isolate virus from blood, CSF and urine failed. Full blood count, erythrocyte sedimentation rate, chest radiograph, visual evoked potentials, brain stem auditory evoked potentials, and cranial CT scan were normal.

Gradual resolution of symptoms and abnormal findings occurred over the following 6 weeks.

In the 1960's Smith and Walsh and later Cogan, described a benign encephalitis with ocular oscillation and truncal ataxia. Following a prodrome of malaise and mild fever, such patients developed ocular flutter or opsoclonus and shivering movements of the head and body. Cerebellar and long tract signs also occurred in some patients but the sensorium usually remained clear. Spinal fluid protein and cell count were often elevated. The illness resolved, usually within a few weeks or months, although the course was occasionally protracted, especially in children (Kinsbourne's myoclonic encephalopathy with "dancing eyes and dancing feet").

The movement disorder of the trunk was precipitated by sitting or standing, particularly on one leg, and by loud noises, but did not occur whilst lying. The initial suggestion by some observers that the patient was either very anxious or hysterical has been noted in other case reports.

The prodromal systemic symptoms, CSF pleocytosis and temporal profile, suggested that the neurological disorder was a sequel to infection, although no viral or bacterial agent was isolated. If so, it probably represented a late or delayed phenomenon occurring after the acute stage of infection at a time when the organism could not be isolated.

The possible pathophysiological substrate for opsoclonus and ocular flutter is probably related to a disorder of the inhibitory control of saccadic burst neurons by pontine pause cells. Baringer postulated that the postural tremulousness was a result of a post-infectious lesion affecting the cerebellar vermis.

The self limited course in all reported cases has precluded any clinicopathological correlation. Awareness of this easily recognisable syndrome may provide the opportunity to further study its possible pathogenesis. Recognition, in any case, provides reassurance for the patient and attending clinician.

We are grateful to Dr RH Edis, for his assistance in the management of this case. The Department of Medical Illustrations, Royal Perth Hospital, provided the illustration, and secretarial assistance was given by Denise Charles.

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Two cases of influenza B encephalitis

SIR: It is a common belief that "influenza" is often associated with neurological sequelae. Osler has been quoted as saying "Almost every form of disease of the central nervous system may follow influenza". He made this assertion before respiratory viruses had been classified, and before virological proof was possible. We report two cases of severe encephalopathy associated with influenza B infection. We are not aware of any other well documented cases of encephalitis associated with influenza B.

Five days after admission to a psychiatric unit for treatment of an anxiety state a 37 year old housewife developed a fever of 39°C, mild neck stiffness and became disorientated. Two days later her condition deteriorated, and she was transferred to a neurological ward. She could not speak, did not respond to commands, reacted in a semi-purposeful manner to painful stimuli and had marked neck stiffness, with Kernig's sign positive. The pupillary reflexes were normal. There was no papilloedema. Oculocoephatic responses were normal. Muscle tone and tendon reflexes were generally increased, with extensor plantar responses. There was no obvious sensory loss in any limb. EEG showed loss of alpha rhythm with widespread delta activity with a tendency to periodicity. Computed tomography (CT) and isotope brain scans were normal. Chest radiograph showed patchy pneumonic changes. Lumbar puncture was traumatic. The CSF contained 6,700 red blood cells (rbc) and 43 lymphocytes per um; sugar 2.7 umol/l with a corresponding blood sugar of 7.6 umol/l protein g/l. CSF repeated 7 days later contained 584 rbc, 75 lymphocytes/um; protein was 0.32 g/l and electrophoresis showed oligoclonal bands. Eight days after her initial fever she required assisted ventilation for six days. She developed status epilepticus and frequent myoclonic jerks. She was treated initially with dexamethasone and anticonvulsants. She also required antibiotics for repeated chest infections due to Staphylococcus aureus.

After about four weeks she became more alert, but remained rigid, with periods of myoclonus. She was treated with a levodopa preparation without benefit. She was allowed home after four months, able to walk with the aid of one person but slightly confused. One year after discharge she was free of fits and myoclonus. She now lives an independent life. There is no evidence of residual intellectual deficit. Five days after the onset of fever the complement fixation titre of antibody to influenza B was < 1:10; 16 days later it was 1:320. There was no rise in complement fixation antibody titre to mumps, measles, herpes simplex, varicella-zoster influenza A virus or Mycoplasma pneumoniae. Using influenza B/Singapore/222/79 as antigen in the haemagglutination-inhibition test, the patient's sera showed a rise of antibody from < 1:10 to 1:80. Virus was not isolated from acute phase faeces or CSF in baboon kidney or HEp2 cells.

A 38 year old housewife had a four day prodromal illness of headache and generalised muscle aches, then became pyrexic, confused and dysphasic with mild weakness in her right arm. Two days later she had a solitary generalised convulsion, developed mild neck stiffness and became stuporous. Her temperature was 38-5°C. She responded to painful stimuli only. (There was no verbal response). There was no papilloedema. The pupillary responses were normal. The eyes were deviated to the left. The right arm was flaccid with diminished reflexes. The plantar responses were equivocal. The CSF was normal in all respects. CT brain scan was normal and the EEG showed extensive low frequency activity, maximal in the left posterior temporal region. A provisional diagnosis was made of herpes simplex encephalitis. Treatment was started with acyclovir 500 mg tds IV and dexamethasone. The next day she was responding to questions, two days later she was orientated in time and place. There was a slight dysphasia and she was able to move her limbs nor-
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nally. She was discharged after two weeks and was back to work after three months. Complement fixation antibody titre to influenza B one day after developing her dysphasia was 1:80 rising to >1:1280 two weeks later. There was no rise in complement fixation antibody titres to mumps, measles, herpes simplex, varicella-zoster and influenza A viruses. Using influenza B/Singapore/222/79 as antigen in the haemagglutination-inhibition test the patient’s sera showed a rise of antibody from <1:10 to 1:40. Virus was not isolated from acute phase faeces and CSF in baboon kidney or HEp2 cells.

The acute phase blood samples were taken during the first few days of neurological features after a prodrome. Diagnostic rises of viral antibody titres to influenza B/Singapore/222/79 virus were established during the course of the illness. We were unable to detect antibody to influenza B virus in the acute phase CSF, and convalescent phase CSF was not obtained. Both patients became ill during January/February 1982 when there was an epidemic of influenza B virus in the local community. During the outbreak, 46 patients with influenza, pneumonia or myocarditis were investigated and influenza B virus, similar to influenza B/Singapore/222/79, was isolated or serological evidence of influenza B infection was found.

There are few reports in the literature of neurological sequelae of influenza B virus infection in general and even fewer reports of encephalopathic illness associated with the virus. In 1946 in London there were five cases of polynuropathy, two of myelopathy and two of encephalopathy, mainly localised to the brainstem. Virological tests for influenza B were not carried out on the patients. This problem was highlighted by the report from South East Wales of 19 patients with acute neurological disorders following an upper respiratory tract infection during the influenza A pandemic of 1969–70. (Of the 19 patients only eight were shown to be associated with influenza A infection and none had encephalopathy. Other viruses were implicated in six cases and no virus was identified in the five remaining cases.)

In the report of four cases of encephalitic illness during an influenza B epidemic in the West of Scotland in 1966, one patient died. At necropsy there was no demyelination in the brain. In all cases there was upper respiratory tract infection. In two cases influenza B virus was isolated from throat swabs. In the other two cases high antibody titres to influenza B were found at the presentation of the encephalitic illness. Twelve patients with peripheral neuropathy during an epidemic of influenza B, have been described, but the clinical features of the cases were not described in detail. Three cases of acute polynuropathy after recovery from influenza B infection established by throat swab culture, and viral serology have been described; all cases made a complete recovery. In a series of 15 cases with influenza B infection, two had neurological disorders, one had Guillain-Barré syndrome, with a high antibody titre on admission. The second case had papiloedema and headache. Cases similar to Roye’s syndrome have been reported to be associated with influenza A and B infection.

It is interesting to speculate on the mechanism of the pathogenesis of encephalopathic illness of influenza virus infection. The virus invades and replicates in the epithelium of the respiratory tract. Whether it invades and multiplies in the brain is not clear. Influenza A virus has been cultured from the brain but there may have been cross-contamination from the lung at necropsy. Gamboa et al3 have reported the presence of influenza A virus antigens detected by immunofluorescence in the brains of post-encephalitic Parkinsonism. This finding has not been independently confirmed. In the post-mortem studies describing five deaths during the influenza A pandemic of 1957, the principal neuropathological findings were scanty microglial infiltration and slight lymphocytic infiltration of the meninges and perivascular spaces. One case had acute haemorrhagic leucencephalitis. Such descriptions are reminiscent of post-infectious encephalomyelitis, rather than encephalitis.

Whether the brain disease could be caused by a toxin or result from an immunological reaction due to a shared antigen, has not been established.

Influenza viruses are very powerful inducers of interferons. This is of great relevance since interferons exert neurotoxicity. Administration of recombinant human leucocyte interferon for therapeutic purposes to patients with advanced breast cancer, and to patients with leukoamasias and lymphomas, have been associated with confusion, disorientation, depression, apathy, coma, cerebellar ataxia, focal neurological deficits and EEG abnormalities which resolved rapidly after the drug was withdrawn. It appears that the amount of naturally produced interferon in the cerebrospinal fluid varies greatly according to the specific virus infecting the patient.

The precise mechanism of the pathogenesis is not clear, but in our patients the timing of the antibody rises (during the development of the neurological illness) and the clinical features of the illness are as much in keeping with encephalitis as post-infectious encephalomyelitis.

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