Optical Coherence Tomography in Papilledema and Pseudopapilledema With and Without Disc Drusen

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The peripapillary retinal nerve fiber layer (RNFL) thickness as depicted by optical coherence tomography (OCT) of 34 eyes of 18 patients with true papilledema (TP), pseudopapilledema with disc drusen (PD) and pseudopapilledema without disc drusen (PWD) was analysed. In TP the RNFL was thickened in all quadrants in 8 eyes, in 6 eyes in all quadrants except temporally, in 2 eyes it was increased only nasally and in 2 only inferiorly. In 2 eyes with true early papilledema RNFL was of normal thickness. In PD high reflective echoes were seen in 3 eyes in the RNFL, the RNFL was thickened in the superior quadrant in 2 eyes and inferiorly in 1. In PWD the RNFL thickness was normal in 4 eyes and increased in all quadrants in 1 and increased in all except temporally in 2 eyes, in 3 increased superiorly and nasally and in 1 eye inferiorly and nasally. The OCT may be helpful in diagnosing pseudopapilledema without disc drusen in children as the RNFL thickness was normal in 4 eyes of 2 children.

It’s a challenging task to diagnose and confirm pseudopapilledema in patients with buried disc drusens who are often on treatment for idiopathic intracranial hypertension (IIH) for years. Similarly children presenting with a history of headaches with elevated discs and no visual complaints present a difficult situation for the treating neuro-ophthalmologist. In the above scenarios a confirmatory test to document an optic nerve head drusen (ONHD) can save the patient from undergoing unnecessary investigations and treatment. Ultrasound, fundus fluorescein angiography (FFA) and a computed tomography (CT) of the orbits have been used to diagnose the disc drusens. ONHD is seen as a hyporeflective echo on the ultrasound B scan and a hyperdense lesion at the optic nerve head on the CT. Autofluorescence has also been described on the FFA to diagnose the optic nerve head drusen. But in the absence of a documented ONHD by the above mentioned investigations it is very difficult to steer the course of further treatment in these patients. We prefer to term these patients as pseudopapilledema without disc drusen (PWD).

This category also includes anomalous discs classically described as small discs with no cup and anomalous branching of the blood vessels. The purpose of this study is to determine the findings on optical coherence tomography (OCT) in documented cases of papilloedema (TP), disc drusen (PD) and pseudopapilledema without evident ONHD.
MATERIALS AND METHODS
The OCT of 34 eyes of 18 patients were assessed retrospectively, consisting of 3 eyes with well documented ONHD, 11 eyes with suspected pseudopapilledema without documented evidence of ONHD and 18 with true papilledema with documented elevated cerebrospinal fluid (CSF) opening pressure. One patient had bilateral disc oedema secondary to Vogt Koygani Harada’s disease. All OCT were performed by one of the two authors (M,SD). Out of 18 patients, 17 were tested by spectral domain OCT (SD-OCT) using Cirrus HD-OCT (Carl Zeiss Meditec, Inc., Dublin, CA) (optic disc scan 200x200) (13 patients) and 3D-OCT-1000 (Topcon, Inc., Tokyo, Japan) (RNFL circle scan and 3-D scan 512x128) (4 patients) and 1 patient was evaluated with time domain OCT using the Stratus OCT (Carl Zeiss Meditec, Inc) fast disc and fast RNFL protocol). All OCT were performed after pupillary dilatation. The 34 eyes were selected retrospectively from the OCT images taken at Medical Research Foundation, Sankara Nethralaya. Out of the 9 patients with TP, 6 had OCT taken during the acute phase when disc oedema was present and 3 had OCT after the initiation of treatment during the resolving phase of disc oedema. All subjects with papilledema had a resolution of disc oedema on follow-ups. All three eyes with disc drusen had calcification on ultrasound B scan. One patient with disc drusen had symptoms of headache, unilateral transient visual obscurations and tinnitus. A lumbar puncture was done which revealed elevated CSF opening pressure. Post antioedema treatment the disc oedema resolved. The 11 eyes with pseudopapilledema without evidence of ONHD on ultrasound had persistence of disc oedema on serial follow ups and had normal optic nerve function tests in the absence of symptom of IIH.

RESULTS
In TP the RNFL was thickened in all quadrants in 8 eyes, in 6 eyes in all quadrants except temporally, in 2 eyes it was increased only nasally and in 2 only inferiorly. In 2 eyes with true early papilledema RNFL was of normal thickness. In PD a high reflective echoes were seen in 3 eyes in the RNFL, the RNFL was thickened in the superior quadrant in 2 eyes and inferiorly in 1. In PWD the RNFL thickness was normal in 4 eyes and increased in all quadrants in 1 and increased in all except temporally in 2 eyes, in 3 increased superiorly and nasally and in 1 eye inferiorly and nasally. The SD-OCT could directly visualize the ONHD in all but one eye in patients with PWD.

DISCUSSION
This study reiterates the role of OCT in detecting disc oedema and also in differentiating a true disc oedema from pseudo disco edema to some extent. The appearance of the optic nerve on OCT in ONHD and optic disc oedema (ODE) has been described in literature. Lenwrth et al reported the that OCT can differentiate between ODE and ONHD particularly when the nasal
The retinal nerve fibre layer is thicker than 86 microns. A recent study by Lee et al. reported direct visualization of the ONHD using SD-OCT. In our study of the 5 patients with a doubtful diagnosis of pseudopapilledema, 8 eyes of 4 patients revealed a hyperreflective mass under the peripapillary retina especially in the nasal retina just as described by Lee et al. Hence SD-OCT can be described as a sensitive tool in diagnosing buried ONHD. In one patient with asymptomatic unilateral disc swelling the OCT did not reveal the hypereflective mass in the peripapillary retina. We found that in children the ONHD is associated with normal RNFL thickness and as the age advances the RNFL thickness profile changes probably secondary to the progressive displacement of the fibres by the buried drusen.

REFERENCES


