

CASE REPORT

Froin Syndrome

¹Aditya Choudhary, ²Manoj K Goyal, ³Manish Modi, ⁴Kanchan K Mukherjee, ⁵Chirag K Ahuja, ⁶Vivek Lal

ABSTRACT

Introduction: Yellow-colored cerebrospinal fluid (CSF) suggestive of xanthochromia can be due to elevated CSF protein and can be one of the causes of papilledema.

Observation: We observed a 55-year-old lady with papilledema with yellow-colored CSF which was hypercoagulable along with elevated CSF protein and no cells. Her systemic and nervous system examination was unremarkable except for the eye findings. Her contrast-enhanced brain magnetic resonance imaging (MRI) showed multiple meningiomas, and on imaging of the spine, she had multiple contrast-enhancing intradural, extramedullary lesions. Her eye findings were attributed to Froin syndrome found in patients with spinal tumors.

Conclusion: Our case stresses the need to keep the possibility of Froin syndrome in mind while evaluating patients with papilledema and it may be pertinent to perform a spinal imaging, especially when no apparent cause for papilledema is found.

Keywords: Froin, Papilledema, Spinal tumors, Xanthochromia.

How to cite this article: Choudhary A, Goyal MK, Modi M, Mukherjee KK, Ahuja CK, Lal V. Froin Syndrome. J Postgrad Med Edu Res 2018;52(1):34-35.

Source of support: Nil

Conflict of interest: None

INTRODUCTION

Yellow-colored CSF is always striking to the naked eye. It along with elevated CSF protein and hypercoagulable CSF forms the triad of Froin's syndrome.¹ We report a case of Froin's syndrome secondary to multiple meningiomas that had a clinical presentation with papilledema in both eyes.

CASE REPORT

A 55-year-old lady who was apparently normal till 6 months back developed painless blurring of vision in

right eye without any other symptoms. Ocular examination at that time revealed bilateral disk edema. She was evaluated elsewhere where a gadolinium-enhanced MRI (GdMRI) of the brain revealed multiple well-defined extra-axial contrast-enhancing lesions suggestive of meningiomas (Figs 1A and B). She was started on Tab Acetazolamide 125 mg BD along with Wysolone 40 mg with which her diminution of vision improved and completely resolved over the next 20 days.

She presented to our center after 4 months for treatment of meningiomas. Ocular examination showed secondary optic atrophy in the right eye (Fig. 1C) and grade II papilledema in the left eye (Fig. 1D). Rest of the general physical, systemic, and neurological examination was absolutely normal. The GdMRI brain with optic nerve cuts revealed multiple well-defined extra-axial lesions in the brain with no change in size compared with previous scan. Magnetic resonance venography was normal. The ocular findings were considered to be independent of meningiomas. The likely etiologies considered were anterior ischemic optic neuropathy, idiopathic intracranial hypertension independent of meningiomas, and some other disease. Optical coherence tomography revealed disk edema in left eye and optic atrophy in the right eye. Fundus fluorescein angiography was normal. Visual acuity was 20/40 in the right eye and 20/25 in the left eye. Visual fields by pattern deviation showed whole field defect in the right eye, while left eye showed mild defects in the inferior quadrants. The CSF opening pressure was 18 cm of CSF. It was golden yellow in color. There were no cells and normal glucose (64 mg/dL) with markedly elevated protein (1.3 gm/dL). Based on CSF findings a possibility of Froin syndrome was considered and she was further evaluated. The GdMRI of the whole spine revealed multiple contrast-enhancing, intradural extramedullary lesions (Figs 1E and F) with obstruction to the CSF outflow from the spinal subarachnoid space. She underwent spinal laminectomy with excision of tumor, which turned out to be a schwannoma on histopathology (Figs 1G and H). She also underwent gamma knife radiation for brain as well as residual spinal lesions. At 4 months follow-up, she is doing well.

DISCUSSION

Froin syndrome or "syndrome de froin" was first described in 1901 by Dr Georges Froin in a patient with syphilitic meningitis resulting in paraplegia.² He found golden yellow CSF coagulating in a test tube. These

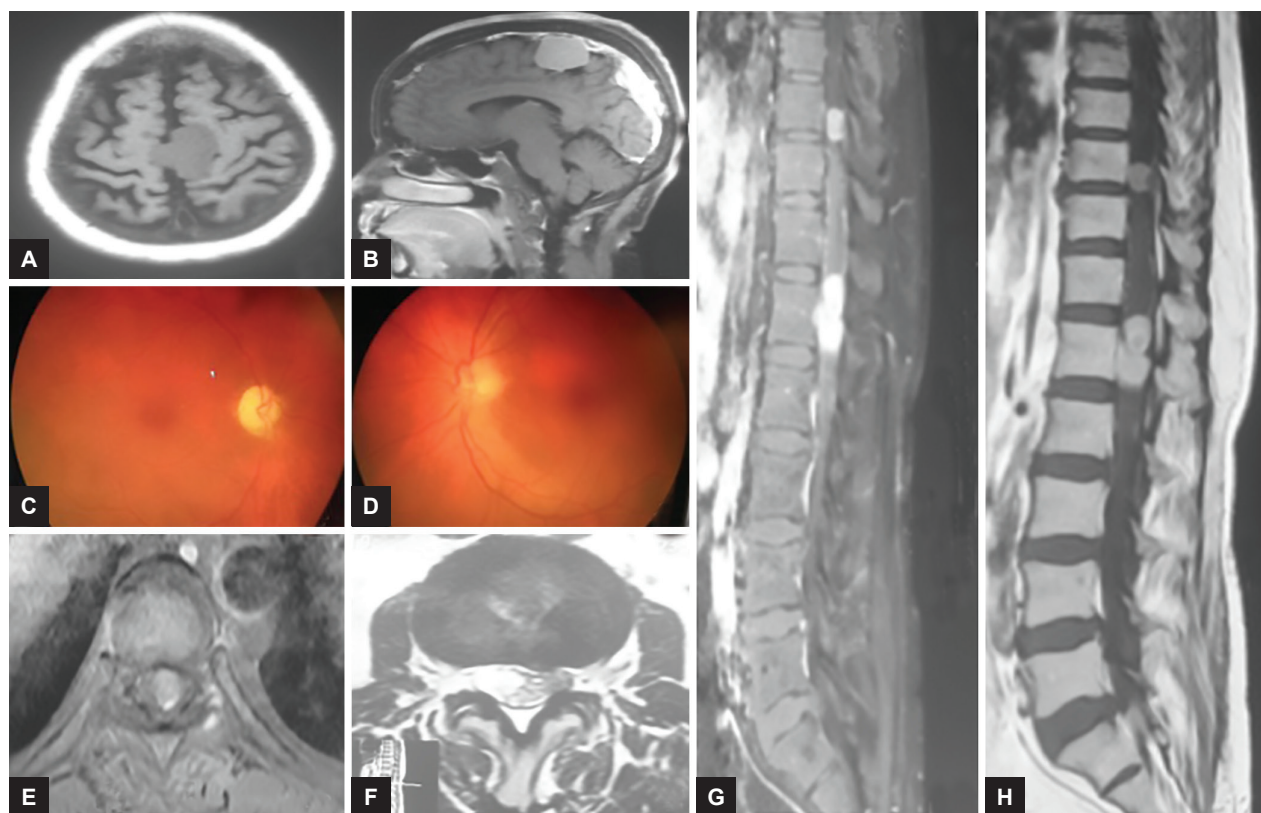
¹Senior Resident, ^{2,5}Assistant Professor, ³Additional Professor
^{4,6}Professor

^{1-3,6}Department of Neurology, Postgraduate Institute of Medical Education and Research, Chandigarh, India

⁴Department of Neurosurgery, Postgraduate Institute of Medical Education and Research, Chandigarh, India

⁵Department of Radiodiagnosis, Postgraduate Institute of Medical Education and Research, Chandigarh, India

Corresponding Author: Manoj K Goyal, Assistant Professor
Department of Neurology, Postgraduate Institute of Medical Education and Research, Chandigarh, India, Phone: +917087008271, e-mail: goyal_mk@yahoo.com



Figs 1A to H: Precontrast T1-weighted axial (A) and postcontrast sagittal (B) images depicting the falx-based lesion showing moderate homogeneous enhancement s/o meningioma. Fundus photographs of the left (C) and right (D) eye. Axial images of the spine showing intradural extramedullary lesions (E and F). Pre- (G) and postcontrast (H) T1-weighted sagittal images demonstrate multiple (at least two) intradural extramedullary lesions in the lower dorsolumbar canal causing compression on the adjacent spinal cord showing similar characteristics as those of intracranial lesions

three findings classically described the triad of Froin syndrome. Few years later, similar CSF was described in spinal tumors by a German neurologist and it was called pseudo-Froin or Nonne-Froin syndrome.³

The association of papilledema and spinal tumor is an unusual but well-known phenomenon.⁴ There are two questions to be answered in such cases.

First, what causes the CSF to be xanthochromic, protein-rich, and hypercoagulable? Schully⁵ proposed that the spinal subarachnoid space below a spinal block, either due to meningeal adhesion or a tumor, behaves like a cul-de-sac. There is diminished pressure in the cul-de-sac, as connection with the spinal fluid above the compression has been cut. Also, pial veins are dilated at the site of compression resulting in transudation. The transudative fluid is rich in proteins including albumin and fibrinogen, the fibrinogen component being responsible for CSF hypercoagulability.

The second question is what causes papilledema in these patients? The high CSF protein interferes with the arachnoid villi endothelial micro-pinocytic mechanism of CSF egress and results in decreased CSF absorption. But how the protein-rich spinal CSF escapes to the ventricles above is still something we are not aware of.

Our case further adds to the repertoire of clinical features of this rare syndrome. Our case is unique for

two reasons. One, our patient did not complain of any symptoms suggestive of spinal lesion and neither did she have any signs suggestive of spinal lesion. Second, our patient had clinical picture with papilledema in one eye and secondary optic atrophy in the other eye, which has not been reported in conjunction with spinal CSF block.

To conclude, our case stresses the need to keep this rare possibility in mind while evaluating patients with papilledema and it may be pertinent to perform a spinal imaging, especially when no apparent cause for papilledema is found.

REFERENCES

1. Mirza S, Adams WM, Corkhill RA. Froin's syndrome revisited, 100 years on. Pseudo-Froin's syndrome on MRI. *Clin Radiol* 2008 May;63(5):600-604.
2. Greenfield JG. Original Papers: ON Froin's syndrome, and its relation to allied conditions in the cerebrospinal fluid. *J Neurol Psychopathol* 1921 Aug;2(6):105-141.
3. Mattsson N, Montelius R, Holtz A, Mouwitz L, Blennow K, Zetterberg H. Coagulation of cerebrospinal fluid—the Nonne-Froin sign. *Pract Neurol* 2013 Aug;13(4):273-274.
4. Guigou S, Mercie M, Blanc JL, Lapierre F, Milinkevitch S, Dighiero P. [Bilateral papilledema as the manifestation of Schwannoma of the cauda equina]. *J Fr Ophtalmol* 2006 Mar;29(3):312-318.
5. Scully FJ. Yellow spinal fluid—its origin and significance. *Arch Neur Psych* 1923 Jul;10(1):83-99.