



## Subacute sclerosing panencephalitis: A case study

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### Abstract

Subacute Sclerosing Panencephalitis (SSPE) is a rare, progressive, and fatal neurodegenerative disorder caused by persistent infection with a mutated measles virus. It typically manifests years after the primary measles infection, leading to chronic inflammation and progressive dysfunction of the central nervous system. We present the case of an 18-year-old male with a history of measles infection at age nine, who developed classical neurological features of SSPE. Diagnosis was confirmed through clinical presentation, neuroimaging, EEG findings, and cerebrospinal fluid analysis. This case underscores the importance of early recognition and highlights vaccination as the most effective preventive measure.

**Keywords:** Subacute sclerosing panencephalitis, measles virus, neurodegeneration, vaccination, case report

### Introduction

The latency period between primary measles infection and SSPE onset ranges from 2 to 10 years. The pathogenesis involves viral persistence in neurons and glial cells, leading to chronic inflammation and demyelination. Diagnosis is based on:

- Clinical features (neurological regression, myoclonic jerks, psychiatric changes).
- EEG findings (periodic high-voltage slow-wave complexes).
- Elevated measles antibody titers in cerebrospinal fluid.
- Neuroimaging showing white matter abnormalities.

Subacute Sclerosing Panencephalitis (SSPE) remains an important neurological complication despite global measles vaccination initiatives. The disease predominantly affects children and young adults who acquire measles infection at an early age, particularly before two years of age. The incidence has significantly declined in developed countries following widespread immunization; however, sporadic cases continue to be reported in developing nations due to gaps in vaccination coverage. The underlying pathology involves a persistent mutated measles virus that evades immune clearance, leading to progressive neuronal degeneration, demyelination, and chronic inflammation of the central nervous system. Early diagnosis is challenging because initial symptoms may mimic psychiatric or behavioral disorders before neurological deterioration becomes evident.

### Background

SSPE is a devastating sequela of measles infection, occurring in approximately 1 per 100,000 to 500,000 individuals worldwide. The disease results from persistent measles virus infection in the brain, often due to defective viral clearance. The condition is marked by progressive cognitive decline, motor dysfunction, and eventual vegetative state. Despite its rarity, SSPE remains a significant public health concern in regions with inadequate measles immunization coverage.

### Case Presentation

An 18-year-old male presented with:

- Reduced responsiveness and generalized rigidity.
- Frequent myoclonic jerks.
- History of measles infection at age nine.

On neurological examination, the patient demonstrated impaired cognitive function, decreased attention span, and generalized muscle rigidity. Deep tendon reflexes were exaggerated, and intermittent involuntary myoclonic jerks were observed involving both upper and lower limbs. The patient showed progressive decline in daily functional activities over a period of several months. There was no history of trauma, toxin exposure, or family history of neurological disorders. Routine hematological and biochemical investigations were within normal limits, helping to exclude metabolic and infectious differentials. Based on clinical findings combined with characteristic EEG and CSF results, a definitive diagnosis of SSPE was established.

### Investigations

- **EEG:** High-voltage slow delta waves with periodic R complexes.
- **MRI Brain:** T2 and FLAIR hyperintense foci in the right frontal lobe.
- **CSF Analysis:** Lymphocytic predominance, elevated protein, and markedly raised measles IgG levels (90 AU/ml).

These findings confirmed the diagnosis of SSPE.

### Discussion

This case illustrates the classical progression of SSPE, including:

- Neurocognitive regression.
- Speech deterioration.
- Psychiatric manifestations.
- Motor abnormalities such as rigidity and myoclonic jerks.

### Management remains largely supportive:

- Anticonvulsants may reduce myoclonic jerks.

- Immunomodulatory therapies (e.g., interferon-alpha, isoprinosine) have been attempted but show limited efficacy.
- Prognosis is poor, with inevitable progression to severe disability and death.

The case emphasizes the preventable nature of SSPE. Widespread measles vaccination has dramatically reduced incidence globally, yet sporadic cases persist in regions with incomplete immunization coverage.

SSPE typically progresses through four clinical stages, beginning with subtle behavioral changes and cognitive decline, followed by myoclonic seizures and motor dysfunction, eventually leading to decerebrate rigidity and vegetative state. The present case demonstrated classical stage II features characterized by myoclonic jerks and neurological regression. Similar clinical patterns have been described in previous studies, emphasizing the diagnostic importance of periodic EEG complexes and elevated measles antibody titers in cerebrospinal fluid.

Differential diagnoses include autoimmune encephalitis, progressive myoclonic epilepsy, metabolic encephalopathies, and viral encephalitis; however, characteristic EEG findings and serological confirmation help distinguish SSPE from these conditions. Neuroimaging findings may vary depending on disease stage but commonly demonstrate white matter involvement and cortical atrophy in advanced disease.

Currently, no definitive cure exists for SSPE. Combination therapy using interferon-alpha and oral isoprinosine has shown partial stabilization in some patients, although outcomes remain inconsistent. Supportive management focusing on seizure control, physiotherapy, and nutritional care remains the cornerstone of treatment. Recent research emphasizes prevention through sustained immunization programs as the most effective strategy to eliminate SSPE worldwide.

### Conclusion

SSPE is a rare but fatal complication of measles infection. Early recognition is crucial, particularly in individuals with a history of measles and incomplete vaccination. While no curative therapy exists, prevention through timely and widespread measles vaccination remains the most effective strategy to eliminate SSPE.

SSPE continues to represent a preventable yet devastating neurological disorder associated with measles infection. This case highlights the importance of maintaining high vaccination coverage and early clinical suspicion in patients presenting with progressive neurological decline and a history of measles infection. Strengthening public health awareness and immunization strategies is essential to prevent future cases and reduce disease burden.

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