An Unusual Case of Optic Atrophy in a Child due to Intracranial Space Occupying Lesion

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Abstract
Optic atrophy is an irreversible end stage of optic nerve damage and is frequently associated with serious intracranial pathology. Ocular manifestations often serve as early indicators of intracranial space occupying lesions (ICSOL), aiding in lesion localization and timely intervention. This case report describes a 9-year-old female who presented with gradually progressive, painless visual loss in the left eye accompanied by headache and systemic symptoms such as fever, weight loss, and seizures. Ophthalmic evaluation revealed relative afferent pupillary defect and optic atrophy in the affected eye, with disc pallor in the fellow eye. Neuroimaging demonstrated an ill-defined conglomerated lesion in the left parieto-occipital region with midline shift and leptomeningeal enhancement, suggestive of tuberculoma. Further investigations, including positive Mantoux test, cerebrospinal fluid analysis, and biopsy findings of necrotic brain parenchyma with giant cell granulomas, confirmed the diagnosis. The patient underwent decompressive craniotomy followed by anti-tubercular therapy and steroids. This report highlights tuberculoma as an uncommon but important cause of compressive optic neuropathy in children. Early recognition of ocular signs and prompt multidisciplinary management are crucial, as visual recovery is possible before the development of optic atrophy. Once optic atrophy is established, visual loss remains permanent.

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Keywords: Optic Atrophy, Intracranial Space Occupying Lesion, Tuberculoma, Compressive Optic Neuropathy

Introduction

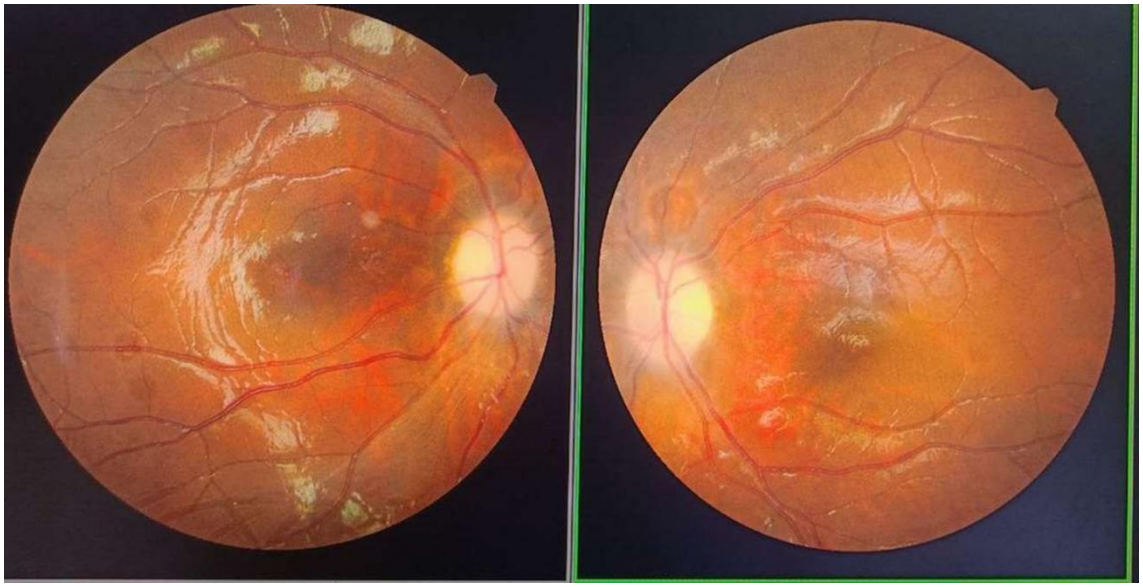
- Eye is the window to look into brain as eye is the prolongation of the brain.
- Ocular symptoms and signs appear with significant frequency in patients with Intracranial Space Occupying Lesions (ICSOL), which help in correlating the site of the lesion.
- Compressive optic neuropathy (CON)- caused by intrinsic or extrinsic compression anywhere along the optic nerve.
- Additionally, demyelination, ischemia, metabolic, and traumatic insult to optic nerve.
- Most common sign - slow progressive monocular visual loss,
- sometimes associated with headaches.
- Optic nerve atrophy - an important ophthalmological sign, associated with serious systemic conditions; a significant bearing on the overall morbidity.

A Case Report

A 9-year-old female child presented with complaints of gradually progressive, painless, loss of vision in left eye (LE) and headache, for one and half month.

	OD	OS
UCVA	6/9	PL+, PR inaccurate
BCVA	-0.50D/-0.50DX180 6/6	No improvement
Pupil	RRR	RAPD III
Fundus	disc pallor	Chalky white disc, distinct margins

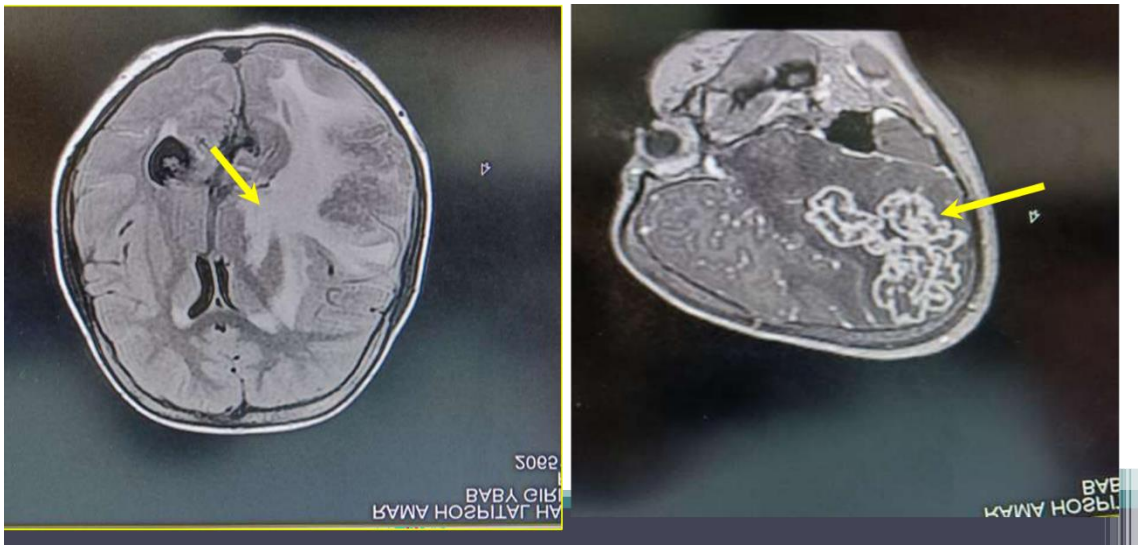
H/o - diminution of vision
- evening rise of temperature
- rigors
- weight loss
- loss of appetite
- seizures.



Fundus picture showing **disc pallor (OD)** & **optic atrophy (OS)**.

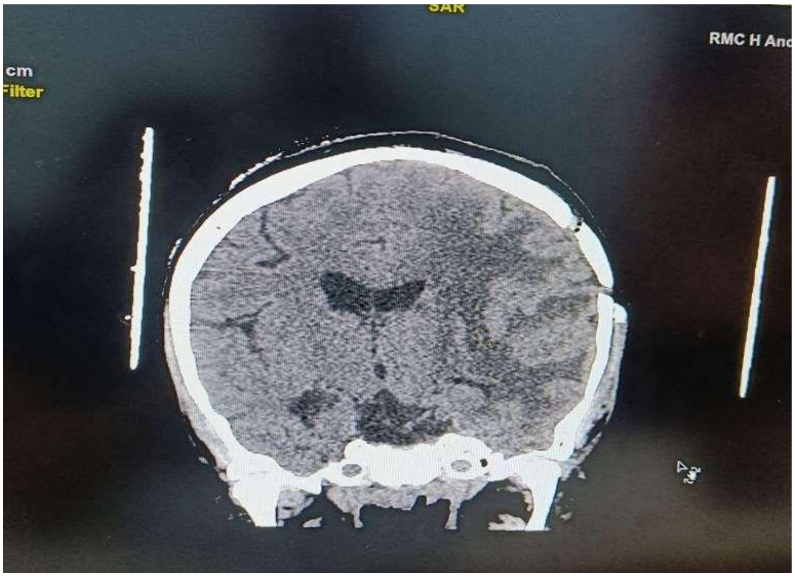
Investigations & Management
Montoux test: **positive (17mm)**
CBC :
Hb - 8 gm/dl,
TLC – 11,500 µl,
N – 72%
L – 30%
E – 2%

ESR – 39 mm/hr.



MRI Brain – Ill defined **conglomerated** lesion in **left parieto-occipital** region, **midline shift**, leptomeningeal enhancement suggestive of tuberculoma.

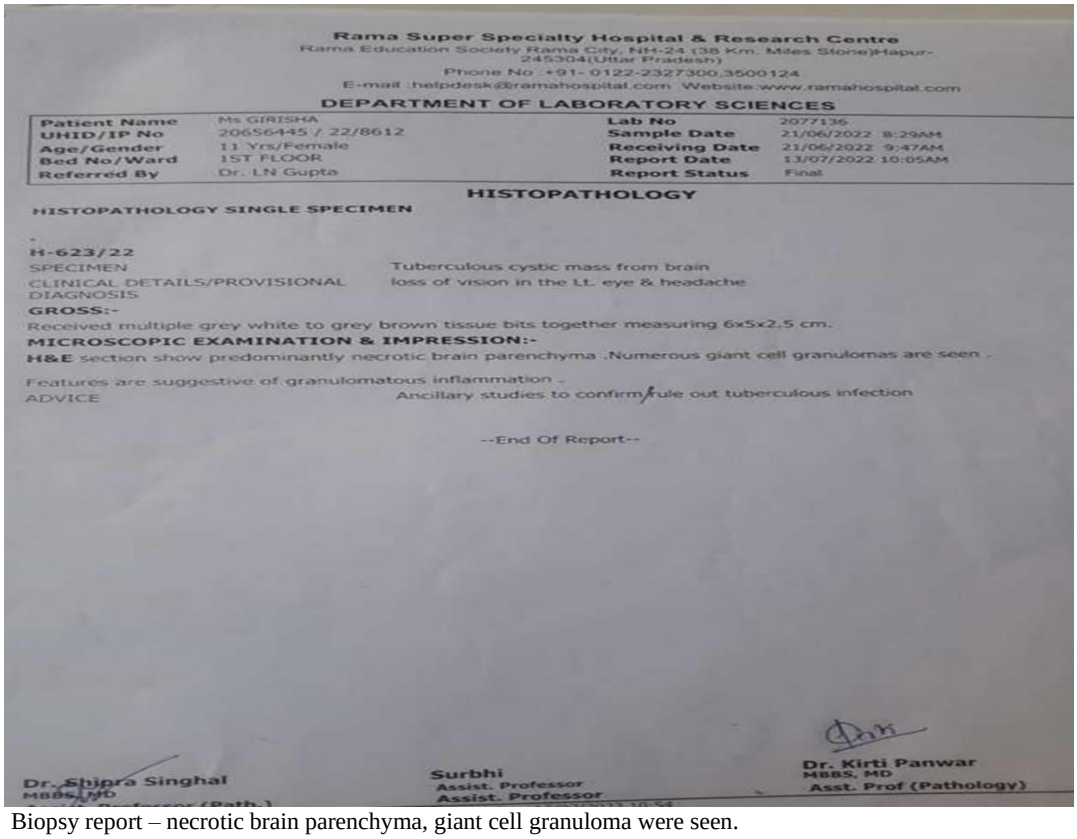
- After initial work up, patient was referred to neurosurgery department for further management.
- Patient underwent decompressive craniotomy & excision of mass lesion with biopsy.



Post-op NCCT – Craniotomy defect in left parieto- temporal region with edematous changes.

CSF Analysis

Appearance	**turbid**
TLC	28 cell/ cu. Mm
Neutrophils	2%
Lymphocytes	**90%**
Protien	**250 mg/dl**
Glucose	20 mg/dl



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DEPARTMENT OF LABORATORY SCIENCES

Patient Name	Ms GIRISHA	Lab No	2077136
UHID/IP No	20656445 / 22/8612	Sample Date	21/06/2022 8:29AM
Age/Gender	11 Yrs/Female	Receiving Date	21/06/2022 9:47AM
Bed No/Ward	1ST FLOOR	Report Date	13/07/2022 10:05AM
Referred By	Dr. LN Gupta	Report Status	Final

HISTOPATHOLOGY

HISTOPATHOLOGY SINGLE SPECIMEN

H-623/22
SPECIMEN — Tuberculous cystic mass from brain
CLINICAL DETAILS/PROVISIONAL DIAGNOSIS — loss of vision in the LL eye & headache

GROSS:-
Received multiple grey white to grey brown tissue bits together measuring 6x5x2.5 cm.

MICROSCOPIC EXAMINATION & IMPRESSION:-
H&E section show predominantly necrotic brain parenchyma .Numerous giant cell granulomas are seen .

Features are suggestive of granulomatous inflammation .
ADVICE — Ancillary studies to confirm/rule out tuberculous infection

--End Of Report--

Dr. Shipra Singhal MBBS, MD
Surbhi Assist. Professor
Dr. Kirti Panwar MBBS, MD Asst. Prof (Pathology)

Biopsy report – necrotic brain parenchyma, giant cell granuloma were seen.

Result

- RE has partial optic atrophy and LE has optic atrophy.
- Post neurosurgery, tuberculoma was found and patient has been put on anti tubercular drugs – isoniazid, rifampicin, pyrazinamide, streptomycin and steroids.

Discussion

- ICSOLs are one of the common causes of optic atrophy.
- The presentation is usually non-specific and thus may go undiagnosed and untreated.
- Optic atrophy is an irreversible consequence following ocular symptoms, thus, making it necessary to screen for

the presence of ICSOL in patients presenting with optic atrophy.

Ophthalmoscopic Classificaton of Optic Atrophy

Sign	Primary	Secondary	Consecutive
Previous swelling of the optic disc	No	Preceded by long-standing swelling of the optic disc.	No
Disc colour	White: diffuse or sectoral pallor.	Grey	Waxy pale
Disc margins	Distinct	Blurred	Normal, attenuated arteries
Fibrosis (gliosis) of the disc	None	Gliosis of the optic nerve head	None
Cause	• compression of the optic nerve or chiasm• hereditary optic neuropathy • nutritional optic atrophy	• chronic papilloedema• papillitis• anterior ischaemic optic neuropathy	• chorioretinal disease e.g. retinitis pigmentosa• central retinal artery occlusion

Osaguona, Vivian B. "Differential diagnoses of the pale/white/atrophic disc." Community Eye Health 29 (2016): 71 - 74.

Study	Mean age / Range of age (years)	Fundus findings	ICSOL (cause)	% of patients presenting with optic atrophy due to ICSOL
Chinta S. *et al.* [1]	6.87	**Optic atrophy**	Craniopharyngioma (44%), arachnoid cyst (16.6%), optic glioma (5.56%)	5.56%
Repka. *et al.* [3]	7	**Optic atrophy**	Craniopharyngioma (22%), pituitary adenoma (5%)	29%
Hema N. A. *et al.*	26.72	**Optic atrophy,** optic neuritis, papilloedema	Astrocytoma (44%), schwannomas (14%) meningothelial tumours (12%)	9.7%
Olueye T.S. *et al.*	40.8	**Optic atrophy**	(unspecified ICSOL)	8%
Bajracharya K. *et al.* [2]	53.6	**Optic atrophy**	(unspecified ICSOL)	4%
Nalawade K. *et al.* [4]	0-60	**Optic atrophy,** papilloedema, optic neuritis, retinal haemorrhages.	Intracranial hematoma (85.7%), brain abscess (10%), brain tumors (4%)	12%
Krishna V. *et al.* [5]	1-80	**Optic atrophy**	(unspecified ICSOL)	10%
Present Study	**9**	**Optic atrophy, disc pallor**	**Tuberculoma**	**(not applicable)**

Conclusion

- Tubercular perineuritis and retrobulbar neuritis though uncommon can lead to primary optic atrophy and permanent visual loss.
- Ocular manifestations are reversible in cases of early diagnosis and prompt treatment. If optic atrophy is present, it is incurable.
- Prompt diagnosis and initiation of treatment results in good visual outcome.
- Interdepartmental co- ordination is required for management of such patients.

Take Home Message

- Optic atrophy is the end stage of a process causing damage to the optic nerve.
- The management goal is to intervene before optic atrophy is noted or to save remaining function.
- Thus, depending upon the underlying cause for the optic nerve damage.

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