Post-Vaccinial Encephalitis after Semple type of Anti-Rabies Vaccine


Abstract

A case of post vaccinial encephalitis after Semple type of anti-rabies vaccine is presented for its rarity.

Key words: Post-vaccinial encephalitis, Acute disseminated encephalomyelitis, Semple vaccine, Macaques.

Introduction

Clinical science dictates that in order to determine, if immunisation or any therapeutic modality is beneficial, then risks must be compared directly to the benefits in an equal manner. The proper scientific end-point of a clinical trial is the enhancement of health in the treatment group as compared to the control group. Disease specific end-points such as the prevention of infection or reduction of a tumour are not proper clinical end-points since a treatment can prevent a cancer or infectious disease but increase one’s risk for even worse diseases. Reports linking vaccination with autoimmunity and other chronic autoimmune mediated diseases are relatively rare even though vaccination is a common practice and autoimmune diseases are common. Adverse reactions to vaccines are greatly under-reported because the methods of tracking vaccine side effects are designed only to detect reactions occurring with in a few weeks of immunisations. Part of failure to report vaccine induced autoimmunity is because the disease may not occur for many years after vaccination. Cases of autoimmunity induced by rabies vaccine have become apparent 10 to 20 years after administration1.

Case report

A fifty year old non-alcoholic, non-smoker, female adult working as school attendant presented with history of fever and headache of 3 weeks duration. Fever was high grade, continuous, accompanied by chills and sweating; and decreasing since the last 1 week. Headache was diffuse and accompanied by giddiness but without vomiting. On the second day of fever, she had abnormal sensation of right half of whole body which changed to increased touch and pain by evening and it was continuous since then. She also developed weakness of right half of body on tenth day of fever and this remained static since then. She was unable to communicate properly since the last one day. There was no history of seizures, ear discharge, and upper respiratory catarrh. Her recent past history revealed that a Macaque (monkey) tried to snatch a packet from her, and during this scuffle she suffered a deep scratch in her left little finger and on the ulnar side of the palm. For these complaints she was taken to the district hospital emergency, where her wound was washed and she was put on anti-rabies Semple vaccine. She took a course of 10 injections subcutaneously for class- III wound. The last booster was given four weeks prior to the start of fever. She was non-hypertensive and non-diabetic. On examination her pulse was 76/minute, regular, all peripheral pulses were well felt and equal on both side. Respiratory rate was 16/min. regular; pupils were B/L equal in size with normal light reflex. She was afebrile at the time of admission and fundus examination was normal. There was no pallor, icterus, cyanosis, oedema, and exanthamatous lesions. Jugular pressure was not raised.

On examination of central nervous system, she was obeying the commands slowly and was unable to speak. There was right sided 6th and 7th nerve supra-nuclear palsy. Right lower limb was externally rotated with slight plantar flexion. There was no wasting. In right upper limb power was normal but reflexes were exaggerated. In the right lower limb tone was increased. Power was grade II-III/V in all the muscles, reflexes were exaggerated. The plantars were B/L extensors. Abdominal reflexes on right

* Registrar, *** Postgraduate, **** Associate Professor, ***** Professor, Department of Medicine,
** Registrar, Department of Radiology, IGMC Shimla-171 001 (HP).
side were not elicitable. The left upper and lower limbs were normal. Tests of coordination could not be done. Sensations of touch, pain, and temperature on right side were markedly increased from head to toe. Neck rigidity was not there and Kernig’s sign could not be elicited. The rest of the systemic examination was normal.

A clinical diagnosis of Rt. sided hemiparesis with 6th and 7th nerve supra-nuclear palsy with motor aphasia with raised intracranial pressure was kept. Cause for it was cerebral vascular accident. A second possibility of post-vaccinal acute demyelinating encephalitis was kept.

Her laboratory investigation were normal including HbsAg, HvcAg, and IgM for toxoplasma, rubella, cytomegalovirus, HSV-I and II. HIV was non-reactive with rapid card. Chest skiagram was normal and plain CT head was also normal. MRI head and cervical region (Fig. 1) showed scattered demyelination with hypointense areas in the region of thalamus and cingulate gyrus on proton density images. There was no enhancement on gadolinium. The lesions were suggestive of a demyelinating disorder. The antirabies antibodies levels were not done.

She was put on methylprednisolone 500 mg I/V 8 hourly for five days and was followed by prednisolone 40 mg daily for two weeks and then tapered. She was given physiotherapy continually. She showed dramatic improvement; weakness of limb improved, and she could also speak properly in three days. At the end of three months follow-up, power in the right lower limb was 4-4+ but dysasthesia over the right side persisted. Follow-up MRI of head after three months was normal.

Discussion

Rabies is endemic in India and approximately 30,000 people die of the disease every year. Ninety six percent of people seeking anti-rabies vaccine are exposed to dogs. The explosion of human as well as animal populations in India offers chances of increased exposure to rabid animals and increased incidence of dog bite cases. Each year 40 million ml of cell culture vaccine and 90 million ml of nervous tissue vaccine is indigenously produced in 12 centres, for human and animal use respectively. A total of 1,800,000 doses of cell culture vaccine are locally produced or imported for human use. More than 5,00,000 people take anti-rabies vaccination every year and of this 3 million receive Semple type of vaccine as it is inexpensive, easy to produce, and is available in peripheral health institutions. Though it is inexpensive, it has a very high incidence of neurological reactions including post-vaccinal encephalomyelitis – 1 in 220 courses, with a 3% mortality.

The Semple type of vaccine is obtained from inactivated virus prepared in adult animal nerve tissue. Myelin basic protein and related neural proteins from the nervous tissue of the sheep brain in which virus is cultivated stimulate an autoimmune reaction in the human nervous system. It can manifest as mononeuritis multiplex, meningoencephalitis, and encephalomyelitis.

To appropriately manage potential human exposure to rabies, the risk of infection must be accurately assessed. Administration of rabies post-exposure prophylaxis is a medical urgency, not a medical emergency but decision must not be delayed. Human Rabies Prevention - United States, 1999 recommendations of advisory committee on immunisation practices (ACIP) has defined the various wild animals, nature of injuries, circumstances of biting incident and vaccination status of exposing animals and various other issues clearly but it is silent on the serious scratches of Macaques which most of the time are unprovoked in an attempt to snatch things. Also, there
Acute disseminated encephalomyelitis (ADEM) is an acute widespread demyelinating condition, which principally affects brain and spinal cord. It usually follows an infection or vaccination. The disease is characterised by multimodal white matter lesion on neuroimaging. The common variant of ADEM is that follows vaccination. This form is clinically indistinguishable from post-infectious variety except that the former more often involve the peripheral system. The hallmark of clinical features of ADEM is the development of a focal or multifocal neurological disorder. Recovery can begin within days; on occasion, complete resolution is noted with in a few days, but more frequently occurs over the course of weeks or months. The mortality varies between 10% and 30% with complete recovery in 50%. None of the patients experienced relapse once complete recovery had occurred. Neuroimaging is extremely valuable in establishing the diagnosis of ADEM. Computed tomography is generally normal at the onset and usually becomes abnormal 5-14 days later. Demyelinating lesions of ADEM are better visualised by MRI, in which white matter predominates but gray matter can also be affected, particularly basal ganglion, thalamus, and brainstem. The diagnosis of ADEM is considered straightforward when it occurs after an exanthem or immunisation. A clear-cut period between systemic symptoms and neurological illness favours ADEM along with typical pattern of diffuse and multifocal involvement of both central nervous and peripheral nervous system and characteristics MRI appearance. Though it has to be differentiated from initial manifestation of multiple sclerosis. The treatment of ADEM is targeted to suppress a presumed aberrant immune response to an infectious agent or a vaccination. Treatment with intravenous corticosteroids (methylprednisolone) or adrenocorticotropic hormone in large doses has been shown to improve the outcome. Approximately two-thirds of patients who are treated with corticosteroids benefit from the treatment. In some patients where corticosteroids fail, use of plasmapheresis or IV immunoglobulin has been shown to produce dramatic improvement. In some cases, a cytotoxic agent has been used with success.

We present this case because neural tissue vaccine (NTV) which has been banned by WHO and has a lot of side effects including the devastating neurological complications like ADEM; also it has got less immunogenicity. NTV use should be discouraged or banned; instead, human diploid cell vaccine should be promoted, which is more economic than NTV if given intradermally in multiple injections regimen. There should be clear-cut guidelines on scratches by animals like Macaques.

References