid crystal display

LGN: the lateral geniculate nucleus

ME: macular edema

mfERG: multifocal electroretinography