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## Homeopathy's role in combatting ethambutol-induced optic neuropathy

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### Abstract

Ethambutol-Induced Optic Neuropathy (EON) is a known complication of ethambutol therapy, commonly used in the treatment of tuberculosis. EON is characterized by visual acuity loss, color vision disturbances, and visual field defects, which can significantly impair a patient's daily life. Conventional treatment involves discontinuing ethambutol and providing supportive care, but alternative therapies such as homeopathy are being explored for their potential benefits. This case series of EON is managed with homeopathic remedies, specifically *Physostigma* and *Natrum Muriaticum*. A patient was presented with typical symptoms of EON, including reduced visual acuity. When there was persistent visual loss even 2 years after discontinuation of ethambutol, a homeopathic regimen was initiated, incorporating *Physostigma* and *Natrum Muriaticum* based on the patient's symptomatology and constitutional type. As a result, notable improvements in visual function were seen. These findings suggest that homeopathic management with *Physostigma* and *Natrum Muriaticum* may offer a supportive role in the recovery from EON. However, comprehensive clinical trials and further research are essential to confirm these results and elucidate the mechanisms through which these homeopathic treatments may exert their effects.

**Keywords:** Ethambutol-induced optic neuropathy (EON), antitubercular treatment (ATT) adverse effects, toxic optic neuropathy (TON), physostigma and natrum muriaticum

### Introduction

Tuberculosis (TB) is a prevalent infectious disease that has impacted extensive populations. [1]. In 2022, approximately 10.6 million individuals globally were afflicted with tuberculosis, including 5.8 million males, 3.5 million females, and 1.3 million minors [2]. TB is ubiquitous across all nations and demographic groups. It has been a principal cause of mortality in India and worldwide [3]. The conventional treatment for TB comprises a 4-drug therapy, among these, ethambutol, a bacteriostatic agent developed in 1962, is notable for causing ethambutol-induced optic neuropathy (EON) [4]. In a significant number of patients EON causes irreversible loss of vision for life.

Ethambutol toxicity can lead to irreversible vision impairment and must be addressed given its prolonged use under India's updated tuberculosis treatment guidelines [5]. Although the effect of ethambutol on the optic nerves and retina has been recognized for a long time, a conclusive treatment remains elusive [6]. This case series underscores the treatment of ethambutol-induced optic neuropathy with Homeopathic medications.

### Case reports

#### Case 1

A 34-year-old female patient presented to the Homeopathy Outpatient Department with a complaint of blurred vision persisting for several months. Upon detailed history-taking, the patient disclosed that 2 years ago, she had undergone treatment for a history of a cold abscess with a positive Mantoux test and a confirmatory diagnosis of tuberculosis. The patient was put on a regimen of Anti-Tubercular Treatment (ATT), specifically Ethambutol administered thrice daily for a period of six months. As vision related changes were observed, Ethambutol was immediately stopped. The MRI of the brain and orbit revealed a mild bulky intra-orbital portion of the left optic nerve with increased STIR signal intensity and post-contrast enhancement presenting optic neuritis. A diagnosis of Ethambutol induced toxic optic neuropathy was made.

However, visual acuity was not restored even after the drug discontinuation. The patient had no prior history of ocular disease, nor had any significant family history. Despite undergoing various treatment modalities including topical and systemic steroids, wysolone, etc. Vision was not restored. Consequently, the patient opted for homeopathic

treatment.

Characteristically, the patient was a sensitive, family oriented person with easy irritability, fear of snakes, ghosts, death, darkness 3+, of being alone, and also suffered repeated headaches. Based on all the findings, repertorial analysis was done (Figure 1).

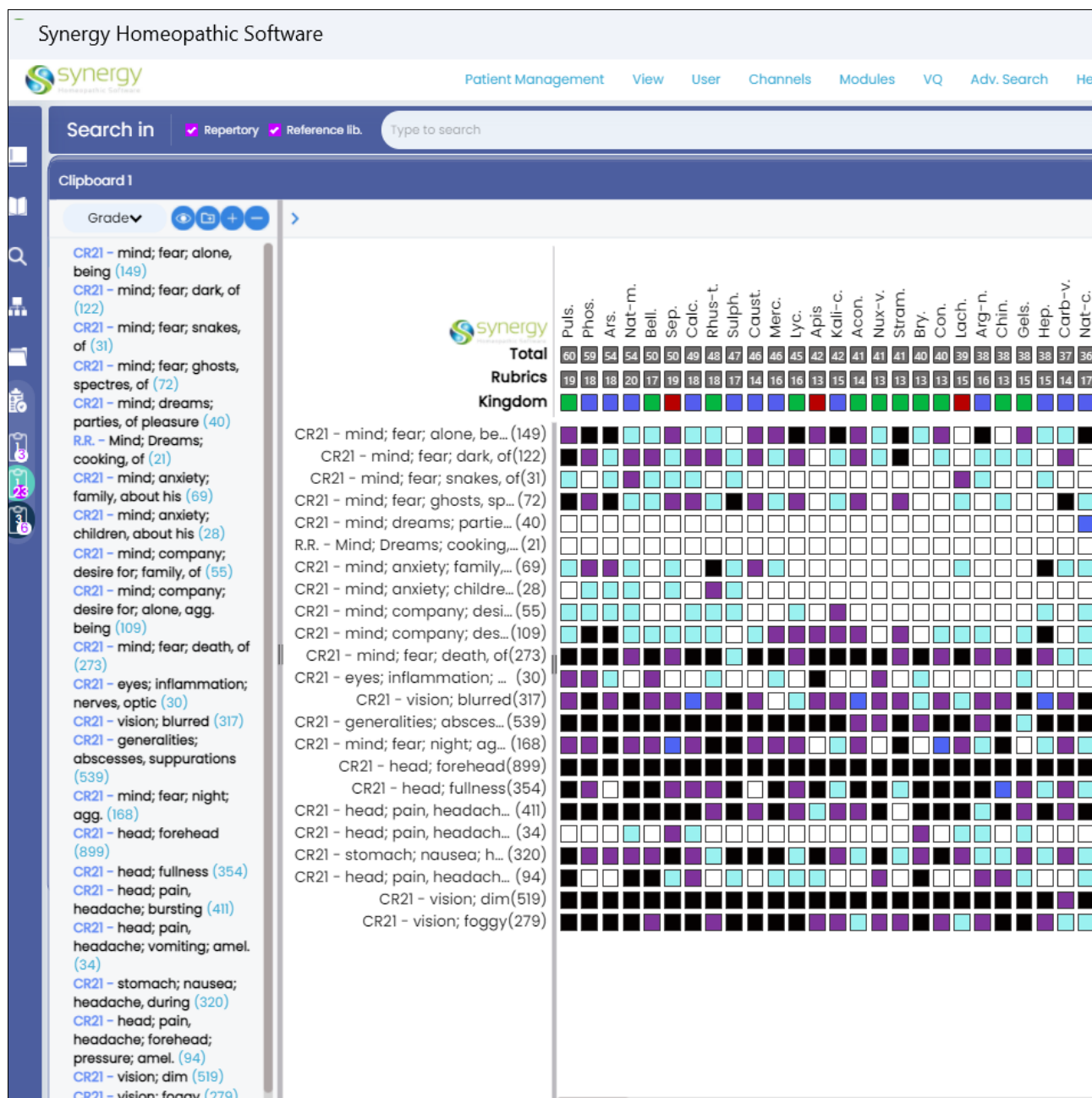


Fig 1: Repertorization chart of case 1

Table 1: Repertorial result

Sr. No.	Medicine	Marks obtained
1.	Natrum Muriaticum	54/20
2.	Pulsatilla nigricans	60/19
3.	Phosphorus	59/18
4.	Sepia	50/19
5.	Arsenic album	54/18
6.	Calcarea carbonica	49/18
7.	Rhus toxicodendron	48/18
8.	Belladonna	50/17

Treatment was started and the following changes were observed in the subsequent visit (Table 1).

**Table 1:** Treatment regimen for Optic neuropathy (Based on Repertorial chart (Figure 1))

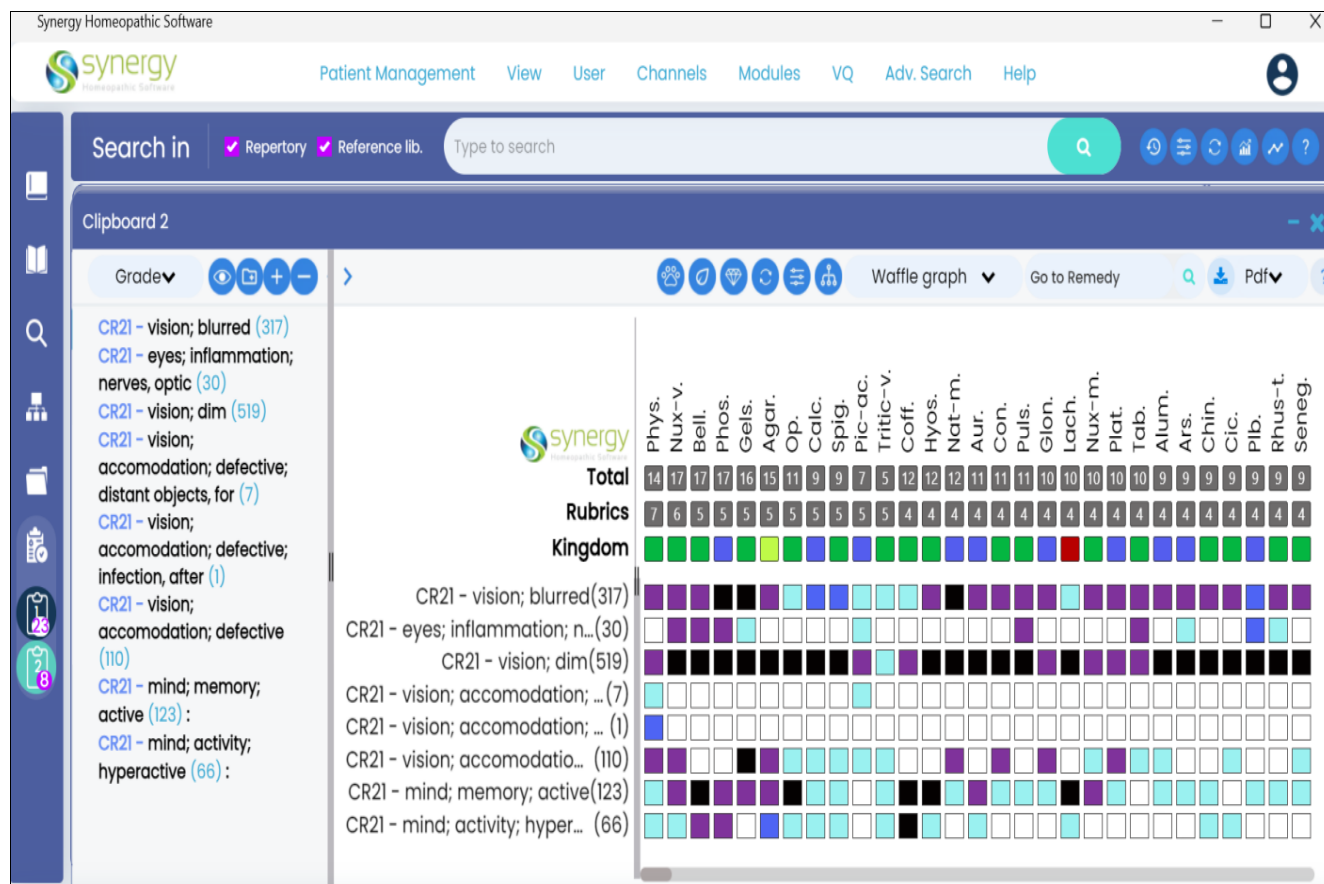
Date	Observation	Prescription
6/12/22	Patient had vision only till 2 feet distance and could not had vision of 6/12 in right eye and 6/9 in left eye and fundus (WMC) for both her eyes. Vision Blurred	First prescription-Natrum Carb 200 BD for 2 days Ruta 30 BD next 1 month
6/1/23	No improvement in vision	Same prescription repeated
27/1/23	No improvement in vision	Natrum Carb 1M, 1 dose Ruta 30 BD 2 weeks
13/2/23	Case reviewed as patient same on all levels, feeling weaker and duller.	Natrum Muriaticum 200 BD for 2 days Followed by Physostigma 30 BD for 1 month
18/3/23	No significant change in vision	Natrum Muriaticum 200 BD for 2 days Followed by Physostigma 30 BD for 1 month
11/4/23	Vision slightly better Every monthly follow up vision was felt slightly better	Same treatment repeated for 3 months
5/7/23	Vision improved	Natrum Muriaticum 200 BD for 2 days Followed by Physostigma 30 BD for 3 months
12/10/23	Vision completely normal. Patient happy that she can not only teach her children but also thread a needle and do embroidery which she liked. (Ophthalmology consultation) patient had vision of 6/6 and 6/6 and fundus (WMC) for both her eyes.	S/L 30 BD for 1 month

## Case 2

A 68-year-old male patient, a known case of diabetes mellitus (DM) and ischemic heart disease (IHD) had suffered from pulmonary tuberculosis three years ago, for which he was put on anti-tuberculosis treatment (ATT). After six months of the ATT regimen, he developed visual impairment, leading to the immediate withdrawal of Ethambutol. Patients funduscopy report revealed secondary optic atrophy with macular degeneration. For the next three months, he continued the ATT minus Ethambutol. However, even after two years of stopping all anti-tubercular

medications and being treated by conventional experts for his optic neuropathy, his vision had not improved. He complained of blurred, smoky vision, with the left eye being more affected than the right. At the time of consultation, his blood sugar levels were 119 mg/dL fasting and 167 mg/dL postprandial. Vitals were within normal limits. His mental general included anger, which was expressed, growth orientation towards business and handling his own independent business.

Repertorial analysis was done (Figure 2), and treatment was managed. (Table 2).



**Fig 2:** Repertorization chart of Case 2

**Table 2:** Treatment regimen for Optic neuropathy (Based on Repertorial chart (Figure 2))

Date	Observation	Prescription
23/1/24	Patient has vision only till 2 feet distance and cannot recognize faces beyond 2 feet (Ophthalmology consultation) patient had vision of 6/15 in right eye and 6/9 in left eye and fundus (WMC) for both her eyes.	Physostigma 30 BD for 1 month
27/2/24	Within 1 month vision gradually improved to clarity till 5 feet distance and he could identify and recognize faces till 5 feet.	Same continued
10/4/24	7-8 feet visual field clarity with inability to recognize things 10 feet distant	Same continued
23/5/24	Visual acuity till 12-13 feet	Same continued
20/6/24	Can clearly recognize people and objects at 15 feet which he could not recognize till last month 6/6 in right eye and 6/6 in left eye and fundus (WMC) for both her eyes.	Physostigma 30 BD for 1 month Patient still under treatment

### Homeopathic approach

A fundamental principle of homeopathy is individualization, which emphasizes the importance of considering the patient as a whole. In homeopathy, the vital force is regarded as being affected, resulting in localized symptoms. Prescriptions are determined based on the patient's mental state, general physical condition, and specific symptoms. Since the individual as a whole is impacted, both physical and mental generalities are crucial, forming the foundation of homeopathic prescriptions.

### Discussion

Ethambutol-induced optic neuropathy (EON) is recognized as dose- and duration-dependent, typically manifesting between 4 and 12 months after the initiation of therapy [7]. Although EON is generally considered reversible, complete recovery is not always achievable, potentially resulting in permanent visual impairment [8, 9]. The extent of reversibility depends on the early recognition of ocular signs and symptoms, making early or subclinical detection of visual impairment crucial [10].

In Case 1, the patient responded to *Natrum Muriaticum* 200 BD for 2 days, followed by *Physostigma* 30 BD for 2 months, leading to gradual improvements. The same regimen was continued, and during the last follow-up visit, the patient reported significant improvement in vision, enabling her to perform detailed tasks such as stitching and threading a needle. A retinal examination revealed that her vision had restored to 6/6 in both eyes, with a normal fundus (WMC) in both eyes. In Case 2, the patient was administered *Physostigma* 30 BD (Table:2) and maintained on it, with recovery and improvement in vision observed every subsequent month.

In both cases, the patients experienced vision-related issues after six months of drug therapy, with ophthalmic changes confirmed by fundoscopy or MRI findings. Despite treatment with various medications, including Wysolone and Optineuron, there was minimal initial improvement, followed by no further progress in vision. Consequently, these patients were additional cases of irreversible vision loss due to Ethambutol-induced toxic optic neuropathy, like thousands of others across the sub-continent.

A similar scenario was seen on a 10-year follow-up study conducted in Taiwan, where almost half of patients with EON suffered from irreversible loss of visual function [11]. Another study concluded that out of thirty-six patients with ethambutol optic neuropathy visiting a neuro-ophthalmological clinic, only fifteen patients regained their visual acuity to better than 1.0. Aside from visual acuity, other visual functions of the recovered ethambutol optic neuropathy patients were incomplete [12].

In our case series, the patients sought homeopathic treatment, which were based on holistic approach. After detailed homeopathic case history taking, individualized homeopathic medicines were prescribed. Several homeopathic remedies, such as *Ruta Graveolens*, *Natrum Muriaticum*, and *physostigma*, are known to have specific actions on the functions and tissues of the eyes and nerves. With *Natrum Muriaticum* maintaining fluid balance, generating electrical impulse and gradients in nerve and muscles cells enabling update of nutrients is known [13]. *Physostigmine* (esrine) prepared from calabar bean has a specific sphere of action on eyes and nerves and is known to reverse the effect on the CNS caused by clinical or toxic dosages of drugs capable of producing the anticholinergic syndrome [14]. Thus, effectively managing vision related ailments.

Many case reports and studies have indicated that Ethambutol usage is associated with permanent visual loss and should be avoided if possible or used with caution and proper ophthalmological follow-ups [15]. In our case series, both patients had discontinued Ethambutol for more than 24 months, but their vision was not restored. Thus, we see a good scope in treating irreversible loss of vision due to EON using a Homeopathic approach.

### Conclusion

Ethambutol-induced optic neuropathy, a recognized adverse effect, poses a significant challenge to healthcare professionals due to its often-insidious onset. Consequently, regular ophthalmologic examinations and timely diagnosis are imperative for patients undergoing post-ethambutol therapy to ensure the preservation and treatment of visual function. This case series underscores the management of optic neuropathy, wherein one patient was treated with *Natrum Muriaticum* and has remained asymptomatic for more than a year, and another is improving drastically with *physostigma* despite his age of 68. The observed beneficial effects of the homeopathic medicines warrant further investigation through clinical trials.

**Conflict of interest:** None

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