

Resolution of papilloedema secondary to cerebral venous sinus thrombosis: A case report.

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Abstract

Purpose

To report a case of bilateral papilloedema secondary to cerebral venous sinus thrombosis (CVST) in association with vitamin B12 deficiency, emphasizing the importance of early recognition and management to achieve resolution of papilloedema with full visual recovery.

Observations

A 44-year-old female presented with a 1-month history of headache and blurred vision. Ophthalmological evaluation revealed visual acuity of 6/6 in the right eye and 6/9 in the left eye, normal intraocular pressure (IOP), and bilateral Grade 3 papilloedema on fundus examination. Magnetic Resonance Venography (MRV) identified thrombosis of the left transverse and sigmoid sinuses, confirming CVST. Laboratory investigations revealed low serum vitamin B12 levels. The patient was started on anticoagulation therapy and vitamin B12 supplementation. Over the following 8 weeks, her symptoms improved significantly, and fundus examination showed complete resolution of papilloedema with recovery of visual function.

Conclusion

This case shows that a timely medical intervention can produce favourable visual outcomes in cases of papilloedema and highlights it to be a reversible entity with optimum visual recovery.

Importance

Prompt diagnosis and targeted therapy in patients with papilloedema due to CVST can lead to full visual recovery, underscoring the reversible nature of this condition when managed early.

Keywords- Papilloedema 1, optic disc edema 2, CVST 3

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Introduction

Papilloedema is defined as optic disc swelling secondary to raised intracranial pressure and represents an important neuro-ophthalmic emergency requiring prompt evaluation to prevent irreversible visual loss. While intracranial mass lesions and idiopathic intracranial hypertension are common causes, cerebral venous sinus thrombosis (CVST) is a less frequent but potentially life-threatening etiology that should always be considered, particularly in patients presenting with headache and bilateral optic disc edema. Impaired cerebral venous drainage in CVST results in elevated intracranial pressure, leading to papilloedema and variable degrees of visual dysfunction.

CVST is an uncommon form of cerebrovascular disease, accounting for approximately 0.5–1% of all strokes. Its clinical presentation is often nonspecific, with headache being the most common symptom, followed by visual disturbances, cranial nerve palsies, seizures, and focal neurological deficits. Because these manifestations may be subtle or overlap with other neurological disorders, diagnosis is frequently delayed. Magnetic resonance venography (MRV) remains the imaging modality of choice for confirming venous sinus thrombosis, while prompt initiation of anticoagulation is the cornerstone of treatment and is associated with favorable neurological and visual outcomes.

Vitamin B12 deficiency is an uncommon but increasingly recognized risk factor for venous thromboembolism,

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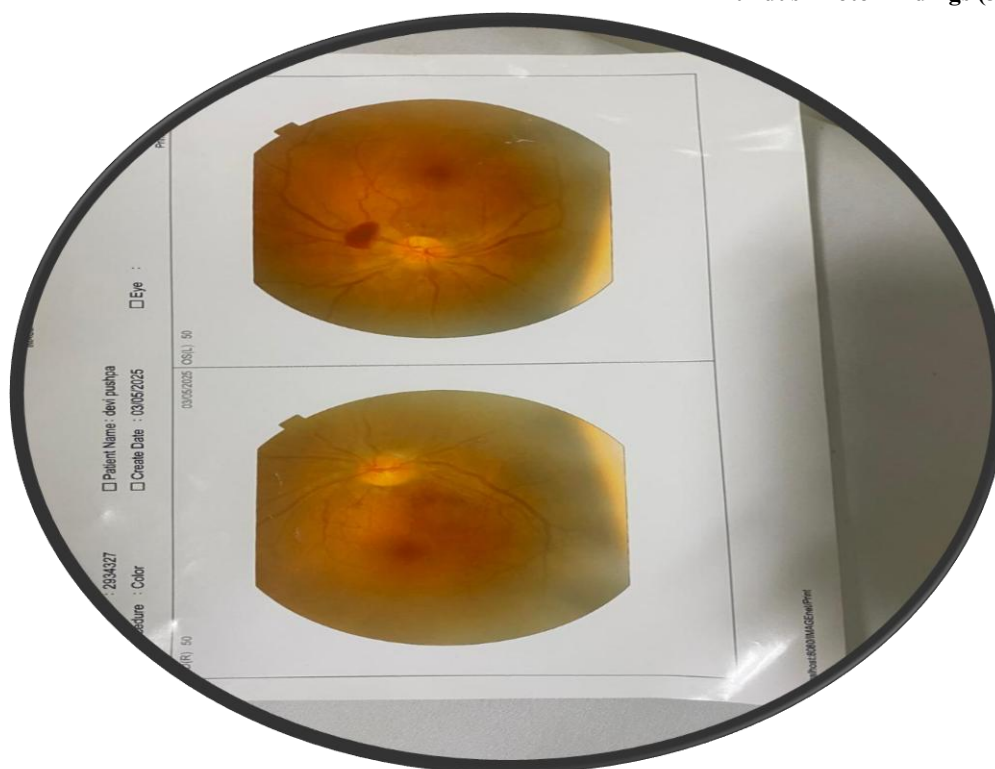
including CVST. Deficiency of vitamin B12 can result in hyperhomocysteinemia, which promotes endothelial dysfunction, platelet activation, and a prothrombotic state, thereby increasing the risk of cerebral venous thrombosis. Recognition of reversible metabolic risk factors is essential, as correction of the underlying deficiency may reduce the risk of recurrent thrombotic events and improve overall outcomes.

Case presentation

A 44-year-old female patient presented to the Eye OPD at SMIH with complaints of diminution of vision of left eye since 2 months. The diminution of vision was gradual and progressive and painless, and associated with headache. Headache was intermittent, mild to moderate, but without any diplopia, nausea or vomiting. There were no other ocular complaints. Patient had no systemic history of

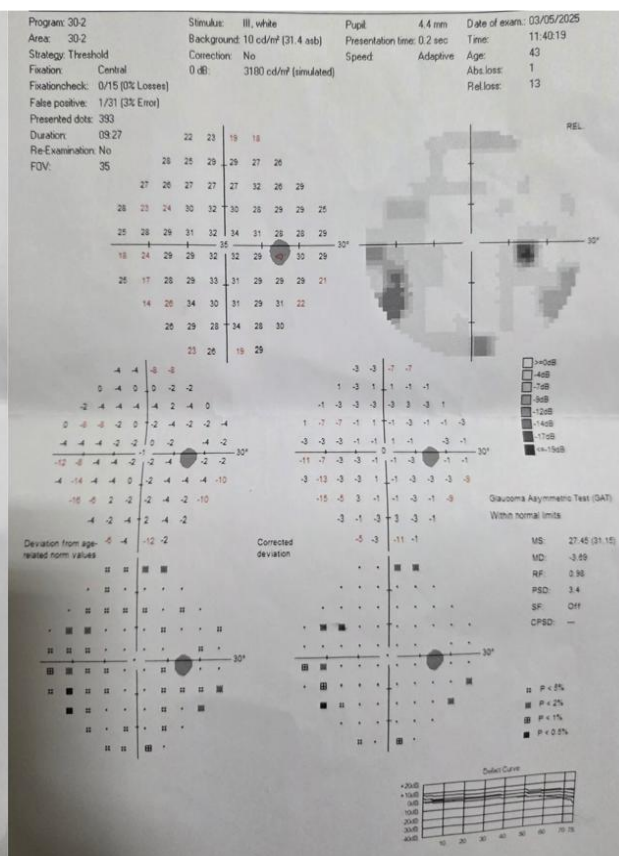
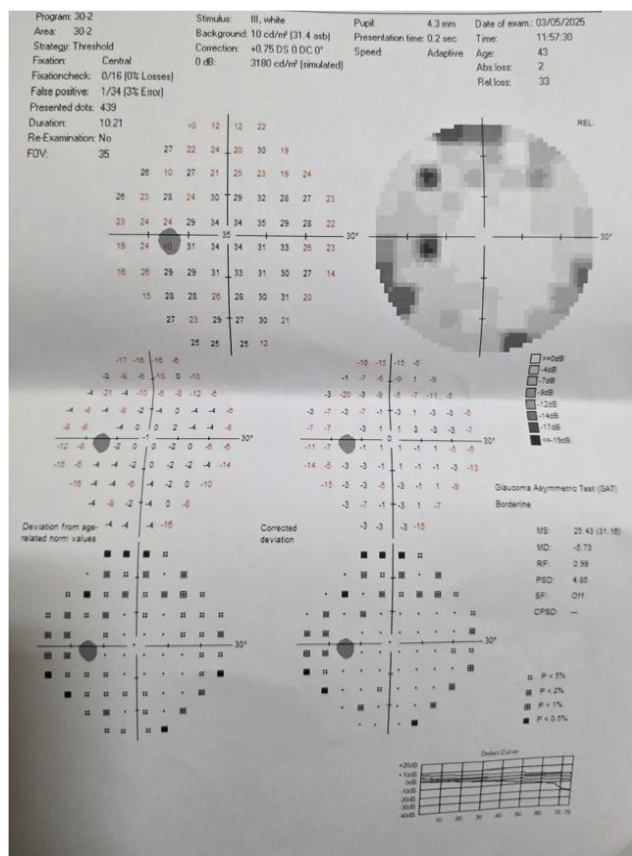
diabetes, hypertension, or Koch's. On ocular examination, the following findings were noticed:

- Visual acuity: Right Eye (RE) 6/6, Left Eye (LE) 6/9 with projection of rays (PR) accurate in both eyes (BE).
- IOP recorded on Non-Contact Tonometer (NCT) 15 in RE and 14 in LE, with a normal pupillary reaction, and no Relative Afferent Pupillary Defect (RAPD) in either eye.
- A dilated Fundus Examination revealed a hyperemic Optic Disc, blurred, ill-defined margins, Splinter haemorrhages on the Disc, Cup Disc ratio (C:D) obliterated in both eyes.
- **Fundus Photo Findings (3/05/2025)**



VISUAL FIELD (30-2) Right eye and Left eye (3/05/2025)

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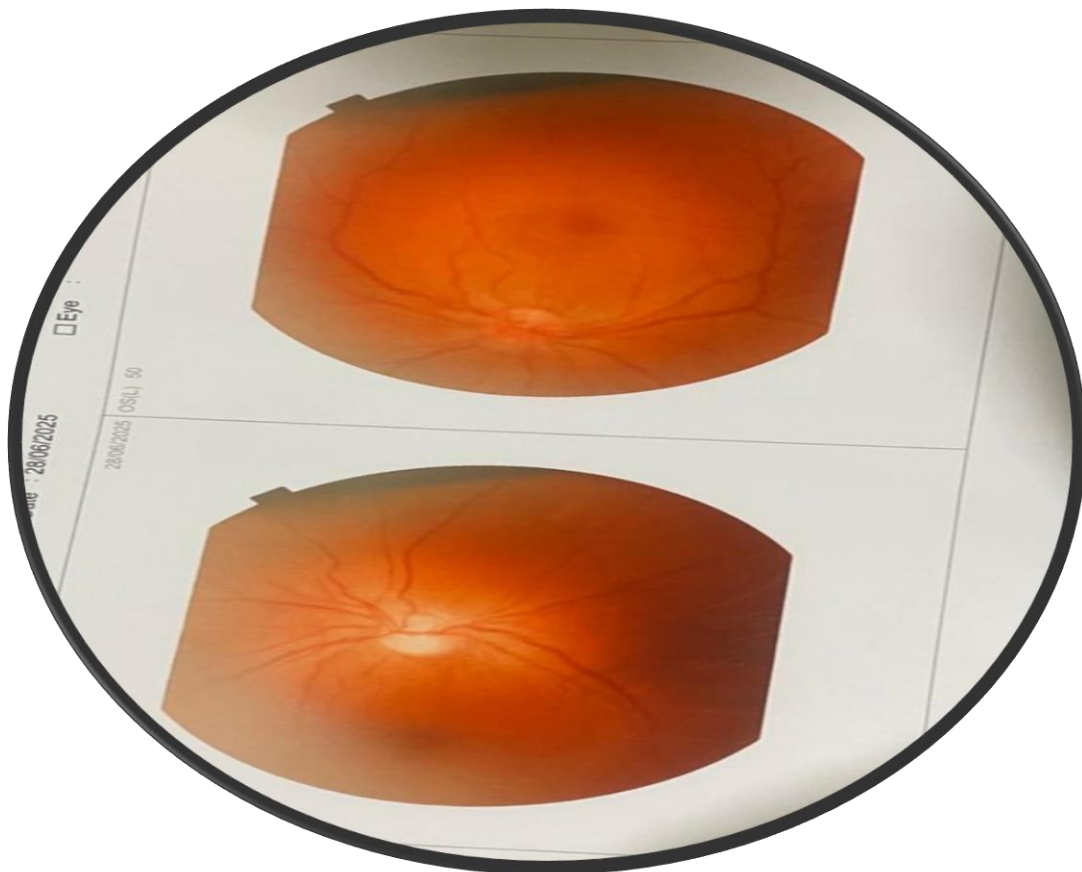
- BE showed vessel tortuosity, flame shaped haemorrhages in background, however absence of hard or soft exudates. Fundus photograph was taken on Topcon TRC-50DX fundus camera for documentation and comparisons in future.
- Foveal reflex was present in BE and Visual fields revealed an enlarged blind spot on oculus centerfield. Patient was diagnosed as BE Established Papilloedema/ Bilateral Grade 3 papilloedema (Frisen scale and referred to neurology clinic for advice. The laboratory investigations showed a deranged value for both vitamin B12 and vitamin D. The

patient had a value of 164 pg/ml Vitamin B12 (normal range: 200-900 pg/ml) while the value of vitamin D was reported to be 9 ng/ml which was required to be above 20 ng/mL

MRV confirmed the diagnosis of CVST with thrombosis of the left transverse and sigmoid sinuses

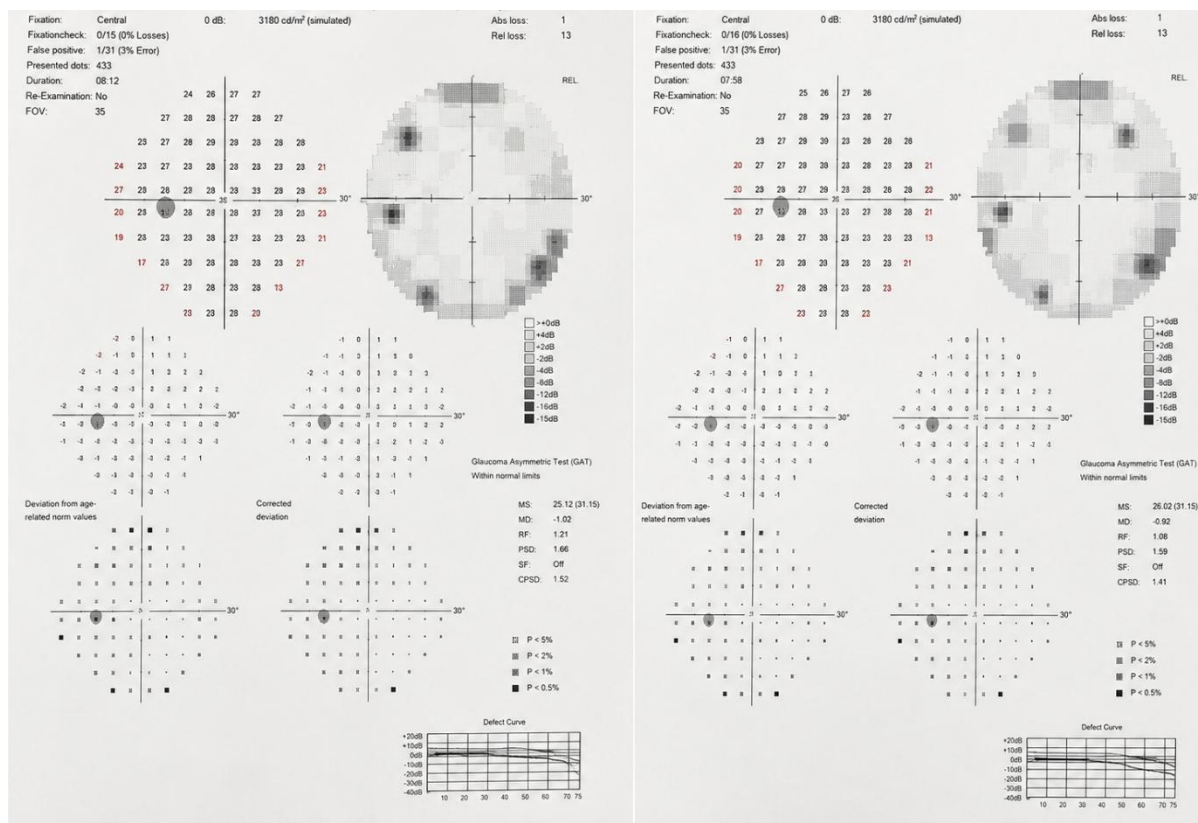
Patient was managed with oral Ecosprin, 75mg, acetazolamide, and oral vitamin B12 supplements. and was asked to follow up for Repeat Fundus photo and Visual Field examination after 4weeks Her first follow-up visit in 4 weeks showed improvement in vision of LE to 6/6, a normal visual field BE, and a resolved edema and haemorrhages.

Fundus Photo findings(28/06/2025)



VISUAL FIELD (30-2) RIGHT EYE AND LEFT EYE (28/06/2025)

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Discussion

Papilloedema denotes optic disc swelling secondary to raised intracranial pressure (ICP) and is attributed either to excessive cerebrospinal fluid (CSF) production or impaired CSF outflow. [1] CVST is an uncommon but important cause of papilloedema and may present with headache, vomiting, visual disturbances, and papilloedema.

Although the pathogenesis of CVST is multifactorial, increasing evidence suggests that nutritional deficiencies, including vitamin B12 and vitamin D deficiency, may act as reversible contributing factors. Other recognized associations include Antiphospholipid antibody syndrome, JAK2 mutations, myeloproliferative disorders, autoimmune diseases, and genetic thrombophilia such as Protein C deficiency, Protein S deficiency, and Factor V Leiden mutation. Additional provoking factors include COVID-19 infection and otitis media. [2,13]

Vitamin B12 deficiency results in hyperhomocysteinemia, which promotes a prothrombotic state by causing endothelial dysfunction and venous

stasis, thereby increasing resistance to cerebrospinal fluid (CSF) flow. [3]

This report emphasizes the need for maintaining a high clinical suspicion even in the absence of visual impairment or a relative afferent pupillary defect (RAPD). Careful history taking and appropriate discussion regarding patient symptoms can provide valuable clinical clues and help prevent overlooking significant fundus findings.

In a study by Katy C Lui et al, the natural history and visual outcomes of papilloedema in CVST were evaluated. Papilloedema was identified at the initial presentation in 54% of patients, whereas 46% developed papilloedema later during the course of the disease. The authors also reported that the approximate time to resolution of papilloedema was 6 months. [4]

In a study by Jessica A Sun et al, 35 pediatric patients with CVST and papilloedema were evaluated. Among them, 17 patients (55%) showed no progression of papilloedema, while 9 patients (29%) demonstrated progression despite treatment. Follow-up records were unavailable for 5 patients (16%). The authors concluded that among the 26

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patients with available follow-up, papilloedema resolved in 107 ± 128 days. [5]

In a study by Levi J Smith et al, it was reported that COVID-19 can induce a hypercoagulable state resulting in CVST with secondary papilloedema. At presentation, the patient was already receiving systemic anticoagulation therapy for a recent pulmonary embolism, which was also considered to be secondary to COVID-19. Following additional treatment with acetazolamide, improvement in optic nerve edema was observed. [6]

Eliseeva N et al evaluated patients with acute and subacute CVST and reported papilloedema in 26 patients. A high frequency of haemorrhages over and adjacent to the optic disc was noted among patients with papilloedema. In patients who required lumboperitoneal shunting because of worsening vision, papilloedema resolved within one month. In contrast, among patients treated with anticoagulant therapy along with acetazolamide and steroids, regression of papilloedema occurred over 6–9 months. [7]

Murdock et al evaluated a 16-year-old adolescent with CVT who presented with high-grade bilateral papilloedema. The patient received 48 mg of subcutaneous enoxaparin and 500 mg of acetazolamide twice daily. Subsequently, ONSF of the left eye was performed, followed by right ONSF using the same surgical technique and precautions on the next day. During follow-up, partial resolution of papilloedema was observed at 2 months, while complete resolution was documented after 4 months. [8]

Hurtado Montalbán N et al evaluated a 14-year-old patient presenting with bilateral frontal headache. Ophthalmoscopic examination demonstrated bilateral papilloedema. Treatment with oral acetazolamide (500 mg/day) resulted in disappearance of headache and reduction of papilloedema after one month. [9]

Ramesh et al evaluated a 59-year-old male presenting with episodic headache, blurring of vision, and papilloedema (PE), who was additionally advised continuous positive airway pressure (CPAP) therapy for moderate obstructive sleep apnea (OSA). The patient was initiated on enoxaparin followed by oral warfarin. Over a follow-up period of 3 months, both PE and sinus thrombosis resolved along with the patient's symptoms. [10]

Park MG et al retrospectively reviewed patients with CVST evaluated between 2008 and 2020. Of the 19 patients identified, 8 were excluded because fundoscopic examination or SWI was unavailable. Eleven patients were included in the final analysis. Papilloedema was

present in 6 patients, including bilateral papilloedema in 4 patients and unilateral papilloedema in 2 patients. Improvement of papilloedema was observed in all affected patients during follow-up, with a mean resolution time of 47.4 ± 40.5 days. [11,12]

This case report demonstrates that papilloedema may be detected as an incidental finding even in patients without visual complaints or other presenting symptoms. Maintaining a high index of clinical suspicion, supported by careful clinical evaluation and experience, may facilitate early diagnosis and contribute to preservation of vision and quality of life.

This study also demonstrates rapid resolution of papilloedema with medical management, with marked clearing of optic disc edema and haemorrhages observed as early as four weeks. These findings highlight the favourable outcomes that can be achieved through timely diagnosis and appropriately guided intervention.

Conclusion

This study emphasizes the need to practice the correct approach in dealing with patients in OPD. Also, it highlights the reversible nature of certain ocular pathology, when managed in a guided and optimum way. This case teaches us the importance of holistic yet integrated learning in medical field.

Credit authorship contribution statement

Vatsala Vats : Writing – original draft, Visualization, Investigation, Data curation.

Shreshtha Sharda: Writing – review & editing, Writing – original draft, Supervision, Conceptualization.

Sumit Oli: Writing – review & editing.

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Conflict of interest

All authors declare no conflicts of interest.

List of abbreviations

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1. CSF – Cerebrospinal Fluid
2. CVST - Cerebral Venous Sinus Thrombosis
3. IOP - Intraocular Pressure
4. MRV - Magnetic Resonance Venography
5. NCT - Non-Contact Tonometer
6. OPD - Outpatient Department
7. OSA - Obstructive Sleep Apnea
8. RAPD - Relative Afferent Pupillary Defect

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