

Benign Neonatal Sleep Myoclonus: Frequently Misdiagnosed as Neonatal Seizures

18 neonates aged 5-60 days with Benign neonatal sleep myoclonus were identified. Fifteen neonates had been misdiagnosed as neonatal seizures before referral. All treatments were withdrawn once the diagnosis of benign neonatal sleep myoclonus was made. Benign neonatal sleep myoclonus should be considered early in the differential diagnosis of neonatal seizures.

Keywords: *Overdiagnosis, Epilepsy, Non-epileptic events.*

Benign neonatal sleep myoclonus (BNSM) is a non-epileptic motor phenomenon that is frequently mistaken for neonatal seizures, resulting in unnecessary investigations and treatments [1]. BNSM is characterised by myoclonic jerks that occur exclusively during sleep and stop abruptly when the infant is awakened. In the interictal period, affected neonates appear well. No treatment other than reassurance is required as the disorder resolves spontaneously over several weeks without long-term neurological deficits [1-3]. We describe our experience with benign neonatal sleep myoclonus seen over 5 years with an aim to create awareness about this benign disorder.

The data on neonates diagnosed with benign neonatal sleep myoclonus between February 2010 and January 2015 at a tertiary care hospital of North India was retrospectively reviewed. Detailed information about the gestation, adverse perinatal events, age at onset, association with sleep/arousal, and any triggers was noted. Findings on neurological examination as well as results of laboratory investigations wherever available were also reviewed. Study was approved by Institutional review board.

The clinical characteristics of the patients are summarized in **Table I**. Interictal neurological examination was normal in all infants. Normal blood sugar and serum calcium was documented in all the 15 infants tested. Electroencephalography was done in 14 cases and was normal in all, including four with ictal EEG. Five infants each had undergone brain MRI and CSF analysis before being referred. Once BNSM was diagnosed, parents were reassured of the benign nature of the disorder and all ongoing treatments stopped.

The infants described in this report had all the characteristic features of BNSM described in literature [4-7]. The myoclonic jerks in BNSM have been variously described as focal, multifocal or generalized and

synchronous. Persistently focal myoclonic jerks as well as involvement of facial musculature is exceptional [1]. The age of onset between 2 to 30 days in our patients was consistent with that reported in the literature [1]. Some authors have reported certain manoeuvres to trigger myoclonic jerks in BNSM and facilitate diagnosis [1,8]. Anticonvulsants, especially benzodiazepines, have been observed to aggravate myoclonus of BNSM [1].

Misdiagnosis of neonatal seizures is common leading to unnecessary investigations [1], as seen by us also. Majority had received treatment with anticonvulsants. Principal reason for diagnostic confusion with neonatal seizures is the lack of familiarity with BNSM among physicians. In addition, we observed that the (mis)diagnosis of neonatal seizures was made by the physicians based on inaccurately performed and interpreted neonatal EEG. The diagnosis of BNSM can safely be made on clinical grounds and the diagnostic errors minimized if characteristic feature of BNSM are kept in mind while evaluating a neonate with suspicious motor activity [1,4,7]. Neuroimaging, CSF analysis and other tests are not needed. Most authorities agree that EEG is not required for its diagnosis [4,6,7].

BNSM is benign self-limiting non-epileptic condition with excellent outcome. The condition resolves in most by 3 months of age. Mild speech delay and mildly abnormal axial tone has been noted in some [1]. Development of epilepsy has been reported in only one child on follow-up [9]. We do not have long-term follow-up in majority but one infant was diagnosed with benign infantile convulsions at two months of age. Treatment with oxcarbazepine resulted in complete remission.

TABLE I CLINICAL PROFILE OF NEONATES WITH BENIGN NEONATAL SLEEP MYOCLONUS (N=18).

Characteristic	No. (%)
Full-term gestation	15 (83)
Age of presentation, mean (range) d	20 (5-60)
Age of onset, mean (range) d	9 (2-30)
Referring diagnosis	
Neonatal seizures	15 (83)
Sepsis/meningitis	4 (22)
Suspected inborn error of metabolism	2 (11)
Myoclonus	2 (11)
Treatment before referral	
Anticonvulsants	10 (55)
Megavitamin therapy	2 (11)
Antibiotics	4 (22)

Pediatricians and neonatologists need to be aware of this non-epileptic condition in the neonates to prevent misdiagnosis of neonatal seizures.

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REFERENCES

1. Maurer VO, Rizzi M, Bianchetti MG, Ramelli GP. Benign neonatal sleep myoclonus: A review of the literature. *Pediatrics*. 2010;125:e919-24.
2. Goraya JS, Poddar B, Parmar VR. Benign neonatal sleep

- myoclonus. *Indian Pediatr*. 2001;38:81-3.
3. John BM, Patnaik SK. Benign neonatal sleep myoclonus: Is it so uncommon. *Med J Armed Forces India*. 2006;62:186-7.
4. Daoust-Roy JD, Seshia SS. Benign neonatal sleep myoclonus. A differential diagnosis of neonatal seizures. *Am J Dis Child*. 1992;146:1236-41.
5. Di Capua M, Fusco L, Ricci S, Vigeveno F. Benign neonatal sleep myoclonus: Clinical features and videographic recordings. *Mov Disord*. 1993;8:191-4.
6. Paro-Panjan D, Neubaur D. Benign neonatal sleep myoclonus: Experience from the study of 38 patients. *Eur J Paediatr Neurol*. 2008;12:14-8.
7. Kaddurah AK, Holmes GL. Benign neonatal sleep myoclonus: History and semiology. *Pediatr Neurol*. 2009;40:343-46.
8. Alfonso I, Papazian O, Jeffries HE. A simple maneuver to provoke benign neonatal sleep myoclonus. *Pediatrics*. 1995;96:1161-3.
9. Nolte R. Neonatal sleep myoclonus followed by myoclonic-astatic epilepsy: A case report. *Epilepsia*. 1989;30:844-50.