Case Report

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Paediatrics Section

Status Epilepticus as the Initial Presentation of Neurofibromatosis Type 1 in a Three-Year-Old Male: A Case Report

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ABSTRACT

Neurofibromatosis Type 1 (NF1) is a common autosomal dominant neurocutaneous disorder, occurring in approximately one in 2,500-3,000 live births. It results from mutations in the NF1 gene and is characterised by diverse cutaneous, ophthalmologic, and neurological manifestations. Although seizures occur in 4-10% of affected children, status epilepticus as the initial presentation in early childhood is uncommon. In present case, a three-year-old boy presented with continuous abnormal body movements and unresponsiveness lasting seven minutes. There was a history of developmental delay without prior seizures. Clinical examination revealed multiple café-au-lait macules, and ophthalmologic evaluation demonstrated bilateral Lisch nodules. Magnetic Resonance Imaging (MRI) of the brain showed multiple non-enhancing T2/FLAIR hyperintense lesions in the cerebellar hemispheres, thalami, and gangliocapsular regions, consistent with Focal Areas of Signal Intensity (FASI). Electroencephalography revealed bilateral epileptiform discharges with right-sided predominance. Based on established diagnostic criteria, NF1 presenting with focal epilepsy was diagnosed. The child responded well to antiepileptic therapy and remained seizure-free on follow-up. The distinct feature of this case is status epilepticus as the first neurological manifestation of NF1 in early childhood, supported by characteristic radiological findings. Subtle cutaneous signs played a pivotal role in establishing the diagnosis. This case highlights the importance of multidisciplinary evaluation and structured long-term follow-up to monitor neurological and systemic complications. Early recognition ensures timely intervention, appropriate counseling, and improved long-term outcomes.

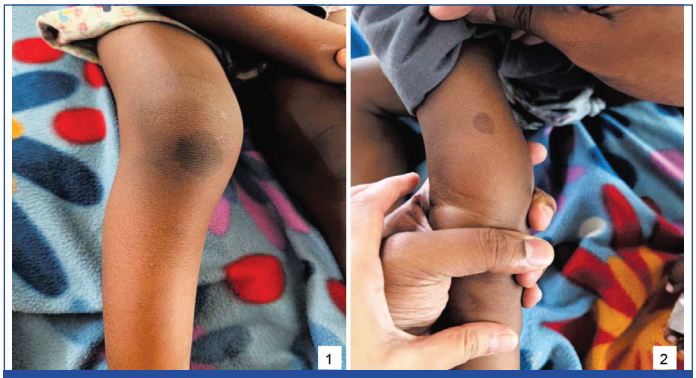
Keywords: Café-au-lait spots, Focal seizures, Genetic mutation, Lisch nodules, Neurocutaneous disorder, Paediatric seizures

CASE REPORT

A three-year-old boy was brought to the emergency department with complaints of continuous shaking of the whole body with rolling of eyes and unresponsiveness lasting approximately seven minutes prior to arrival. The episode began suddenly and involved generalised tonic-clonic movements. There was no history of prior seizures, fever, head trauma, toxin exposure, or symptoms suggestive of central nervous system infection. The child had a documented history of global developmental delay, particularly in speech and social domains. There were no previous hospital admissions. Antenatal history was unremarkable, with no history of maternal infections, drug exposure, or perinatal complications. Birth history was normal, with term delivery and no neonatal intensive care admission. There was no significant family history of seizures, neurocutaneous disorders, intellectual disability, or similar cutaneous lesions.

On arrival, the child was actively seizing and received standard emergency management for status epilepticus. After stabilisation, following administration of intravenous Injection midazolam 0.1 mg/kg 2 doses followed by Injection Levetiracetam at 60 mg/kg/dose and securing airway, breathing, and circulation- vital parameters were stable. Glasgow Coma Scale was E2V2M4 (8/15) which improved to E4V5M6 (15/15) age-appropriate levels postictally. Cutaneous examination [Table/Fig-1,2] revealed 10-12 café-au-lait macules measuring more than 5 mm in diameter over the trunk and extremities. No axillary or inguinal freckling was observed.

Neurological examination revealed no focal motor deficits. Tone and reflexes were appropriate for age. Other systemic examinations, including cardiovascular, respiratory, and abdominal systems, were within normal limits. Ophthalmological evaluation with slit lamp examination revealed bilateral Lisch nodules on iris.



[Table/Fig-1,2]: Café-au-lait macule over the knee and forearm showing a well-defined, uniformly pigmented with smooth borders homogenous pigmentation patch (>5 mm).

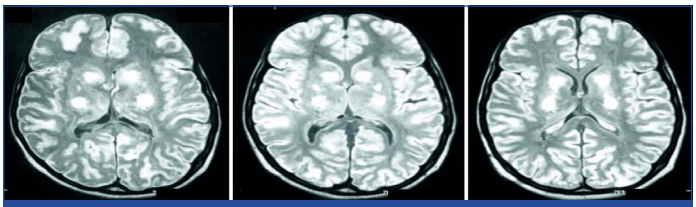
Routine laboratory investigations [Table/Fig-3] including complete blood count, serum electrolytes, blood glucose, calcium, renal function tests, liver function tests, and infection markers were within normal limits. Blood culture and inflammatory markers were negative, reducing the likelihood of infectious aetiology.

The MRI of the brain demonstrated multiple non-enhancing T2/FLAIR hyperintense lesions in the bilateral cerebellar hemispheres, thalami, and gangliocapsular regions without mass effect or diffusion restriction. These findings were consistent with FASI, characteristic of NF1 [Table/Fig-4].

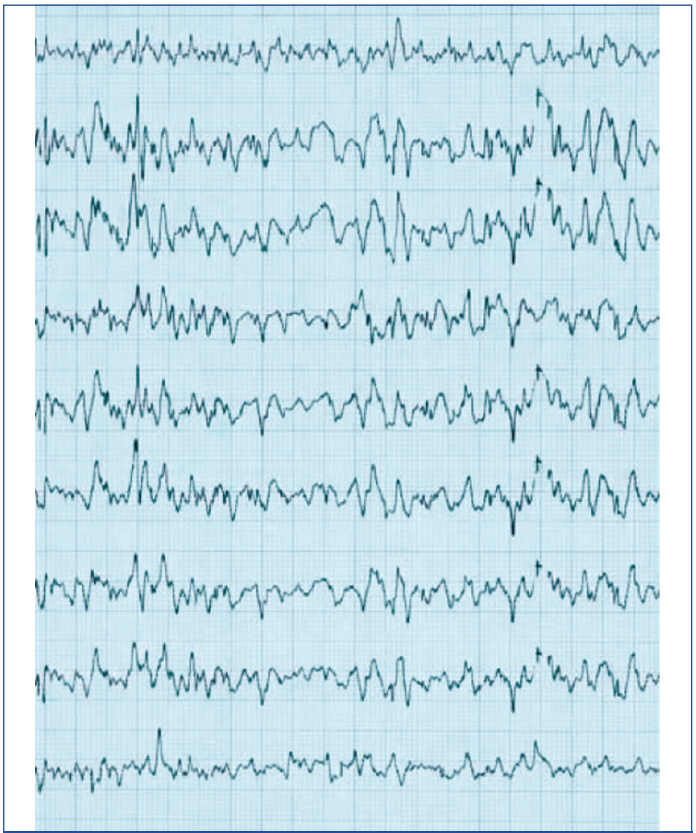
[Table/Fig-5] presents EEG tracing demonstrating generalised epileptiform activity corresponding to the seizure episode based on the presence of more than six café-au-lait macules (>5 mm in prepubertal child) and bilateral Lisch nodules, the diagnostic criteria for NF1 were fulfilled [Table/Fig-6]. A provisional diagnosis of status

Complete blood count	Observed	Normal range
Haemoglobin (g/dL)	11.9	>11.5
RBC count (/L)	$4.7\times10_{12}$	$4.4\text{-}5.2\times10_{12}$
Haematocrit (%)	35	35-45
Total count (/L)	$10.63\times10_{9}$	$5\text{-}13\times10_{9}$
Differential count- N/L/M/E/B* (%)	N- 61.8; L- 27.9; M-5.5; E- 4.4; B-0.4	N: 38-68; L: 25-54; M: 2-10; E: 1-6; B: <1
Platelet (lakh)	2,61,000	1.5-4.5
CRP (mg/dL)	0.1*	<0.6*
Renal function test		
Urea (mg/dL)	21*	12.8-42.8*
Creatinine (mg/dL)	0.33*	0.2-0.7*
Uric acid (mg/dL)	4.2*	4.4-7.6*
Serum electrolytes		
Sodium (mEq/L)	138.6	136-145
Potassium (mEq/L)	4.09	3.5-5.1
Chloride (mEq/L)	105.8	96-106
Liver function test		
SGOT* (IU/L)	29*	<35*
SGPT* (IU/L)	14*	<45*
Ionised calcium (mmol/L)	1.14	

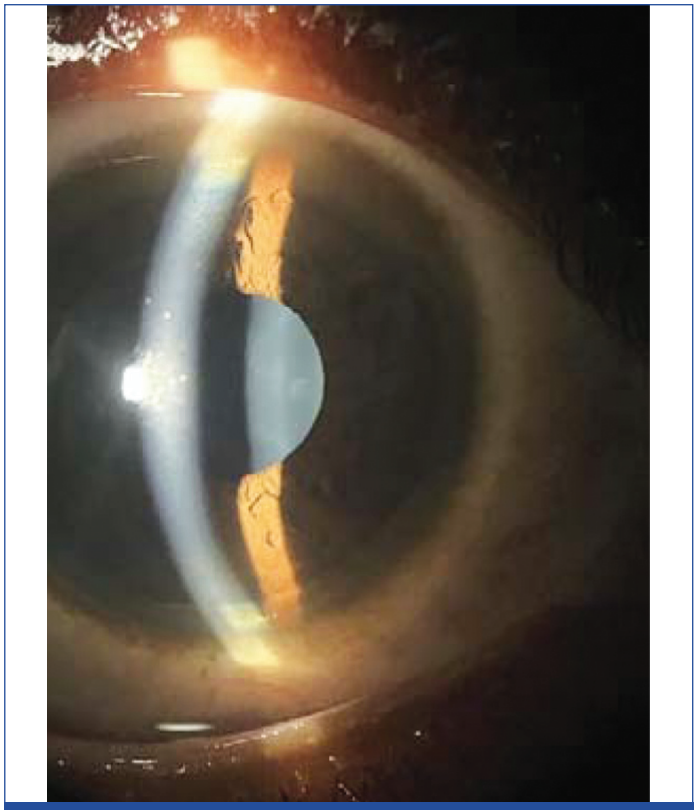
[Table/Fig-3]: Complete blood count, C-Reactive Protein (CRP), serum electrolytes, calcium, and liver function tests are within normal limits.
*N: neutrophils; L: lymphocytes; M: monocytes; E: eosinophils; B: basophils
SGOT: serum glutamic oxaloacetic transaminase; SGPT: serum glutamic pyruvate transaminase; mg/dL: milligram/deciliter; IU/L: International unit/ liter



[Table/Fig-4]: Axial T2/FLAIR MRI brain showing bilateral hyperintense lesions consistent with Focal Areas of Signal Intensity (FASI), characteristic of NF1.



[Table/Fig-5]: EEG tracing demonstrating generalised epileptiform activity corresponding to the seizure episode.



[Table/Fig-6]: Slit-lamp image showing multiple Lisch nodules on the iris.

epilepticus, likely due to focal epilepsy with secondary generalisation was made.

In view of the acute presentation with status epilepticus in a previously undiagnosed child, various causes were considered. Causes of epilepsy were evaluated first; Structural brain abnormalities were unlikely as MRI showed no cortical malformations or mass like lesions that could explain the seizure activity. Acute symptomatic seizures secondary to metabolic or infectious aetiologies were also considered, but normal serum electrolytes, calcium levels, inflammatory markers, and absence of fever or systemic signs made these unlikely. Genetic epilepsy syndromes were considered given the developmental delay, yet the presence of multiple café-au-lait macules and bilateral Lisch nodules directed attention toward a neurocutaneous disorder. Other phacomatoses were considered; however, the absence of characteristic clinical stigmata and the fulfillment of established diagnostic criteria supported the diagnosis of NF1 presenting with focal epilepsy and status epilepticus.

Acute seizures were terminated with intravenous Injection midazolam 0.1 mg/kg two doses followed by Injection Levetiracetam at 60 mg/kg/dose. The child was subsequently initiated on oxcarbazepine at a starting dose of 10 mg/kg/day in two divided doses, gradually titrated to 20 mg/kg/day over one week. Seizure control was achieved, and no further episodes occurred during hospitalisation. The patient was hospitalised for five days and discharged in stable condition on maintenance oxcarbazepine at 10 mg/kg/day therapy. Neurology, ophthalmology, dermatology, and genetics consultations were obtained. Parents were counseled regarding the genetic nature of the condition and the need for long-term surveillance.

At 6-month follow-up, the child remained seizure-free with good drug compliance. Neurodevelopmental assessment and periodic monitoring for optic pathway glioma, learning difficulties, and other NF1-associated complications were planned.

DISCUSSION

NF Type 1 is one of the most common autosomal dominant neurocutaneous disorders, with an estimated birth incidence of approximately one in 2,500-3,000 live births, as reported in epidemiological studies including the UK genetic register analysis

by Evans DG et al., [1]. Nearly 50% of cases arise from de novo mutations, while the remaining cases follow autosomal dominant inheritance [2]. NF1 results from pathogenic variants in the NF1 gene, which encodes neurofibromin, a tumour suppressor protein involved in regulation of the Ras signaling pathway [3]. Dysfunction of neurofibromin leads to abnormal cellular proliferation and contributes to the diverse clinical manifestations of the disorder. Neurological involvement is frequently observed in children with NF1. Cognitive impairment and learning disabilities are reported in up to 50-75% of affected individuals, reflecting the significant neurodevelopmental burden associated with the condition [4]. The developmental delay noted in the present child is therefore consistent with the neurocognitive profile commonly described in NF1 populations [5].

Epilepsy is a recognised neurological complication of NF1, although it is not included among the diagnostic criteria. Sorrentino U et al., (2021) analysed a large cohort of patients with NF1 and reported seizure prevalence ranging from approximately 4-10%, consistent with earlier epidemiological estimates [6]. In their series, seizures were predominantly focal and were frequently associated with structural brain abnormalities, including cortical dysplasia or tumour-related lesions. Importantly, epilepsy was generally diagnosed after NF1 had already been identified based on characteristic cutaneous or genetic findings [7].

Similarly, Khair AM et al., (2022) described electroclinical characteristics of epilepsy in children with NF1 and reported that most seizures were focal in onset and often correlated with EEG abnormalities and neuroimaging findings [8]. Their study emphasised that epileptiform discharges frequently correspond to structural brain changes, supporting a lesion-related epileptogenic mechanism. In contrast, although the seizure semiology and EEG findings in the present case were compatible with focal epilepsy with secondary generalisation, neuroimaging did not reveal cortical dysplasia, tumour, or other major structural abnormalities [9,10].

Wu F et al., (2023) also reported that structural brain abnormalities frequently contribute to seizure pathogenesis in children with NF1 [11]. Their findings reinforced the concept that epilepsy in NF1 is often associated with identifiable MRI correlates. However, the present child developed status epilepticus without evidence of tumour, cortical malformation, or progressive structural pathology. Instead, MRI demonstrated FASI, which are commonly observed in NF1. Although FASI lesions are well recognised radiological features, their direct epileptogenic role remains uncertain.

In a multicenter tertiary cohort, Almuqbil M et al., (2024) reported seizure prevalence consistent with established epidemiological data and noted that epilepsy frequently occurred in association with additional neurological comorbidities and structural neuroimaging abnormalities [12]. In most cases, seizures developed in patients with a previously established diagnosis of NF1. Compared with these observations, the present case demonstrates a different clinical sequence, in which seizure emergency preceded recognition of NF1.

Kravljanac R et al., (2025) evaluated seizure characteristics and outcomes in children with NF1 and reported that although status epilepticus can occur, it is relatively uncommon as an initial presentation [13]. In their cohort, seizure emergencies were more frequently observed in children with established epilepsy or underlying structural abnormalities. In contrast, the present child presented with new-onset status epilepticus that served as the sentinel clinical event leading to the diagnosis of NF1.

Neuroimaging in this case demonstrated bilateral FASI involving deep brain structures without evidence of tumour or cortical malformation. FASI lesions are frequently described in NF1 and are thought to represent areas of abnormal myelination or vacuolar change rather than neoplastic processes. Their relationship to epileptogenesis remains uncertain, as many patients with FASI do not develop seizures. The clinical course in this child was favourable, with good seizure control achieved on antiepileptic monotherapy and no recurrence during follow-up. This observation is consistent with previous studies indicating that seizure prognosis in NF1 is generally favourable in the absence of progressive structural pathology [14,15]. Nevertheless, central nervous system tumours, particularly optic pathway gliomas, remain important contributors to neurological morbidity in NF1 and warrant ongoing surveillance [16].

Overall, this case highlights an atypical clinical presentation in which status epilepticus preceded recognition of NF1 and occurred in the absence of tumour or major structural brain abnormalities. Unlike most reported cohorts where epilepsy develops after diagnosis, seizure emergency in this child prompted detailed clinical evaluation that revealed characteristic pigmentary lesions and Lisch nodules fulfilling NIH diagnostic criteria. This case underscores the importance of careful dermatological and ophthalmological examination in children presenting with new-onset status epilepticus. Recognition of subtle cutaneous signs may provide crucial diagnostic clues, allowing early identification of NF1 and enabling appropriate neurological monitoring, genetic counseling, and long-term multidisciplinary follow-up.

CONCLUSION(S)

This case highlights status epilepticus as a rare and early presenting manifestation of NF Type 1 in a young child. The diagnosis was established based on characteristic cutaneous and ophthalmologic findings supported by typical neuroimaging features, despite the absence of tumour-related structural pathology. This presentation underscores that NF1 should be considered in the differential diagnosis of unexplained new-onset seizures or status epilepticus, particularly when subtle pigmentary abnormalities are present. Early recognition enables timely initiation of antiepileptic therapy, appropriate genetic counseling, and structured multidisciplinary surveillance to monitor for neurological, developmental, and systemic complications. Increased clinical awareness of such atypical presentations may improve early diagnosis and long-term outcomes in children with NF1.

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