

The usefulness of brain perfusion SPECT in an infant with focal convulsions associated with *Hemophilus influenzae* central nervous system infection

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Left hemiconvulsions occurred in a 13-month-old girl with *Hemophilus influenzae* (*H. influenzae*) central nervous system (CNS) infection. Tc-99m HMPAO brain SPECT showed a focal hyperperfusion area in the right frontal lobe. The patient recovered without complications, and follow-up SPECT revealed markedly improved findings. Tc-99m HMPAO brain SPECT is useful for evaluating focal convulsions associated with *H. influenzae* CNS infection.

Key words: *Hemophilus influenzae*, Tc-99m HMPAO, SPECT, central nervous system

INTRODUCTION

INFECTION of the central nervous system (CNS) is a common but serious medical condition, and the importance of early diagnosis and treatment should be kept in mind. Although many species of bacteria can induce CNS infection, *Hemophilus influenzae* (*H. influenzae*) is one of the most common causes in young children.^{1,2}

We report an infantile case with focal convulsions associated with *H. influenzae* CNS infection and discuss the usefulness of Tc-99m HMPAO brain SPECT.

CASE REPORT

A 13-month-old girl was admitted to our hospital because of a high fever (39°C) and two episodes of generalized convulsions. The high fever and a nasal discharge had been noted for two days. The infant had been delivered at 40 weeks gestation with a birth weight of 2,560 g, and her neonatal course was uneventful.

On admission, the white blood cell count was 10,500 and CRP was 3 mg/dl. The cerebrospinal fluid (CSF)

findings were 800/3 cells/ μ l, protein 160 mg/dl, and glucose 80 mg/dl. CSF cultures yielded *H. influenzae*. The patient was treated with antibiotics, and the fever gradually subsided. A focal convulsion of the left upper extremity occurred on Day 12 of the illness and a focal convulsion of the left lower extremity occurred on Day 15. CT performed on Day 10 showed no evidence of an intracranial mass, but mild swelling was seen in the right frontal lobe (Fig. 1).

Brain SPECT with 185 MBq Tc-99m HMPAO and a dual-headed gamma camera (Toshiba GCA-7200A) was performed on Day 13. Each detector was set to rotate continuously through 180 degrees in 5 minutes with an acquisition time of 20 minutes. SPECT showed focal hyperperfusion in the right frontal lobe (Fig. 2). This finding was thought to be associated with the cause of the left focal convulsions. An EEG performed on Day 16 showed no definite abnormal findings. The clinical course is briefly shown in Figure 3.

The patient recovered without complications. Follow-up CT one month later continued to show mild swelling of the right frontal lobe, but follow-up SPECT two months later showed improvement of the hyperperfusion (Fig. 4).

DISCUSSION

This case report describes Tc-99m HMPAO brain SPECT images in an infant with focal convulsions associated with

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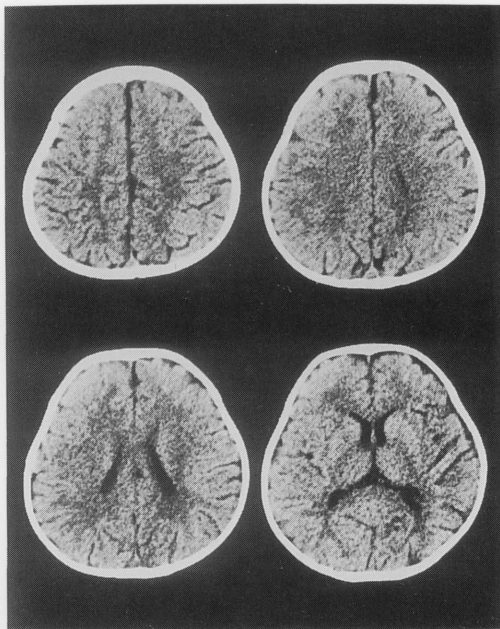


Fig. 1 CT performed on Day 10 showed no intracranial mass but mild swelling of the right frontal lobe.

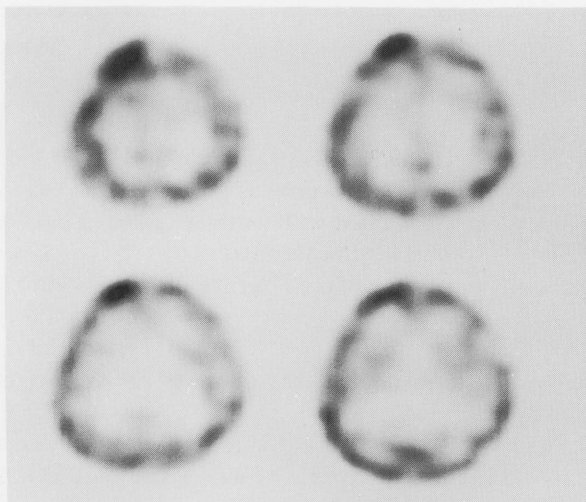


Fig. 2 SPECT performed on Day 13 showed focal hyperperfusion in the right frontal lobe.

H. influenzae CNS infection, and it is presented for two reasons. First, because Tc-99m HMPAO brain SPECT provided good clinical information in the evaluation of the focal convulsion. Second, because diagnostic information could be obtained in such a small patient by a conventional method.

About the mechanism of the hyperperfusion in the present case, we considered that, (1) hyperperfusion suggested the presence of cerebritis, (2) hyperperfusion was due to convulsion caused by CNS infection, and (3) epilepsy was unlikely because of the subsequent clinical course and normal EEG.

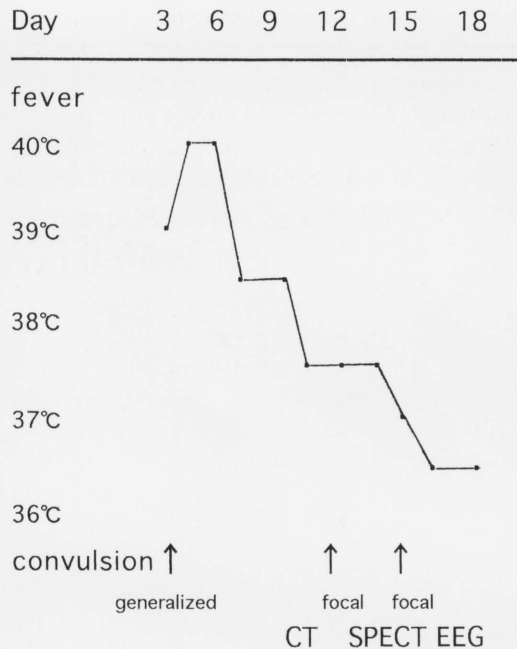


Fig. 3 The clinical course of the patient.

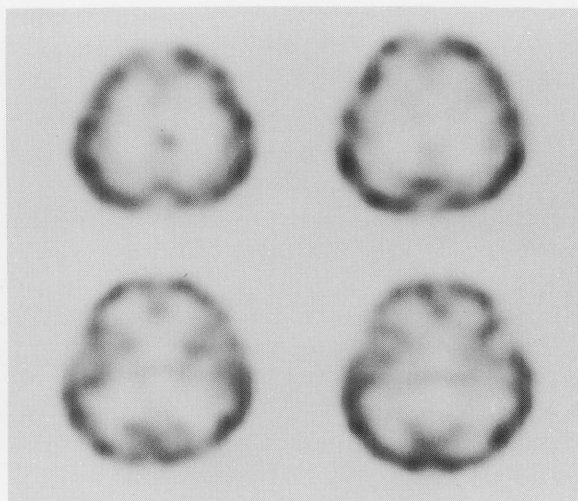


Fig. 4 Follow-up SPECT two months later showed improvement of the hyperperfusion.

There are many reports of brain perfusion SPECT in the evaluation of viral encephalitis. In most patients, SPECT shows focal hyperperfusion during the acute phase, and the detectability of the disease by SPECT is better than by CT or MRI,³⁻⁸ but no reports of hyperperfusion on Tc-99m HMPAO SPECT images in *H. influenzae* CNS infection could be found in a literature search by the authors. The origin of the increased Tc-99m HMPAO is unknown, but is presumably related to a transient local increase of Tc-99m HMPAO binding cells related to the inflammatory reaction.⁹ A similar mechanism might be considered in this case.

Our patient was sleeping during the examination after intravenous administration of propofol, and the examination time was only 30 minutes. We emphasize that SPECT examinations of infants do not require much time or labor and the information obtained is very important.

In conclusion, we have demonstrated the utility of Tc-99m HMPAO brain SPECT images in an infantile case of focal convulsions associated with *H. influenzae* CNS infection.

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