

**Case Report**

Hong Kong J Pediatr  
ISSN (e): 2663-5887  
ISSN (p): 2663-7987  
2018; 1(1): 03-06  
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www.hkpaediatricjournal.com

**Toddler Presenting as Atypical Subacute Sclerosing  
Panencephalitis (With History of Measles Infection  
Affected at Less Than 6 Months of Age)**

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**Abstract**

**Background:** Measles is caused by an RNA virus, paramyxoviruses affecting infants and toddlers commonly and Subacute sclerosing panencephalitis (SSPE) is a devastating “slow virus” brain disease resulting from persistent measles virus infection of neurons with a latency period of 8 to 10 years. **Case characteristics:** Here we report a case of measles affecting child of age group less than 6 months old and its progression into atypical SSPE with short latency period presenting clinically as progressive encephalopathy. **Intervention:** CSF measles antibodies were tested considering the spectrum of clinical scenario, neuroimaging findings and EEG findings. **Outcome:** Positive antibody titres in CSF for anti-measles antibody in a 18 months old child presenting as progressive encephalopathy.

**Keywords:** Toddler; SSPE; CSF IgG immunoassay; Isoprinosine.

**INTRODUCTION**

Measles is caused by an RNA virus, which belongs to the marbillivirus subgroup of paramyxoviruses affecting infants and toddlers. Subacute sclerosing panencephalitis (SSPE) is a devastating “slow virus” brain disease resulting from persistent measles virus infection of neurons. Fortunately, its incidence has decreased in developed countries as a result of large vaccination campaigns; it is still one of the commonest causes of progressive myoclonia with cognitive decline in developing countries with incomplete measles immunization coverage [1-4]. The age at presentation is usually from 8 to 11 years [5,6] with onset usually occurring 2–10 years after measles infection [7].

We report a 1-and-a-half-year-old boy who presented with progressively increasing myoclonic jerks and subtle cognitive decline with motor milestone regression. He was diagnosed as a case of SSPE based on clinical features, electroencephalographic finding, neuroimaging findings and elevated cerebrospinal fluid measles antibody titers. He had history of fever with rash typical of measles at the age of 4 months. This case along with review of recently published reports suggests growing trend of early onset of measles infection in less than 6 months old children and progressively decreasing latency period between measles infection and onset of symptoms observed in cases with SSPE.

Clinical implication would mean a) suspect infection for even less than 6 months old infants who present with typical symptoms of measles in an endemic area and poorly immunized communities, b) investigating for SSPE even in infants or toddlers with compatible clinical features and recent history of measles infection.

**CASE REPORT**

A previously well, one-and-a-half-year-old boy born to consanguineous parents and symptomatic for the last two months presented with progressively increasing myoclonic jerks along with cognitive decline and motor mile stone regression into refractory status epilepticus. He had history of symptoms of measles infection at age of 4 months and had received measles vaccination at 9 months. Prior to this illness, child was developmentally normal. On examination, the child is lethargic and irritable and was able to recognize his parents. He had recurrent myoclonic jerks and brisk reflexes and extensor plantars. No focal neurodeficit or cranial nerve palsy was evident. Fundus examination was normal. He had no organomegaly and the rest of the systemic examination was essentially normal. Provisional diagnosis of neurodegenerative disease was

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considered and child was investigated.

Routine hematological and biochemical parameters were all normal. Scalp electroencephalogram revealed diffuse high amplitude bursts of periodic slow-wave complexes every three to five seconds, often accompanied by clinically evident axial myoclonus and later followed by burst suppression pattern (**figure1**). Brain magnetic resonance imaging showed basal ganglia hyper intensity on T1 weighted sequence and MRI spectroscopy did not show much abnormality (**figure 2**). Cerebrospinal fluid (CSF) was acellular; CSF protein 52mg/dL, CSF sugar 48 mg/dL

against blood sugar of 112mg/dL; CSF lactate and pyruvate were normal. Blood Tandem Mass Spectroscopy sent was reported to be normal, ultrasonography abdomen showed no gross abnormality. Based on the above workup and clinical scenario possibility of SSPE was suspected and CSF measles antibody IgG titers by enzyme immunoassay was sent for analysis and was found to be raised as 1: 625 confirming diagnosis of SSPE. Child was started on sodium valproate and clonazepam. However, therapy for SSPE could not be initiated because of financial restrains. Prognosis was explained to parents.

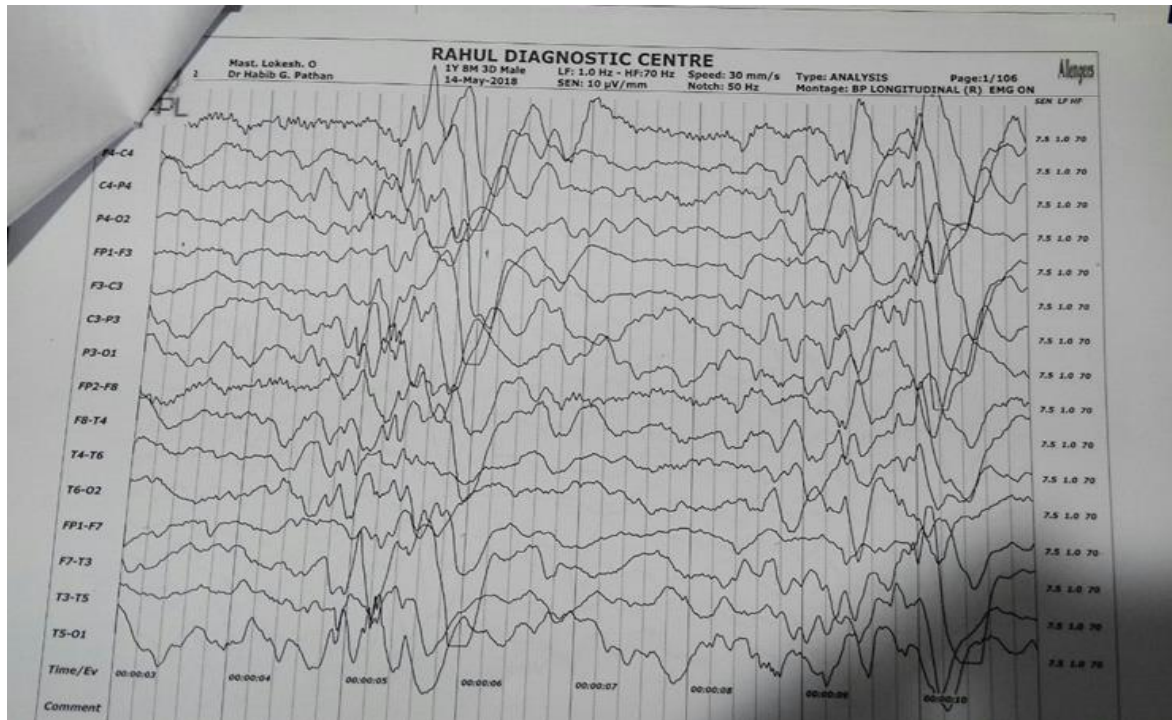


Figure 1: Burst suppressions pattern EEG, a finding of SSPE.

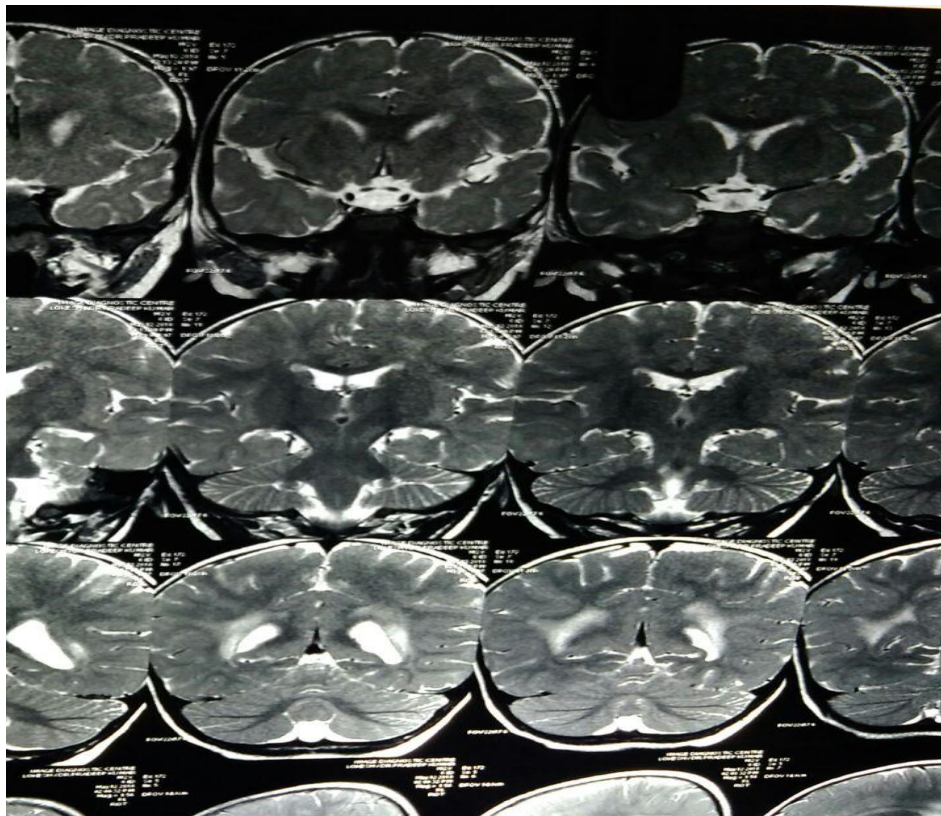


Figure 2: Contrast CT showing enhancement in basal ganglia region an atypical feature of SSPE.

## DISCUSSION

The percentage of all measles cases that were <6 months is increasing recently globally<sup>8</sup>. Data from the systematic review is insufficient to recommend vaccination under 6 months of age. Immunizing infants <6 months would not be a primary strategy as it is not as effective as protecting through herd immunity achieved by high coverage in older age groups<sup>9</sup>. Children infected with measles under the age of 1 year carry a risk of 16 times greater than those infected at age 5 years or later for progression into SSPE<sup>10</sup>. It is widely accepted that SSPE cannot occur in the absence of direct measles virus infection<sup>11,12</sup>.

The age at presentation is usually from 8 to 11 years<sup>5,6</sup> with onset usually occurring 2–10 years after measles infection<sup>7</sup>. Measles continues to be a major cause of childhood morbidity and mortality in India. Hence, SSPE continues to be one of the commonest causes of progressive myoclonic encephalopathy in developing countries with poor nutritional status and immunity of mothers and infants with inadequate coverage of measles immunization<sup>1-4</sup>.

Atypical form of SSPE occurs in about 10% of all patients. Unlike classical SSPE, in atypical form there are no defined stages in clinical presentation due to rapid course<sup>13</sup>. Atypical features also include unusual age of onset, visual loss, seizures and other focal symptoms as initial presentations, a lack of SSPE-specific EEG pattern, and atypical fast progression of disease. A patient could have more than one of these atypical features<sup>14</sup>.

In this child, measles infection had occurred at age of less than 6 months probably due to inadequate cover of maternally transferred antibodies due to mother's poor nutritional and immunity status and inadequate breast feeding. Here the latency for development of symptoms of SSPE was very short, only 12 months. There is a rising trend of reporting such cases with short latency period<sup>15</sup>.

Various risk factors reported to influence the risk of chronic brain infection with the mutant measles virus include younger age at measles onset, living in a rural area, poverty, overcrowding, low level of parental education, an older mother, a higher number of siblings, and a higher birth order (i.e., elder sibling who would have higher chance of being exposed younger siblings with measles before the age of 5 years)<sup>16</sup>. Recently an association between programmed cell death protein 1 (PD-1), a member of the CD28 family, and children with SSPE has been reported<sup>17</sup>. Numerous alterations in M protein have been described in SSPE because of extensive point mutations in viral genome, possibly resulting in persistent viral infection<sup>18</sup>. The exact factors and influences that allow the measles infection to persist are unclear, but may include several immunological factors. For example, in tissue culture, the addition of antibodies against measles virus may alter the pattern of viral gene expression<sup>19</sup>.

Few of these risk factors were operating in this case like poor socioeconomic status and overcrowding. The literature review revealed only a few cases of reports of SSPE in toddlers<sup>20,21</sup> with a majority being reported to be a result of congenital measles infection<sup>20,22</sup>.

## CONCLUSION

With this changing epidemiological trend in measles infection and SSPE, a high index of suspicion is needed to diagnose measles in infants less than 6 months and detect atypical SSPE with shorter latency period after history of postnatally acquired measles infection. No curative treatment is available for SSPE but therapy with immunomodulators such as isoprinosine and interferons; and antiviral drugs like ribavirin may help in halting the progression of the disease<sup>23</sup>. As the disease can mimic acute encephalopathy, it is important to include SSPE on the list of differential diagnosis of acute encephalopathy, especially in infants.

## Conflict of Interest

The authors declare no conflict of interest in preparing this article.

## Funding

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

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