Original Research Paper

Volume -10 | Issue - 4 | April - 2020 | PRINT ISSN No. 2249 - 555X | DOI : 10.36106/ijar

Ophthalmology

ROLE OF B-SCAN ULTRASONOGRAPHY IN EVALUATION OF PAPILLEDEMA

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ABSTRACT

AIM To study the usefulness of B-scan ultrasonography in the evaluation of papilledema.

METHODS Sixty patients who were referred from the neurology and medicine department and patients who are clinically suspected to have papilledema were selected. Thorough, clinical examination with slit-lamp biomicroscopy and visual acuity assessment was done. These patients underwent B-scan ultrasonography to demonstrate the crescent sign and optic nerve sheath diameter(ONSD) . The patients were further evaluated with the neurologist and magnetic resonance imaging (MRI) thus confirming the diagnosis of papilledema. The results of our ultrasonographic evaluation were correlated with final diagnosis after thorough clinical evaluation, imaging and the neurologist's opinion.

RESULTS Out of 60 patients diagnosed having papilledema on MRI, 54 (90%) showed crescent sign and 55(92%)mean optic nerve sheath diameter(ONSD) of 4.85(±0.66)on B scan ultrasonography. Headache was the most common presenting complaint in 52 (86%) and idiopathic intracranial hypertension was the most common underlying cause of papilledema in 40 (67%) cases.

CONCLUSION "Crescent sign" and Optic nerve sheath diameter(ONSD) seen on ultrasonography are a sensitive tool for the diagnosis of papilledema. It is a cost-effective, less cumbersome and effective tool to differentiate between papilledema and pseudo papilledema before subjecting the patients to costly investigations like MRI. A positive crescent sign with optic nerve sheath diameter more than 3.3mm should always be followed by MRI to find out the cause of papilledema.

KEYWORDS :

INTRODUCTION

Papilledema is a passive swelling of the optic disc secondary to elevated intracranial pressure (ICP). The treatment and prognosis of patients with increased ICP depend to a great degree on the early and prompt diagnosis. The most common and credible sign of raised ICP is papilledema. Suspicion of papilledema warrants timely ascertaining of its diagnosis, evaluation, and management. Differentiation between papilledema and pseudo papilledema is important as patients with papilledema need thorough work up whereas patients with pseudo papilledema often only need reassurance monitoring and follow-up. The presentation of papilledema patients is varied, some present with headache, transient visual blurring, etc.Pseudopapilledema might present with more severe and acute visual presentation. To differentiate these and confirmation of the diagnosis is usually done by magnetic resonance imaging (MRI). MRI is a tedious,

costly investigation. Ultrasonography is a safe, cost-effective, easily available, non-cumbersome modality for the diagnosis of papilledema. There are very few studies done that demonstrate the value of ocular ultrasonography in the diagnosis of papilledema.

MATERIALS AND METHODS

This was a study conducted in our institute from August 2018 to December 2019. Sixty patients diagnosed to have papilledema clinically were included in this study. For each patient's age, sex, duration of complaints, headache if present, associated systemic conditions were recorded. After measuring the visual acuity, all patients were clinically examined first by torchlight, followed by slit-lamp examination, intraocular pressure recording by applanation tonometry and a dilated fundus examination using a 90 diopter lens. Informed consent was taken from all patients. Ocular ultrasonography using a 10 MHz probe was performed on all in a supine position. If the fluid was seen around the optic nerve, within the sheath, then it was noted as "crescent" or "doughnut" sign positive and it and Optic nerve sheath diameter(ONSD) of more than 3.3mm which indicates the presence of papilledema (Figure 1). Allpatients were referred to a neurologist and were subjected to neuroimaging.

RESULTS

The average age of presentation was 30 years (range 10 to 70 years). There were 43(72%) females and only 17(28%) males. Headache was the most common presenting complaint seen in 52/60 (94%) cases. Transient visual loss and diplopia were other complaints in very few cases. The duration of symptoms ranged from four days to 3 years. The most common systemic association was hypertension and diabetes mellitus in 5 patients (8%) each. Out of the 60 diagnosed cases of papilledema 54(90%)showed positive "crescent sign" and 55(92%) patients had mean optic nerve sheath diameter(ONSD) of 4.85(±0.66) on ultrasonography. Thus the sensitivity of orbital ultrasonography in diagnosing papilledema was 92% (n = 55). Neuro imaging was done in all these cases and the most common cause of papilledema on MRI was idiopathic intracranial hypertension (IIHT) in 40 cases (66%) followed by space-occupying lesions (SOL) in 10 (17%). Of the SOL cases, four had tumors in posterior cranial fossa, two in the frontal lobe, two had meningiomas and one had craniopharyngioma. Sinus thrombosis was seen in 10 cases (17%). The common sinuses involved were sagittal sinus, sigmoid sinus, and transverse sinus.

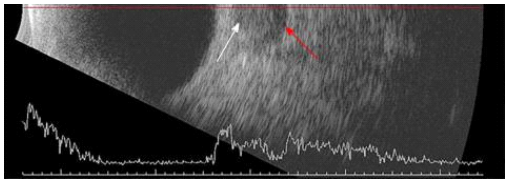

Fig 1:Crescent sign in papilledema

Table No.1:Causes of papilledema

	Cause	No.of cases	(%)
1	IIHT	40	66
2	Space occupying lesions	10	17
3	Sinus thrombosis	10	17

DISCUSSION

Papilledema is an important reason for emergency referral for the patient to neuro-ophthalmology clinics. However, sometimes it is difficult to differentiate papilledema from pseudo papilledema and the patient has to be subjected MRI for confirmation of diagnosis. Cost, time duration, difficulties in claustrophobic and metal implants patients make it a tedious investigation.

Ocular ultrasonographic measurement of optic disc width along with a 30° test and presence of fluid around the optic nerve as a "crescent" or "doughnut" sign has been shown to be useful in confirming papilledema. In our study crescent sign was seen in 54/60 cases with a 90% sensitivity, and optic nerve sheath diameter of more than 3.3mm

in 55(91%) which proves ultrasound B scan is a sensitive tool in the initial diagnosis of papilledema. Sensitivity was 90%, 95% and 100% in studies by Neudorferet al, Carter et al and Mehrpouret al respectively.

Other investigative modalities like optical coherence tomography (OCT) and fluorescein angiography have also been studied in the diagnosis of papilledema. However, retro-orbital anatomy cannot be imaged by OCT and fluorescein angiography has the disadvantage of being invasive.

In conclusion, our study demonstrates, "crescent sign" on ultrasound for the diagnosis of papilledema a highly sensitive tool in differentiating papilledema from pseudo papilledema before subjecting the patients to more costly, tedious and time-consuming investigative modalities like MRI. A positive crescent sign should always be followed by MRI to find out the cause of papilledema.

CONCLUSION

In conclusion, in the presence of symptoms of raised ICP and ultrasonographic ONSD,>4 mm and crescent signs are diagnostic of papilledema. It is a cost-effective, less cumbersome and effective tool to differentiate between papilledema and pseudo papilledema before subjecting the patients to costly investigations like MRI.

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