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REVIEW

Diagnostic and Management Strategies of Visual Snow Syndrome: Current Perspectives

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Introduction: Visual Snow Syndrome (VSS) is characterized by the presence of dynamic, continuous, tiny dots in the entire visual field persisting for more than three months, with at least two associated symptoms- palinopsia, photopsia, photophobia, or nyctalopia. VSS was introduced as perpetual visual disturbance representing TV static, based on early case reports from 1995. Despite its recognition, VSS management remains vague as many cases are refractory to treatment. This literature review aims to provide a summary of all attempted treatments and efficacies to help physicians manage VSS.

Methods: The authors performed a search of articles, literature reviews, and case reports using PubMed and Google Scholar with the key words "visual snow" and "treatment". Forty-one publications were identified; however, 14 were excluded as they did not discuss treatment options or focused on medical conditions associated with visual snow, such as migraine with aura. 27 articles were found to be relevant (from 1999–2024) with treatments in patients officially diagnosed with VSS. Treatments included pharmacotherapy, tinted lenses, neuromodulation, and behavioral therapy.

Results: Based on this review of 27 publications, benzodiazepines and lamotrigine had the best effect (71.4% and 61.5% of patients had an improvement of VS symptoms on each medication, respectively). Antidepressants and AV nodal blocking agents were frequently prescribed but were less effective. VS symptoms improved with filtered lenses combined with cognitive behavioral therapy. Most treatments only partially alleviate VSS or manage associated symptoms like headache and palinopsia, rather than the visual snow itself.

Conclusion: The subjective nature of VSS has posed challenges. Among pharmacological treatments, benzodiazepines and lamotrigine have the most favorable therapeutic ratio in managing VSS. FL-41 tinted lenses consistently provide symptom relief, with cognitive behavioral therapy showing promise as an emerging intervention. Due to the small sample size, further research is recommended to enhance the applicability of findings.

Keywords: visual snow syndrome, palinopsia, photophobia, nyctalopia

Introduction

Visual Snow Syndrome (VSS) is a neurologic visual disturbance phenomenon that is described by "three or more months of dynamic, continuous, tiny dots in the entire visual field with at least two associated symptoms of palinopsia, photopsia, photophobia, or nyctalopia".[1] The syndrome can be essential or acquired. The diagnostic criteria of VSS were established by Schankin et al in 2014 through a combination of retrospective chart review and prospective interviews of patients with visual snow symptoms.[1] Additionally, a diagnosis of VSS can only be achieved if symptoms are "not consistent with typical migraine visual aura" and "not better explained by another disorder". VSS typically presents with normal findings on ophthalmological and neurological exams. Visual snow (VS) can be most readily distinguished from migraine visual aura, as defined by the International Headache Society, by its persistent "TV static" appearance, in contrast to a transient visual defect commonly seen in migraine visual auras.

Although it has been 30 years since VS was first defined in literature by Liu et al,[2] treatment has remained unclear, primarily due to the uncertain pathophysiologic nature of the condition itself. Current literature suggests that VSS is a result of occipital cortex hyperexcitability, loss of habituation,[3] as well as thalamocortical dysrhythmia, which leads to

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lack of inhibitory modulation.[4] Additionally, treating VSS is difficult due to the need for an objective method of symptom measurement. VSS is largely known as a subjective disorder, often with psychiatric comorbidities such as depression and anxiety. Therefore, treatment response is often based on self-reported history or alleviation of comorbidities, making it difficult to quantify efficacy of treatment. However, given the fact that the psychosomatic symptoms of VSS decrease quality of life,[5] providing patients with possible treatment options is critical.

Using the limited understanding of the physiology of VSS, pharmacologic interventions were first attempted. However, as research began to uncover the psychiatric implications of VSS, the horizon of treatment has widened to filtered lenses, behavioral therapy, and neuromodulation. In this paper, we comprehensively review existing literature summarizing all attempted treatments for VSS and their respective efficacies. Our goal is to summarize the reported effects of various treatment approaches on patients affected by this poorly understood, complex, yet disabling condition.

Methods

We performed a literature review of existing papers, retrospective studies, and case reports in English using PubMed and Google Scholar using the keywords "visual snow treatment", "visual snow, treat", "tv static, vision, treatment", and "visual snow syndrome treatment" from April 1995 to June 2024. These articles discussed therapeutic attempts to treat visual snow, including successful and failed therapies. All attempted therapies were included in this review. Existing literature reviews were excluded to prevent redundancy. Additionally, "migraine with visual aura" cases were excluded as research has shown it to be a separate neurologic phenomenon.[1] Cases with "possible visual snow" were also excluded due to lack of confirmation of diagnosis. This review focused on treatment options rather than pathophysiology; hence, publications that did not mention treatment were also excluded. Based on these criteria, the review encompasses 27 publications.

Results

In the papers we reviewed, treatments documented for visual snow can generally be categorized into 4 types: medications, tinted lenses, neuromodulation, and behavioral therapy. Below are the summaries of the prescribed treatment and patient response within each category from all included papers. Table 1 displays each study in chronological order and their respective attempted pharmacotherapies. Table 2 displays each attempted pharmacotherapy and the percentage of patients it benefitted.

Table 1 Visual Snow Treatments in Chronological Order

Author	Year	N	Treatment	Conclusion
Liu et al[2]	1995	n=1	Aspirin	No effect
		n=1	Amitriptyline	No effect
		n=1	Nifedipine	No effect
		n=1	Sertraline	Reduced visual phenomena by 50%
		n=1	Nortriptyline	Resolved only the palinopsia
		n=1	Carbamazepine	Resolved only the palinopsia
San Juan et al[6]	2007	n=1	Verapamil	No effect
		n=1	Clozapine	No effect
		n=1	Aspirin	No effect

(*Continued*)

Table 1 (Continued).

Author	Year	N	Treatment	Conclusion
Wang et al[7]	2008	n=1	Propranolol, Amitriptyline & Lamotrigine	Frequency and severity of headaches improved, but "TV static" persisted
		n=1	Sumatriptan, Flurbiprofen	No effect
Evans et al[8]	2012	n=1	Baclofen	Partial improvement
		n=1	Acetazolamide, Carbamazepine, Coenzyme Q10, Cyproheptadine, Divalproex Sodium (Oral & IV), Gabapentin, Magnesium Oxide, Methylphenidate, Lamotrigine, Sertraline, Topiramate, Propranolol	No effect
		n=1	Topiramate 200 mg QD	Partial improvement of visual snow (less noticeable) and palinopsia (less frequent)
		n=1	Verapamil 240 mg QD	Partial improvement of visual snow (less noticeable) but worsening of headache
Simpson et al[9]	2013	n=1	Sumatriptan 20 mg QD nasal spray	No effect
			Topiramate 100 mg BID	
			Riboflavin 400 mg BID	
			Acetazolamide 500 mg QD	
			Occipital nerve injections (40 mg)	
			Methylprednisolone with 30 mg 1% lidocaine	
		n=1	Flunarizine 10 mg QD	Discontinued due to GI intolerance
Schankin et al[10]	2014	n=1	Naproxen	Partial improvement
		n=3	Sertraline	Worsening in 1 patient. No effect on 2
		n=2	Fluoxetine	No effect
		n=1	Amitriptyline, Propranolol	No effect
		n=1	Verapamil, Lamotrigine	No effect
		n=1	Clonazepam	No effect
Schankin et al[1]	2014	n=1	Propranolol 80 mg per day	Partial improvement
		n=1	Lamotrigine 150 mg per day	Partial improvement
		n=1	Topiramate and Amitriptyline	Worsening symptoms
Thissen et al[11]	2014	n=1	Lamotrigine, Sodium Valproate	No effect
Unal-Cevik et al[12]	2015	n=1	Lamotrigine 50 mg BID	Complete resolution of visual snow. Palinopsia improved by 80%. Migraine frequency decreased
		n=1	Fluoxetine	No effect
Sastre-Iba et al[13]	2015	n=1	Lamotrigine	Partial improvement of visual snow and photophobia
		n=1	Magnesium	No effect

(*Continued*)

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Table 1 (Continued).

Author	Year	N	Treatment	Conclusion
Lauschke et al[4]	2016	n=12	Yellow-blue colored filtered lenses	Visual snow symptoms improved in 10 patients
	n=12			
Metzler et al[14]	2018	n=1	Topiramate, Onabotulinum	No effect on visual snow but improved migraines
			Toxin A injections and Verapamil	
van Dongen et al[15]	2019	n=26	Lamotrigine	Partial improvement in 5 patients
		n=4	Topiramate	Partial improvement in 1 patient
		n=2	Acetazolamide	No effect
		n=1	Flunarizine	No effect
		n=7	Valproate	No effect
Grey et al[16]	2020	n=9	10 + 1 hz rTMS	Reduced sum of visual snow intensity the week after therapy
		n=9	10 hz rTMS	No effect
Shibata et al[17]	2020	n=1	Valproate 200mg	Improved headache, no effect on visual snow
Yoo et al[18]	2020	n=1	Lamotrigine 25 mg/day	No effect
		n=2	Propranolol 20 mg/day	No effect
		n=1	Topiramate 25 mg/day	No effect
		n=1	Acetazolamide 750 mg/day	No effect
Mehta et al[19]	2021	n=6	Benzodiazepines	Partial improvement of visual snow
		n=30	Lamotrigine	Partial improvement of visual snow
		n=56	Topiramate	Partial improvement of visual snow
		n=14	Acetazolamide	Partial improvement of visual snow
		n=3	Sertraline	Worsened visual snow
		n=2	Venlafaxine	Worsened visual snow
		n=1	Bupropion	Worsened visual snow
		n=1	Escitalopram	Worsened visual snow
		n=1	Fluoxetine	Worsened visual snow
		n=1	Nortriptyline	Worsened visual snow
		n=1	Topiramate	Worsened visual snow
		n=1	Verapamil	Worsened visual snow
		n=3	Visual/mental distraction (visually stimulating environments)	Improved visual snow
		n=4	Tinted lenses, details unclear	Improved visual snow
		n=2	Good night's sleep	Improved visual snow
		n=4	Stress reduction techniques, details unclear	Improved visual snow

(*Continued*)

Table 1 (Continued).

Author	Year	N	Treatment	Conclusion
		n=2	"Visual snow relief" videos	Improved visual snow
		n=6	Exercise	Worsened visual snow
		n=2	Caffeine	Worsened visual snow
		n=4	Stress	Worsened visual snow
		n=2	Marijuana	Worsened visual snow
		n=2	Botulinum toxin injection	Worsened visual snow
Coleman et al[20]	2021	n=1	Phenylephrine 2.5% eye drops PRN	Partial improvement of nyctalopia
		n=1	FL-41 Tinted Glasses	Complete resolution of photophobia. No effect on visual snow
Grande et al[21]	2021	n=10	rTMS	Discontinued due to covid-19 pandemic
Puledda et al[22]	2022	n=227	Antidepressants	Medications are generally ineffective in visual snow syndrome, with the exception of vitamins (improved symptoms in 26 patients) and benzodiazepines (improved symptoms in 39 patients)
		n=198	Recreational drugs, alcohol	
		n=168	Vitamins	
		n=151	Antiepileptics	
		n=141	Antibiotics/antifungals	
		n=124	Benzodiazepines	
		n=81	Pain medication	
		n=68	Antihypertensive drugs	
		n=45	Steroids	
		n=30	Triptans	
		n=26	ADHD medication	
		n=18	Antihistamines	
		n=10	Antipsychotics	
		n=81	Nausea/Dizziness	
		n=93	Others (caffeine, contraceptives, etc).	
Guay et al[23]	2022	n=1	Topiramate 25mg QD	Worsened visual snow symptoms
		n=1	Amitriptyline 30 mg/day	No effect
		n=1	Gabapentin 900 mg/night with Magnesium Citrate	No effect
		n=1	Onabotulinum toxin A	Pending
Werner et al[24]	2022	n=1	Blue-tinted lenses	Partial improvement; 10% reduction visual snow symptoms
Tannen et al[25]	2022	n=25	FL-41 or BPI-Omega filter lenses	At least 50% reduction in frequency and intensity of visual snow

(*Continued*)

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Table 1 (Continued).

Author	Year	N	Treatment	Conclusion
Tsang et al[26]	2022	n=21	6-week Neuro-Optometric Visual Rehabilitation Therapy	Improvement in QOL, VFQ
Han et al[27]	2023	n=40	Blue tint filtered glasses	Improved perceived intensity, duration, and frequency of visual snow in 80%, 32 patients
Montoya et al[28]	2023	n=27	High-contrast dynamic patterns	135 second exposure eliminated the snow for 14.1 seconds on average.
Wong et al[29]	2024	n=21	Cognitive behavioral therapy	Improved visual snow

Table 2 Attempted Pharmacotherapies in Treating VS

Therapy	Number of Subjects Attempting Therapy	Number of Subjects with VS Improvement	Percentage of Subjects with Improvement
SSRI/SNRI	15	1	6.7%
TCA	7	0	0%
Atypical antidepressant	1	0	0%
Topiramate	14	4	28.5%
Lamotrigine	13	8	61.5%
Valproate	10	0	0%
Carbamazepine	2	0	0%
Gabapentin	2	0	0%
Verapamil	5	1	20%
Flunarizine	2	0	0%
Nifedipine	1	0	0%
Propranolol	6	1	16.7%
Acetazolamide	8	3	37.5%
Sumatriptan	2	0	0%
Benzodiazepine	7	5	71.4%

Pharmacotherapy

Antidepressants were one of the most commonly trialed therapies for VSS. Selective Serotonin Reuptake Inhibitors (SSRIs) and Serotonin-Norepinephrine Reuptake Inhibitors (SNRIs), including sertraline, fluoxetine, escitalopram, or venlafaxine) were attempted in six studies and included 15 subjects (Table 2). These medications reduced the VS symptoms by 50% in one patient, had no effect in six patients, and worsened symptoms in eight patients. Tricyclic antidepressants were trialed in seven studies and included seven subjects. They had no effect in three patients and worsened symptoms in two patients. Nortriptyline resolved palinopsia in one patient, while amitriptyline, in combination with propranolol and lamotrigine, improved the frequency and severity of associated headaches, although the "TV static" VS phenomenon persisted. Lastly, bupropion was attempted in one study but worsened visual snow. Dosage information

was not provided for any of these findings. Overall, only 1 subject (6.7%) improved from the use of SSRI. 0% of patients benefitted from TCA or atypical anti-depressants. Anticonvulsants were also commonly explored as a treatment option for VSS (Table 2). Topiramate was trialed in nine studies with 14 patients. Four patients (28.5%) noted partial improvement. One patient trialed 200 mg topiramate daily and noted VS was less noticeable and palinopsia was less frequent. One patient experienced no effect on VS, but it improved their migraine. Six patients noted no improvement, noting trials at 25 mg daily or 100 mg twice daily. Lastly, two patients had worsening VS on topiramate.

Lamotrigine was trialed in nine studies with 13 patients (Table 2). One patient experienced complete resolution of visual snow at 50 mg twice daily with an 80% improvement in palinopsia and a decrease in migraine frequency. Seven patients noted partial improvement of VSS, with one patient specifically at 150 mg/day. Another patient noted improved headaches with the combined use of lamotrigine, propranolol, and amitriptyline, although the VS phenomenon persisted. Lamotrigine had no effect in four patients at a dosage of 25 mg/day), including two who combined it with verapamil and sodium valproate. Overall, 8 out of 13 patients benefitted from lamotrigine, making it efficacious in 61.5% of patients.

Valproate was trialed in four studies with ten patients (Table 2). It had no effect on nine patients; however, a 200 mg dose improved headaches in one patient without any impact on visual snow, resulting in a 0% treatment benefit. Carbamazepine was tested in two studies with two patients (Table 2). One patient experienced resolution of palinopsia, while another reported no effect, resulting in a 0% benefit for visual snow. Lastly, among the anticonvulsants, gabapentin was trialed in two studies with two patients. Neither experienced any effect on VS.

AV Nodal Blocking Agents, including calcium-channel-blockers and beta-blockers, were frequently attempted to treat VSS. Verapamil was the most commonly used, with five studies involving a total of five subjects. Only one patient, taking a dose of 240 mg daily, reported that their VS was less noticeable, but it worsened their headaches; thus, Verapamil had a 20% success rate). One patient noted an improvement in migraines only, two had no effect, and one experienced worsening symptoms on verapamil. Propranolol was tested in four studies with a total of six patients. One patient reported partial symptom improvement with an 80 mg daily dose, another experienced relief from headaches but no change in visual snow symptoms, while four patients observed no effect on visual snow. Consequently, propranolol demonstrated a 16.7% efficacy rate.

Flunarizine was trialed in two studies (Table 2). One patient initiated treatment with 10 mg QD but discontinued due to gastrointestinal intolerance, while another patient experienced no therapeutic benefit, resulting in a 0% success rate. Similarly, nifedipine was administered to one patient, yielding no improvement in visual snow and also demonstrating a 0% success rate.

Migraine medications were also frequently tried. Acetazolamide was included in five studies with eight patients (Table 2). Three patients experienced partial improvement of VS symptoms, with a 37.5% success rate. The remaining five patients saw no effect, even at doses such as 500 mg and 750 mg daily. Sumatriptan was evaluated in two studies using both oral and nasal formulations; however, neither demonstrated efficacy in patients with visual snow, resulting in a 0% success rate. Benzodiazepines were used in two trials involving a total of seven patients (Table 2). Five experienced partial improvement of VS, although the specific benzodiazepine and dosages were not detailed (71.4%). One patient tried clonazepam without any effect.

Lastly, within pharmacotherapy, a variety of "Miscellaneous" drugs were attempted to treat VSS. Naproxen improved symptoms in one patient, while botulinum toxin only alleviated migraines in another. Baclofen provided partial improvement in one patient, and phenylephrine eye drops, used as needed, partially improved nyctalopia. However, other drugs, including aspirin, clozapine, cyproheptadine, coenzyme Q10, flurbiprofen, methylprednisolone, magnesium, methylphenidate, and riboflavin, had no effect on patients.

FL-41 / Tinted Lenses

Filtered lenses have been increasingly utilized in recent visual snow studies and were mentioned in six publications. Lauschke et al involved 12 patients who tried yellow-blue colored filtered lenses. Of these participants, 83% reported an improvement in their VS symptoms.[4] In another study, four patients found that tinted lenses improved their VS symptoms, though the specific details of the lenses used were not provided.[19] In one study (n = 1), FL-41 tinted lenses completely resolved photophobia but had no effect on VS.[20] Another patient tried blue-tinted lenses and reported a partial reduction (10%) in VS symptoms.[24] In a study of

25 patients, FL-41 or BPI-Omega filtered lenses resulted in at least 50% reduction in frequency and intensity of VS.[25] Lastly, in a study of 40 patients using blue-tinted filtered lenses, 80% experienced improvement in the perceived intensity, duration, and frequency of VS.[27]

Neuromodulation

Some recent studies have attempted to use neuromodulation to treat VSS. Two trials were conducted in total, although one was discontinued due to the COVID-19 pandemic.[21] Another study compared the efficacy of 10 + 1 hz repetitive transcranial magnetic stimulation (rTMS) to 10 hz rTMS alone. The results indicated that, in all nine patients, the 10 + 1 hz rTMS protocol significantly reduced the overall intensity of VS symptoms in the week following therapy.[16]

Therapies

Lastly, various therapeutic approaches have been explored, with Cognitive Behavioral Therapy (CBT)—a form of psychotherapy that helps individuals manage mental health challenges by altering thought patterns—being one of the initial interventions. In a study involving 21 patients, participants self-rated the impact of VS symptoms on daily life at Week 9 and Week 20, reporting improvements following mindfulness-based CBT.[29] Noise therapy was studied in a group of 27 subjects, revealing that a 135 second exposure to high-contrast dynamic noise patterns temporarily eliminated VS for an average of 14.1 seconds.[28]

Another therapeutic approach distinct from CBT was explored: neuro-optometric rehabilitation, which aims to regulate oculomotor dysfunction in patients. A six-week neuro-optometric visual rehabilitation therapy was also conducted with 21 patients, who subsequently reported improvements in their quality of life and their scores on the Visual Function Questionnaire.[26] Lastly, various daily modifications were attempted, revealing that mental distraction (through visually stimulating environments), restful sleep, stress reduction techniques, and "visual snow relief" video improved VS symptoms in 15 patients. The video features five minutes of TV static, which may function similarly to white noise therapy for tinnitus. It is available on YouTube at the following link: YouTube Video. Conversely, exercise, caffeine, stress, and marijuana worsened visual snow symptoms in 14 patients.[19]

Discussion

In summary, our findings established that the most commonly used therapies for VSS fall into four main categories: pharmacologic treatments, filtered lenses, neuromodulation, and behavioral therapies. Among the pharmacologic options, anticonvulsants were the most frequently used, followed by antidepressants and calcium channel blockers. Among medications, anticonvulsants demonstrated the highest therapeutic ratio, particularly Lamotrigine, which showed efficacy in 61.5% of patients who reported improvement in VS symptoms with this treatment. One proposed explanation for visual snow suggests it involves hyperexcitability in the occipital cortex.[3] The diffuse cortical hyperexcitability[30] often associated with epilepsy may explain the effectiveness of lamotrigine in treating visual snow. Bou Ghannam et al[31] recommend oral Lamotrigine as a treatment option, starting at 25 mg once daily and gradually increasing to 200–300 mg once daily, with increments of 25–50 mg weekly after the initial two weeks. It is worth emphasizing that while the therapeutic ratio appears promising, only one patient achieved complete resolution with Lamotrigine,[12] while most experienced only partial relief of visual snow symptoms. Thus, achieving 100% efficacy in treating VSS remains a challenging and largely elusive goal.

Given the frequent association of depression and anxiety with VSS,[5] antidepressants have often been explored as a treatment option. However, studies have shown that SSRIs had a limited therapeutic ratio of 1/15 (6.7%), indicating minimal success. However, these conclusions remain largely limited given the subjective nature of reported antidepressant effect on VSS. Interestingly, CBT has gained more attention in recent years. Wong et al specifically investigated the functional connectivity (FC) dysregulation in visual networks of VS patients who underwent 20 weeks of mindfulness-based CBT. Remarkably, all patients reported decreased VS symptoms in daily life from week 9 to week 20, and MRI findings revealed a reduction in FC dysregulation in the left lateral occipital cortex. These improvements were sustained three months post-intervention, marking a significant advancement in VSS treatment. Such prolonged improvement is unexpected based on natural history studies.[29] It is important to note that neuro-optometric

rehabilitation was another therapy explored, distinct from cognitive behavioral therapy, as it specifically targets oculomotor dysfunction, a condition frequently associated with VSS. Similarly, Tannen et al[25] and Han et al[27] identified accommodative insufficiency, convergence insufficiency, and saccadic eye movement deficits as common forms of oculomotor dysfunction in patients with concussion, demonstrating that these patients benefited from neuro-optometric rehabilitation.

Lastly, research observed that filtered lenses, especially FL-41 or blue-tinted lenses, were favorably received by VS patients, leading to partial alleviation of symptoms in approximately 80% of patients. The effect of these lenses was particularly evident in reduced palinopsia and decreased intensity, frequency, or duration of VS symptoms.[27] These findings support an additional hypothesis that VS is due to a thalamocortical dysrhythmia in the visual pathway[4] and that VS is often exacerbated by high-contrast visual stimuli.[4] Filtered lenses, particularly those with a yellow-blue tint that modulate the koniocellular processing pathway and provide symptomatic relief to individuals with VS, likely because this pathway reduces light sensitivity. It is important to note that Lauschke et al[4] and Han et al[27] have extensively tested the chromaticity of the color filters using an Intuitive Colorimeter and found that the optimal choice of color to decrease cortical excitability can vary between individuals. While this particular study identified yellow-blue tint to be helpful for many patients, the selection of color filter may require precise customization based on the individual patient preferences. A similar approach is often employed when prescribing filtered lenses for dyslexic children to mitigate visual instabilities associated with dyslexia.[32]

There are limitations to extending these treatment options to all patients with visual snow. Several of the studies reviewed here were based on case reviews involving patients of diverse ages and with various comorbidities, including depression, anxiety, and hypertension. The existing studies are largely limited by small sample sizes, often consisting of case reports with a sample size of n = 1. Additionally, numerous articles lacked detailed information regarding medication dosage, frequency, or duration of pharmacotherapy attempts. Moreover, many interventions relied solely on subjective reports of VS symptoms, often in the form of a symptom diary. As a result, many studies merely noted improvements or worsening of VS without being able to quantify their findings in a standardized manner, complicating cross-study comparisons.[8]

Conversely, studies such as the one by Unal-Cevik et al, which utilized VEP[12] measurements, provided more quantifiable outcomes. Similarly, Grey et al[16] combined VEP measurements with participants' completion of a VS diary and questionnaire, thereby capturing the subjective and objective aspects of this enigmatic visual syndrome. Given that VS typically has an unremarkable ophthalmological and neurological exam, providing objective measurements of disease severity remains a significant challenge.

Conclusion

The results of our study highlight the extensive efforts made so far to explore a wide range of treatment modalities, including pharmacological and non-pharmacological approaches, for VSS. Despite these efforts, the subjective nature of the condition has posed challenges, with only a few treatments demonstrating complete efficacy. Nevertheless, our literature review suggests that FL-41 tinted lenses consistently provide symptom relief, with cognitive behavioral therapy showing promise as an emerging intervention. Among pharmacological treatments, benzodiazepines and lamotrigine demonstrate the most favorable therapeutic ratio for managing VSS with success rates of 71.4% and 61.5%, respectively. However, the small sample sizes in most existing studies present a significant limitation. Therefore, future large-scale prospective cohort trials will be crucial in providing strong evidence to guide the development of comprehensive medical guidelines for managing this challenging and debilitating syndrome.

Disclosure

The authors report no conflicts of interest in this work.

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