CASE REPORT

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SUB ACUTE SCLEROSING PANENCEPHALITIS (SSPE): A RARE AFTERMATH OF MEASLES IN CHILDREN

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ABSTRACT

Sub acute sclerosing panencephalitis (SSPE) is a neurodegenerative disease of the central nervous system (CNS) caused by defective measles virus infection. There are many criteria developed to diagnose SSPE, one of them is Dyken criteria. The SSPE diagnosis is based on characteristic clinical symptoms: intellectual deterioration, behavioral changes, poor school performance, frequent fall; EEG findings: burst suppression pattern in myoclonic phase and in cerebrospinal fluid (CSF) there are findings of elevated antibody titres against measles. Here we present a case who fulfill most of the Dyken criteria: Repeated fall during walking, poor school performance, jerky movement of body. EEG (electroencephalograph) findings: interictal expression of localization related epilepsy with focal neuronal dysfunction at both hemispheres with pseudo periodic pattern, could be very early stage of encephalopathy, such as SSPE. In CSF the total IgG was 11.64 mg/dl, measles antibody IgM serum was found to be positive:1.208. There is no cure of SSPE. Few percentage may recover spontaneously. Isoprinosine with or without interferon alpha, ribavirin, IVIG (intravenous immunoglobulin) may be given for slowing the course of disease. Sodium valproate, carbamazepine may be given for control of myoclonic seizure. We managed the patient by sodium valproate for control of myoclonic seizure and advised isoprinosine for slowing the progression of disease.

Key Ward: Panencephalitis, Dyken criteria, EEG, rare condition, immunization, measles virus

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INTRODUCTION

Sub acute sclerosing panencephalitis caused by persistence of aberrant measles virus in CNS and its outcome is nearly always fatal. It occurs due to persistent infection caused by altered measles virus that is harbored for several years intracellularly in the CNS. After 7-10 years, virus achieve virulence and attack the cells in the CNS. This "slow virus infection" results in inflammation and cell death, leading to neurodegenerative change[1].

SSPE (a rare condition) usually follows measles prevalence in a population[2]. In western world, it is considered to be rare, with less than 4-5 cases per year observed in the United States[3].Substantial decline in its incidence has been noted since introduction of an effective measles vaccine. The annual incidence of SSPE is quite high but variable among developing countries. Saha et al. reported an annual incidence rate 4.3 cases per million for children below 20 years in South India[4,5]. In Germany, a study noted the ratio of SSPE to measle infection cases was 1:1700 to 1:3300 for those getting measles infection prior to the age of five years. This probability is 1.7 times higher for children who are infected before the age of 3 years when compared to those below age of 5 years.

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A study done in California reported that children with measles under the age of 5 years exhibited a ratio of 1:1367 while for those contracting measles before age of 1 years the ratio 1:609[6,7]. The ratio of incidence has been reported to be 3:1 (male: female) which indicates boys being more prone to being infected. Children in the rural area exhibit a higher infection incidence in comparison to those in the urban region.The SSPE incidence has dropped in developed nations by more than 90% due to widespread immunization[8]. Evidence has not been found in support of attenuated vaccine virus causing SSPE[3,6,8]. Measles has re-emerged in the industrialized nations in the past few years. Hesitancy in getting vaccinated has been linked to reduction in vaccination[9].

Pathogenesis of SSPE remains unclear, factors that seem to be involved are defective measles virus and interaction with a defective or immature immune system. The fact that most patients with SSPE were exposed at a young age suggests that immune system immaturity is involved in pathogenesis.

Pathological features of SSPE:
The features that are attributed to SSPE include perivascular inflammatory cells and neuronal loss in brain tissue; an eosinophilic intra nuclear inclusion body; and electron microscopy of intracytoplasmic inclusion bodies and intra nuclear filamentous course inclusions.

Clinical features of SSPE:
The clinical features of SSPE are highly variable. The initial symptoms are subtle and include intellectual deterioration, poor performance at school, changes in behavior, irritability, reduced attention span, temper outbursts, and frequent fall.

Stages of the disease:

Stage 1: Poor school performance, intellectual deterioration, memory loss, altered speech, decreased attention span, irritability, altered sleep pattern. High index of suspicion is required for early diagnosis of SSPE.

Stage 2: Hallmark of this stage is myoclonic jerks. There are marked disturbances of ataxia, motor function, behavior disorder, retinopathy.

Stage 3: Decerebrate rigidity and decorticate rigidity.

Stage 4: Severe loss of cortical function, flexion posturing of limbs and mutism.

SSPE can be diagnosed by a compatible clinical history and a minimum of one of the following supportive findings:

1. Measles antibody detected in CSF,
2. Characteristic EEG findings,
3. Brain biopsy.

The analysis of CSF exhibits normal cells but IgG and IgM antibody titers are elevated in dilutions > 1.8 .Burst suppression pattern in myoclonic phase is observed in EEG. SSPE diagnosis no longer requires biopsy of the brain.

Management of SSPE is supportive. Clinical trials using isoprinosine with or without interferon suggest significant benefit (30-34%) remission rate, about 5-10% spontaneous remission. Carbamazepine is significantly beneficial in the control of myoclonic jerks in the initial stages of the illness. Sodium valproate, Clonazepam and Zonisamide may also be used. Baclofen may be used in severe spasticity.

All patients eventually succumb to SSPE. Most die within 1-3 years of onset of infection. Vaccination like measles, rubella (MR) and mumps, measles, rubella (MMR) can prevent SSPE.

CASE REPORT

A 5 years old male child, second issue of his non consanguineous parents hailing from magura, Bangladesh, immunized as per EPI (Expanded Program on

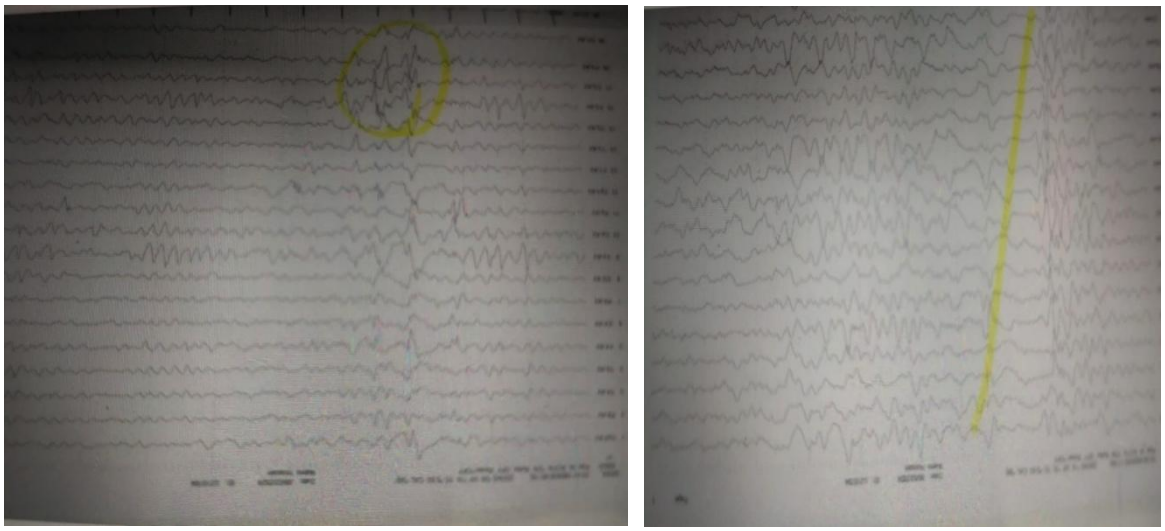
Immunization) schedule got admitted on 01.06.2024 with the complaints of repeated falls during walking for 1 month, gradual deterioration of school performance for 1 month, jerky movement of body for 10 days. He had history of measles at the age of 10 months and was admitted in Infectious Disease Hospital, Mohakhali. He had no history of jaundice, and seizure.

On examination he was conscious, having slurred speech with myoclonic jerks, muscle tone was normal, score on the MRC muscle power scale was 4 out of 5, reflex are normal. Patient was walking unsteadily. His vital signs were within normal range. He was non icteric, and there was no skin pigmentation, no organomegaly, no history of similar illness in his family. Kayser-fleischer (KF) rings was absent. We managed the patient with Isoprinosine, Sodium valproate and other supportive medications.

Long term follow up may be required for prognosis of disease.

Investigation findings:

- EEG findings were consistent with interictal expression of localization related epilepsy with focal neuronal dysfunction at both hemispheres with pseudo periodic pattern which could be indicative of very early stage of encephalopathy such as SSPE.



A **B**

Figure 1 (A and B) displaying the EEG report of the patient

Other investigation findings

Measles antibody IgM serum: Positive 1.208 (Ref. Positive- >1.1; Negative- <0.9)
Serum total IgG: 1478 mg/dl

CSF findings:

- Total IgG: 11.64 mg/dl (increased) (Ref 0-3.4 mg/dl)
- Cell count: 02 cell/cmm
- Protein: 22 mg/dl
- Globulin: Not increased

DISCUSSION

SSPE is a serious and rare disease of CNS and results from being infected by mutated virus of measles. The disease displays variable clinical features and course but typical features include progressive deterioration of intellectual function, personality change, and poor school performance. Certain patients presents with seizures specially myoclonic; epilepsy develops in one third of those having SSPE.

Patients ultimately develop a vegetative state or akineticmutism followed by death[9,10,11]. This patient presents with change in personality, poor school performance, frequent fall and myoclonic seizures.

The course of SSPE has been divided into four stages:

Stage 1: Behavioral changes like irritability, speech regression, lethargy, and dementia.

Stage 2: Myoclonus, dyskinesia, dystonia.

Stage 3: Extrapyramidal symptoms posturing and spasticity.

Stage 4: Severe loss of cortical function, flexion posturing of limbs[10].

Our patient had myoclonic jerks, therefore he was at stage 2.

Dyken criteria (used for diagnosing SSPE) consisted of typical symptoms, specific CSF antibody, serum antibody, typical EEG findings and brain biopsy. There is a requirement of at least 3 out of the 5 criteria to be fulfilled for establishing a diagnosis of the condition. This patient had typical clinical features, specific CSF and serum antibody findings and typical EEG findings. However, certain patients' EEG may show findings that are atypical like lacking rhythmicity, intervals alternating between occipital spikes before complexes and slow-wave complexes[11]. Although imaging may act as supportive evidence for diagnosing SSPE, abnormal findings may not be observed in every case. Gray matter volume decrease, atrophy with marked ventriculomegaly and hyperintensities may be noted in magnetic resonance imaging (MRI)[10].

At present there exists no certain cure for SSPE. The aim of treatment is no mitigate symptoms. There is only about a third of patients that benefit from treatments. The advantages of the management include slowing the stabilizing progression, course of the disease, survival prolongation and clinical improvement[10, 11].

Several drugs are used in combination with each other. We managed our patient's seizure with sodium valproate. Due to financial constraint we did not give any other drugs. Interferon Alpha can be used with isoprinosine but it has been reported that results obtained by giving daily isoprinosine plus weekly interferon-alfa (INF-alpha) does not display any added advantage when compared to the outcome observed in those who are given isoprinosine monotherapy[11].Ribavirin may also be given. Research has suggested that therapies blocking neuronal membrane fusion would possibly halt CNS infection progression due to measles virus[12].

IVIG is effective in SSPE when administrated along with prolong therapy with inosiplex[13]. Several case reports have recommended following a ketogenic diet as an adjunct to therapy which can aid in symptom control[14]. The mortality rate is high in SSPE (about 95%) and remaining 5% cases go under spontaneous remissions[11,14]. The life expectancy in such patients after the initial presentation ranges from 45 days to 12 years with an average of about 3.8 years[10].

CONCLUSION

There is no cure of SSPE. Few percentage may recover from this deadly disease. Most important limitation in the treatment of SSPE is the inability to detect early manifestations of the disease, when the inflammatory changes are possibly reversible. So early diagnosis may prevent serious complications of this disease. Palliative care is very important for handicapped children to improve the quality of life. Families need physical, psychological and economic support. Multidisciplinary management can reduce complications of patient.

CONFLICT OF INTEREST

There is no conflict of interest.

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