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Original Article

Clinical and Electroencephalographic Characteristics of Childhood Occipital Epilepsies: Comparison of Self-limited and Symptomatic Forms

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ABSTRACT

Aim: This study aimed to evaluate the clinical, electroencephalography, neuroimaging, and treatment characteristics of childhood occipital epilepsy spectrum disorders and to compare self-limited and symptomatic cases.

Materials and Methods: Sixty-four pediatric patients followed between October 2015 and January 2026 were retrospectively evaluated. The patients were classified into three groups according to clinical, developmental, and radiological findings: self-limited, symptomatic, and unclassified.

Results: Sixty-four patients were included, comprising 25 (39.1%) self-limited, 36 (56.3%) symptomatic/determinable, and 3 (4.7%) unclassified cases. The mean seizure onset age was 4.77±3.77 years and this was significantly earlier in the symptomatic group ($p<0.001$). Magnetic resonance imaging abnormalities were identified in 31 patients (48.4%). Autonomic symptoms (54.7%) and nocturnal seizures (37.5%) were common, with nocturnal seizures occurring more frequently in the self-limited group ($p=0.014$). Occipital epileptiform activity was observed in 55 patients (85.9%), including 24 out of the 25 (96.0%) patients in the self-limited group and 29 out of the 36 (80.6%) in the symptomatic/determinable group. The remaining nine patients (14.1%) demonstrated multifocal epileptiform activity with occipital involvement. Extra-occipital spread of occipital epileptiform discharges was observed in 56.3% of the patients, and generalized spike-wave discharges (31.3%) and spike-wave activation in sleep (9 patients) were identified in both groups. Initial antiseizure medication failure and polytherapy requirement were significantly more frequent in the symptomatic/determinable group.

Conclusion: Childhood occipital epilepsies represent a heterogeneous and dynamic electroclinical spectrum rather than sharply separated syndromes. The presence of extra-occipital epileptiform activity, generalized spike-wave discharges, and sleep-activated epileptiform activity supports the concept that childhood occipital epilepsies represent a dynamic electroclinical spectrum. Therefore, long-term neurocognitive and electroencephalographic follow-up remains important, particularly in those children with self-limited occipital epilepsy syndromes as electroclinical evolution may continue despite clinical seizure remission.

Keywords: Childhood occipital epilepsy, self-limited epilepsy with autonomic seizures, electroencephalography, generalized spike-wave discharges, symptomatic occipital epilepsy

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Introduction

Childhood-onset focal epilepsy syndromes were redefined under the category of "self-limited focal epilepsies" in the International League Against Epilepsy (ILAE) 2022 classification. Occipital epilepsy syndromes within this group are characterized by age-related onset, typical electroclinical features, and generally favorable prognosis. In the current terminology, Panayiotopoulos syndrome is referred to as "self-limited epilepsy with autonomic seizures (SeLEAS)," whereas Gastaut-type occipital epilepsy is referred to as "childhood occipital visual epilepsy (COVE)" (1).

SeLEAS typically begins between 3 and 6 years of age, although onset may range from 1 to 14 years, and it is characterized by seizures with prominent autonomic features. Ictal vomiting, eye deviation, altered consciousness, and frequently nocturnal seizures are among the characteristic clinical features of this syndrome. Electroencephalography (EEG) findings may initially be limited to occipital spikes but can demonstrate a multifocal distribution over time and with advancing age (2). Indeed, interictal electroencephalographic findings in SeLEAS have been reported to evolve with age; occipital spikes may predominate in early childhood, whereas a posterior-dominant multifocal distribution involving occipito-frontopolar and centro-parieto-temporal regions may emerge later in the course of the disease (2). These findings suggest that occipital epilepsies cannot be explained solely by localized occipital pathology and may instead represent an age-dependent multifocal electrophysiological spectrum. Although these syndromes are defined as self-limited, their prognosis is not always entirely benign (3). In addition, several studies have reported atypical or mixed forms and emphasized that the classical Panayiotopoulos–Gastaut distinction may not always be clear-cut in terms of clinical and electroencephalographic features (4). By contrast, symptomatic occipital epilepsies arise secondary to underlying structural pathology and, although their clinical features may overlap with self-limited forms, they may differ in terms of prognosis and treatment response (5). Several studies have demonstrated that the presence of a structural etiology may be a major determinant of seizure control and remission outcomes (6).

Most studies on childhood occipital epilepsies have focused on self-limited syndromes such as SeLEAS and COVE, whereas studies comparing self-limited and symptomatic cases are less common. The aim of the present study was to describe the clinical, electroencephalographic, and neuroimaging characteristics of childhood occipital epilepsies and to identify differences between self-limited and symptomatic cases.

Materials and Methods

This retrospective single-center cohort study included patients aged 0-18 years with occipital epilepsy spectrum disorders who were followed at the Pediatric Neurology Clinic of Koç University Hospital between October 2015 and January 2026. Ethical approval for this study was obtained from the Koç University Ethics Committee (approval no.: 2026.164.IRB2.088, date: 23.03.2026). Patients with occipital epilepsy spectrum disorders were retrospectively identified from the clinical records, EEG archives, and neuroimaging data. Eligible patients had at least 6 months of clinical follow-up after diagnosis, at least one interictal EEG recording, and sufficient clinical data for electroclinical classification. Occipital epilepsy spectrum disorder was defined as the presence of occipital-predominant interictal epileptiform discharges and/or seizure semiology suggestive of occipital onset, with or without supporting neuroimaging findings. As ictal EEG recordings were not available for all patients, classification relied on a comprehensive evaluation integrating seizure semiology, interictal EEG findings, neurodevelopmental assessment, magnetic resonance imaging (MRI) findings, and longitudinal clinical follow-up, with ictal EEG data incorporated whenever available. Owing to the fact that classical self-limited occipital epilepsy syndromes may not be fully expressed in very young children, patients younger than 3 years were classified according to these integrated electroclinical criteria rather than age alone. Those cases with insufficient clinical, EEG, neuroimaging, or follow-up data for electroclinical classification were excluded.

Data were retrospectively obtained from the hospital electronic medical records, EEG archives, and neuroimaging reports and recorded in a standardized data form. Demographic characteristics, seizure semiology, neurological and developmental status, EEG and MRI findings, treatment characteristics, and follow-up outcomes were evaluated retrospectively. Focal features were defined as focal motor, sensory, autonomic, or behavioral semiological manifestations suggestive of focal seizure onset, irrespective of the final seizure type classification. Autonomic symptoms included vomiting, pallor, flushing, hypersalivation, cardiorespiratory changes, or other autonomic manifestations occurring during seizures. Loss of consciousness referred to impaired awareness or unresponsiveness during the ictal or immediate postictal

period. Seizure recurrence within 24 hours was defined as two or more seizures occurring within a 24-hour period. Status epilepticus was defined according to the current ILAE operational definition.

MRI findings were classified according to structural characteristics. Perinatal/hypoxic-ischemic injury was analyzed as a separate neuroimaging category. Acquired structural lesions included postinfectious, posttraumatic, vascular, neoplastic, or other non-congenital structural abnormalities identified by MRI. For descriptive analysis, structural MRI abnormalities were classified according to their predominant anatomical distribution as occipital-predominant, posterior-predominant, multifocal, or diffuse. Each patient was assigned to the single category which best reflected their predominant distribution of structural abnormalities.

Occipital epileptiform activity was defined as epileptiform discharges involving the occipital regions. Extra-occipital spread was defined as the propagation of occipital epileptiform discharges to additional non-occipital regions during EEG recording. This category was distinct from multifocal epileptiform activity, which referred to the presence of independent epileptiform foci in two or more non-contiguous regions. Generalized spike-wave discharges (GSWD) were defined as bilaterally synchronous spike-wave complexes involving both hemispheres.

EEG background rhythm abnormality was defined as a slowing or disorganization of the age-appropriate posterior dominant rhythm. Initial antiseizure medication failure was defined as persistence of clinically documented seizures despite an adequate dose and duration of the first antiseizure medication, resulting in dose escalation, medication switch, or add-on therapy. EEG normalization was assessed during follow-up EEG recordings.

Spike-wave activation in sleep (SWAS) was defined as spike-wave activity occupying ≥50% of non-rapid eye movement (non-REM) sleep. Patients fulfilling this EEG criterion and demonstrating developmental, cognitive, language, behavioral, or motor stagnation/regression were considered to be within the ESES/EE-SWAS spectrum. Sleep EEG recordings were available for all patients, and adequate non-REM sleep segments were obtained for SWAS assessment. Spike-wave activation was assessed by a visual estimation of the spike-wave activity during non-REM sleep.

The patients were divided into three groups according to their clinical, EEG, neurodevelopmental, and neuroimaging features. Group 1 consisted of patients compatible with the self-limited occipital epilepsy spectrum, with normal neurodevelopmental evaluation and structural MRI findings together with occipital epileptiform activity. Group 2 included symptomatic cases with structural brain lesions, neurodevelopmental impairment, or identifiable genetic/metabolic/systemic etiologies. Group 3 consisted of those patients who could not be definitively classified into Group 1 or Group 2 based on the available data. As structural MRI abnormalities, developmental delay, and abnormal neurological examination findings were incorporated into the group classification framework, these variables were not included in the between-group statistical comparisons. Within Group 1, cases compatible with SeLEAS, COVE, and POLE were additionally identified; however, these subtypes were not included in separate comparative analyses due to clinical-electroencephalographic overlap and their limited subgroup sizes.

Statistical Analysis

Statistical analyses were performed using IBM SPSS Statistics version 29.0 (IBM Corp., Armonk, NY, USA). Continuous variables were assessed for normality using visual methods and the Shapiro-Wilk test. Normally distributed variables were compared using the Independent Samples t-test, whereas non-normally distributed variables were analyzed using the Mann-Whitney U test. Categorical variables were compared using the Pearson chi-square test or Fisher's exact test, as appropriate. Results are presented as mean ± standard deviation, median (range), or number (percentage), as appropriate. Analyses were performed using the available-case data, and missing values were not imputed. A two-sided p value <0.05 was considered statistically significant. Given the retrospective design and multiple unadjusted comparisons, p values should be interpreted with caution.

Results

A total of 64 patients were included in this study, comprising 33 males and 31 females. The demographic, clinical, radiological, electroencephalographic, and treatment characteristics of the cohort are summarized in Table I. The mean age was 10.76±3.90 years, and the mean age at diagnosis was 5.19±3.71 years. The mean follow-up duration was 30.1±25.3 months (range, 6-108 months). The mean seizure onset age was 4.77±3.77 years (n=62), with a median age of 5 years; seizure onset age data were unavailable for two patients. Of the patients, 39.1% were classified as Group 1 (compatible with the self-limited occipital epilepsy spectrum), 56.3% as Group 2 (symptomatic/determinable etiology), and 4.7% as Group 3 (unclassified/undetermined group).

Table I. Clinical, radiological, electroencephalographic, and treatment characteristics of the study cohort

Category and parameter	Number of patients (n)	Percentage (%)/Mean
Demographics and classification		
Male	33	51.6%
Female Mean age at study (years)	31 64	48.4% 10.76±3.90
Mean age at diagnosis (years)	64	5.19±3.71
Mean seizure onset age (years)	64	4.77±3.77
Median follow-up duration (months)	64	30.1±25.3
Group 1 (self-limited spectrum)	25	39.1%
Group 2 (symptomatic/determinable etiology)	36	56.3%
Group 3 (unclassified)	3	4.7%
Clinical and semiological features		
Focal semiological features	36	56.3%
Autonomic symptoms	35	54.7%
Automatisms	37	57.8%
Loss of consciousness	57	89.1%
Ictal vomiting	28	43.8%
Seizure recurrence (within 24 hours)	12	18.8%
Nocturnal seizures	24	37.5%
History of status epilepticus	25	39.1%
Visual symptoms	3	4.7%
Abnormal neurological examination	32	50.0%
Developmental delay	29	45.3%
Brain MRI findings		
Normal MRI	33	51.6%
Perinatal/hypoxic-ischemic injury	15	23.4%
Cortical atrophy	6	9.4%
Cerebral infarction	2	3.1%
Cortical dysplasia	2	3.1%
Multiple cavernomas	1	1.6%
Posterior reversible encephalopathy (PRES)	1	1.6%
Tuberous sclerosis complex	1	1.6%
Hydrocephalus	1	1.6%
Sleep EEG findings		
Occipital epileptiform activity	55	85.9%
Bilateral occipital involvement	26	40.6%
Extra-occipital spread	36	56.3%
Multifocal epileptiform activity	9	14.1%
Generalized spike-wave discharges	20	31.3%
EEG normalization (during follow-up)	24	37.5%
Spike-wave activation in sleep	9	14.1%

Table I. Continued

Category and parameter	Number of patients (n)	Percentage (%)/Mean
Treatment and outcomes		
Monotherapy	39	60.9%
Polytherapy	24	37.5%
Initial medication failure	35	54.7%
Most common medications		
Levetiracetam	46	71.9%
Valproate	20	31.3%
Clobazam	19	29.7%
Carbamazepine	9	14.1%
Oxcarbazepine	6	9.4%
Steroid	5	7.8%

Percentages may exceed 100% because individual patients could be included in more than one category
MRI: Magnetic resonance imaging, EEG: Electroencephalography

Three patients (4.7%) were classified as Group 3 because their electroclinical features did not allow for confident assignments to either the self-limited or symptomatic/determinable categories. None of these 3 patients had structural MRI abnormalities. Two of these patients had developmental delay and abnormal neurological examination findings, while one of them had normal neurodevelopment and neurological examination. All three showed occipital epileptiform activity with extra-occipital spread, and one of them also exhibited GSWD.

Focal semiological features were present in 56.3% of patients, autonomic symptoms in 54.7%, and automatisms in 57.8%. Loss of consciousness occurred in 89.1%, vomiting in 43.8%, and seizure recurrence within 24 hours in 18.8%. Nocturnal seizures were observed in 37.5%, while a history of status epilepticus was present in 39.1% overall, including 36% (9/25) of Group 1 and 39% (14/36) of Group 2 patients. Of these, two patients in Group 2 had non-convulsive status epilepticus, whereas all of the remaining cases were convulsive. Visual symptoms were rare and identified in only three patients, whose clinical features were compatible with the COVE spectrum. Neurological examination abnormalities were detected in 50% of cases and developmental delay in 45.3%. Family history revealed epilepsy in nine patients and febrile seizures in four. Four patients had a personal history of febrile seizures, while fever-triggered seizures were reported in 11 cases. Consanguinity was present in four patients.

Brain MRI was normal in 33 of 64 patients (51.6%). MRI abnormalities were identified in 31 patients (48.4%), most commonly perinatal/hypoxic-ischemic injury (15 patients, 23.4%) and cortical atrophy (6, 9.4%), followed by cortical dysplasia (2, 3.1%), cerebral infarction (2, 3.1%), posterior reversible encephalopathy syndrome (2, 3.1%), hydrocephalus (1, 1.6%), multiple cavernomas (1, 1.6%), tuberous sclerosis complex (1, 1.6%), and delayed myelination (1, 1.6%). Regarding lesion distribution, occipital-predominant lesions were present in 4 patients, posterior-predominant lesions in 10, multifocal lesions in 11, and diffuse cerebral involvement in 6.

EEG evaluation demonstrated occipital epileptiform activity in 55 patients (85.9%), including bilateral occipital involvement in 26 cases. The remaining nine patients (14.1%) exhibited multifocal epileptiform activity with occipital involvement. Extra-occipital spread was observed in 56.3% of the patients and was similarly frequent in Group 1 and Group 2 (40% vs. 63.9%). GSWD were detected in 20 patients (31.3%), including 28% (7/25) of Group 1 cases. EEG normalization was documented in 24 patients (37.5%), with a mean time to normalization of 24.8±19.9 months (range, 6–66 months). Electrographic seizures were recorded in four patients, and SWAS was identified in nine (5 in Group 1, 3 in Group 2, and 1 in Group 3). Photosensitivity was observed in two patients, both considered compatible with the POLE spectrum. Both photosensitive patients also demonstrated GSWD.

Additional systemic disorders were present in 19 patients (29.6%). Among these, four (6.3%) had organ transplantation or severe chronic systemic disease, 10 (15.6%) had metabolic-genetic/syndromic disorders, and five (7.8%) had other systemic comorbidities.

Overall, 60.9% of the patients were managed with monotherapy, whereas 37.5% required polytherapy; one patient remained untreated. Levetiracetam was the most commonly used antiseizure medication (71.9%), followed by valproate (31.3%) and clobazam (29.7%). Oxcarbazepine and carbamazepine were used in 9.4% and 14.1% of the patients, respectively. Steroid treatment was administered in five patients; however, steroids were prescribed for associated epileptic encephalopathies rather than occipital epilepsy itself, including West syndrome (n=3) and ESES/EE-SWAS (n=2). Those patients with a previous history of West syndrome were included because they subsequently developed electroclinical features compatible with the occipital epilepsy spectrum during follow-up and fulfilled the predefined inclusion criteria.

Initial antiseizure medication failure, requiring treatment modification or additional therapy, was observed in 35 patients (54.7%).

The comparative clinical, electroencephalographic, and treatment-related characteristics of Group 1 and Group 2 patients are presented in Table II. Comparative analyses were performed between Group 1 (n=25) and Group 2 (n=36), excluding Group 3 cases. Those patients in Group 2 had significantly earlier seizure onset (3.34 vs. 6.63 years, p<0.001) and earlier diagnosis ages (3.81 vs. 6.96 years, p<0.001) compared with Group 1. No significant difference was observed between the groups regarding status epilepticus. Autonomic symptoms were present in 68% of Group 1 and 50% of Group 2 patients; however, this difference was not statistically significant (p=0.165). Similarly, vomiting was observed in 52% of Group 1 and 41.7% of Group 2 patients, without any significant difference (p=0.428). Nocturnal seizures were significantly more frequent in Group 1 than in Group 2 (56% vs. 22.2%, p=0.014).

Neither occipital epileptiform activity nor multifocal epileptiform activity differed significantly between Group 1 and Group 2. By contrast, EEG background rhythm abnormalities were observed exclusively in Group 2 patients (p<0.001). Although EEG normalization was more frequent in Group 1 than in Group 2 (48% vs. 33.3%), the difference was not statistically significant (p=0.294). Similarly, no significant difference was found between Group 1 and Group 2 regarding extra-occipital EEG spread (p=0.075). In addition, EEG normalization was not associated with multifocal epileptiform activity (p=0.464), MRI abnormalities (p=0.561), or developmental delay (p=0.080).

Among those patients with normal development, 66.7% were managed with monotherapy, whereas 66.7% of those with developmental delay required polytherapy (p=0.010).

Initial antiseizure medication failure was significantly more frequent in Group 2 than in Group 1 (69.4% vs. 28.0%, p=0.001), and the need for polytherapy was also higher in this group (47.2% vs. 20.0%, p=0.038). No association was found between initial medication failure and multifocal epileptiform activity (p=0.166), MRI abnormalities (p=0.075), EEG background rhythm abnormalities (p=0.069), or extra-occipital EEG spread (p=0.155). However, developmental delay was significantly associated with a higher rate of initial medication failure (p<0.001).

Table II. Comparative analysis of self-limited (Group 1) and symptomatic (Group 2) occipital epilepsy cases

Parameters	**Group 1 (n=25)**	**Group 2 (n=36)**	**p value**
Mean seizure onset age (years)	6.63±3.52	3.34±3.41	<0.001
Mean age at diagnosis (years)	6.96±3.41	3.81±3.44	<0.001
Nocturnal seizures (%)	56.0% (14/25)	22.2% (8/36)	0.014
Autonomic symptoms (%)	68.0% (17/25)	50.0% (18/36)	0.165
Ictal vomiting (%)	52.0% (13/25)	41.7% (15/*36)*	0.428
Extra-occipital EEG spread (%)	40.0% (10/25)	63.9% (23/36)	0.075
Generalized spike-wave discharges	28.0% (7/25)	36% (13/36)	0.594
EEG background rhythm abnormality (%)	0.0% (0/25)	36.1% (17/36)	<0.001
EEG normalization	48.0% (12/25)	33.3% (12/36)	0.294
Status epilepticus history (%)	36.0% (9/25)	39.0% (14/36)	0.812
Initial medication failure (%)	28.0% (7/25)	69.4% (25/36)	0.001
Polytherapy requirement (%)	20.0% (5/25)	47.2% (17/36)	0.038

MRI: Magnetic resonance imaging, EEG: Electroencephalography

Although systemic disorders were more frequent in Group 2, the difference between the groups was not statistically significant (p=0.089). Both Group 1 patients with systemic comorbidity had type 1 diabetes mellitus. By contrast, Group 2 patients exhibited more heterogeneous and clinically severe comorbidities, including organ transplantation, congenital heart disease, and genetic syndromes.

Discussion

In this study, the clinical, electroencephalographic, and neuroimaging features of childhood occipital epilepsy spectrum disorders were evaluated, and differences between self-limited spectrum cases and symptomatic/determinable etiologies were identified. Symptomatic/determinable cases showed earlier seizure onset and greater treatment burden, including higher rates of initial antiseizure medication failure and polytherapy. Additionally, multifocality and extra-occipital EEG spread were not limited to symptomatic cases, supporting the concept that childhood occipital epilepsies represent a heterogeneous and dynamic electroclinical spectrum.

Regarding seizure semiology, autonomic symptoms and ictal vomiting were among the commonly observed features in our cohort and were largely compatible with the SeLEAS spectrum in the self-limited group. Ictal vomiting and other autonomic manifestations have been reported as characteristic clinical features of SeLEAS (1,7). Aksoy et al. (4) similarly identified vomiting (80%) and eye deviation (87%) as the most frequent findings in Panayiotopoulos syndrome. Although autonomic symptoms and vomiting were more frequent in Group 1 in our cohort, the differences between groups did not reach statistical significance. This may be related to clinical overlap, the presence of autonomic manifestations in symptomatic cases, and/or the limited sample size.

Visual symptoms were rare, suggesting an autonomic-dominant spectrum rather than classic COVE; such manifestations may be underreported in young children due to their brevity and description difficulties (8). Additionally, the higher frequency of nocturnal seizures in Group 1 is consistent with SeLEAS patterns. These results, alongside noted overlaps between Panayiotopoulos and Gastaut syndromes, reinforce the concept of childhood occipital epilepsies as a dynamic, overlapping electroclinical spectrum (4).

The significantly earlier seizure onset in the symptomatic group (3.34 vs. 6.63 years) highlights the association between structural etiologies and a more severe clinical course. The mean onset age of 4.77 years in our cohort is consistent with previous reports supporting the age-dependent nature of occipital epilepsies (9). Early onset has been recognized as one of the strongest predictors of poor prognosis, treatment resistance, and structural MRI abnormalities (6,7,10).

The frequent presence of perinatal/hypoxic injury in our cohort, together with the selective vulnerability of the occipital lobe to neonatal hypoglycemia (11), suggests that structural posterior abnormalities may contribute to epileptogenesis in a subset of patients. The higher need for polytherapy and the presence of EEG background rhythm abnormalities in the symptomatic group further emphasize that etiological classification is a major determinant of treatment strategy and prognosis (1,6).

In recent years, the term "*self-limited occipital epilepsy*" has been preferred over "*benign occipital epilepsy*" due to risks such as cognitive impairment and the development of electrical status epilepticus during sleep (ESES) (12). The presence of multifocality, extra-occipital spread, and SWAS in our cohort supports this approach. The current literature suggests that SWAS/ESES is not limited to SeLECTS and may occur at similar rates in SeLEAS. İriş et al. reported a SWAS rate of 9.23% in a SeLEAS group, comparable to that observed in SeLECTS (3). Therefore, those patients presenting with autonomic seizures may require follow-up with sleep EEG recordings.

Prolonged seizures and focal status epilepticus have been reported to occur frequently in SeLEAS, affecting approximately one-third of patients (12). In Panayiotopoulos syndrome, nearly half of seizures may present as autonomic status epilepticus (13), while convulsive status at onset has not been found to be directly associated with prognosis (14). The 36% rate of status epilepticus in Group 1 in our cohort supports the inclusion of these presentations within the self-limited occipital epilepsy spectrum. Although this relatively high rate may partly reflect referral bias related to our tertiary center setting, our findings indicate that self-limited occipital epilepsies do not always present with a mild clinical course and that the term "*self-limited*" does not exclude dramatic seizure presentations during the acute phase.

In the SeLEAS spectrum, interictal electroencephalographic findings are not limited to the occipital region, and shifting multifocal discharges are frequently observed (12). The literature further emphasizes that multifocality and extra-occipital spread are among the

main features supporting the use of the term "*self-limited*" rather than "*benign*". The 31.3% rate of GSWD in our cohort is consistent with previously reported rates of 17-35% (15-17).

The relatively high frequency of GSWD in our cohort may reflect broader network involvement in a subset of patients, although the retrospective design and limited ictal EEG data did not allow firm mechanistic conclusions. In COVE series excluding photosensitive cases according to newer criteria, markedly lower GSWD rates (5%) have been reported, suggesting a relationship between photosensitivity and generalized epileptiform activity (18). Verrotti et al. (14) also emphasized that occipital epileptiform activity may evolve into multifocal patterns during the course of the disease. The extra-occipital and multifocal findings in our cohort are consistent with the concept that childhood occipital epilepsies represent a dynamic electroclinical spectrum. In addition, as SWAS recurrence has been reported even years after EEG normalization (3), these findings suggest that selected patients, particularly those with persistent EEG abnormalities, developmental concerns, sleep-activated epileptiform activity, or treatment difficulties, may benefit from longitudinal clinical and EEG follow-up.

The ability to manage self-limited occipital epilepsy cases with monotherapy supports the pharmaco-sensitive nature of this group (19), whereas symptomatic cases more often require polytherapy. Although carbamazepine and valproate have traditionally been preferred in the literature (1,18,19), the predominance of levetiracetam usage (71.9%) in our cohort likely reflects the current tendency in pediatric practice toward well-tolerated broad-spectrum antiseizure medications.

Study Limitations

This study had several limitations. Its retrospective design may have introduced selection bias and limited the completeness of the clinical data, including seizure semiology. Neurocognitive outcomes were not systematically assessed using a standardized longitudinal protocol, and ictal EEG recordings were available for only a small proportion of the patients. The absence of multivariable analyses limited our ability to determine whether the observed associations were independent of underlying etiological or developmental factors. In addition, as this was a tertiary referral center cohort, referral bias may have resulted in an overrepresentation of more complex or treatment-resistant cases.

Conclusion

Childhood occipital epilepsies demonstrated heterogeneous clinical and electroencephalographic characteristics in this retrospective cohort. Self-limited spectrum cases more frequently exhibited autonomic symptoms and nocturnal seizures, whereas symptomatic/determinable cases showed earlier seizure onset and greater treatment burden. The extra-occipital epileptiform activity, GSWD, and sleep-activated epileptiform activity observed in a subset of our patients further support the concept that childhood occipital epilepsies may represent a dynamic electroclinical spectrum rather than sharply separated syndromes. These findings suggest that selected patients, particularly those with sleep-activated epileptiform activity, persistent EEG abnormalities, developmental concerns, or treatment difficulties, may benefit from longitudinal clinical and EEG follow-up. These results should be interpreted in light of the retrospective design and the limited subgroup sizes in this study.

Ethics

Ethics Committee Approval: Ethical approval for this study was obtained from the Koç University Ethics Committee (approval no.: 2026.164.IRB2.088, date: 23.03.2026).

Informed Consent: Informed consent was obtained.

Footnotes

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