An unusual case of Behçet’s disease presenting with bilateral internal carotid artery occlusion

Behçet’s disease (BD) is a multisystemic recurrent inflammatory disorder, which is originally described as a triad of oral and genital ulcersations with uveitis. As vasculitis of the vasa vasorum is the main pathological hallmark of BD, it is generally seen in the form of superficial thrombophlebitis or occlusion of major veins; however arterial obstruction and aneurysms may also be seen to a lesser extent. We present a patient with BD who developed bilateral internal carotid artery (ICA) occlusions.

Case report
A 43 year old, right handed male patient was referred to Ege University Neurology Department for evaluation of an acute onset right sided weakness, fever, headache, and difficulty with gait and speech in August 2001.
On admission, he was alert and fully oriented. His temperature was 38°C, pulse was regular (90/min), blood pressure was 150/80 mm Hg. His speech was severely dysarthric but he could name, repeat, read, and follow instructions. His cranial nerves and fundoscopic examination were normal. His gait was wide based and unsteady. He had four sided mild weakness, which was prominent on the right. Muscle stretch reflexes were normal but plantar reflexes were extensor bilaterally. His coordination was impaired in proportion to weakness in all four extremities. He had mild nuchal rigidity of the neck with positive Brudzinski’s sign. On physical examination, erythema nodosum like dark red, painful lesions were noticed on both anterior aspects of the legs. His ophthalmological examination did not reveal any signs of uveitis. He also complained of pain and fever in his scrotum, and urological examination showed swelling, induration, and marked tenderness of epididymis on both sides as the clinical findings of epididymitis.

His medical history showed that he had complained about recurrent oral aphthous lesions and aforementioned skin lesions for 8 to 10 years without medical consultation. He had no other medical history associated with BD. He was a moderate cigarette smoker for 20 years.

Laboratory tests were consistent with an inflammatory condition with a high erythrocyte sedimentation rate (100 mm 1st h) and C reactive protein (12.27 mg/dl; normal range 0–5 mg/dl) levels. CSF examination, serum immunoglobulin levels, platelet count, protein C, protein S, antithrombin III, C3 and C4 complement, rheumatoid factor, and lipid levels were within the normal range. C3 and C4 complement, rheumatoid factor, and lipid levels were within the normal range. Serum anti-antineutrophil cytoplasmic and anticardiolipin antibodies were negative.

Figure 1 DSA of the cranial vessels showing the obstruction of (A) right and (B) left internal carotid arteries on lateral view.

After consultation with the rheumatology clinic, a pathergy test was performed to confirm the diagnosis of BD and found to be positive. The patient was then transferred to the rheumatology clinic. He was treated with aspirin 300 mg/day, prednisolon 1 mg/kg/day, pentoxifylline 1200 mg/day, 750 mg pulse cyclophosphamide monthly for BD. He was also treated with oral antibiotics and analgesics for the epididymitis. Two months later, he had almost completely recovered.

Comment
Our patient had presented with unusual neuroimaging findings for a classic stroke syndrome and MRI showed bitemporal ischaemic lesions and bilateral ICA occlusion, which was also shown by DSA. It is known that cardiovascular risk factors, smoking, fibromuscular dysplasia, or moyamoya disease are frequently found as an aetiological factor in patients with bilateral ICA occlusion, whereas essential thrombocythaemia, giant cell arteritis, and BD are among the very rare causes.

Although our patient did not have cardiovascular risk factors except for smoking, he had been suffering from BD for about 10 years, which was not diagnosed before neurological presentation. His medical history, skin lesions, and urogenital findings supported with a positive pathergy test verified the diagnosis of BD according to latest diagnostic criteria for BD.

Neurological involvement in BD has been reported to occur in 2.2% to 43% of cases in large series, either in the form of neuro-Behçet disease (papenchymal CNS involvement) or vasculo-Behçet disease (secondary or non-papenchymal CNS involvement) or both. Neuro-Behçet’s disease has a characteristic clinical picture with male predominance and typical cranial MRI findings of reversible inflammatory parenchymal lesions, attributable to small vessel disease, which may rarely be confused with those of MS. On the other hand, vasculo-Behçet’s disease is attributable to large vessel disease generally in the form of cerebral venous thrombosis and has limited symptoms with a better prognosis.

Our patient’s neurological signs and symptoms were highly suggestive of neuro-Behçet; however CSF findings with acellularity and normal protein level and neuro-imaging studies showing ischaemic lesions and bilateral ICA occlusions supported a very unusual type of vasculo-Behçet.

Diffuse cerebral atrophy and survival with minimal or no neurological or urogenital findings in our patient is not infrequent in patients with bilateral ICA occlusion. This is explained by the adequate collateral flow provided by vertebrobasilar system and slow, gradual occlusion.

Occlusive lesions in the bilateral ICAs, as seen in our patient, are extremely rare in BD and we suggest that this is a very unusual case of vasculo-neuro-Behçet’s disease. We also conclude that BD should always be remembered as an aetiologial factor for bilateral ICA occlusions, especially in countries where the disease is highly prevalent.

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References
Miller-Fisher syndrome and Hodgkin's disease

Miller-Fisher syndrome (MFS) is a rare clinical entity classically regarded as a variant of Guillain-Barré syndrome (GBS) and characterised by the triad of ophthalmoplegia, ataxia and areflexia. In MFS, paralysis is restricted to extraocular and occasionally other cranial or bulbar muscles. We report on a patient with a relapsing Hodgkin's disease who developed MFS. Conventional immunosuppressive and intravenous immunoglobulin treatments improved the neurological deficits. A 58 year old man of Portuguese descent who had an eight year history of Hodgkin's disease (type mixed cellularity, pathological stage IVB) had been receiving a salvage ESHAP regimen (etoposide 16 68 mg/day, methylprednisolone 500 mg/day, and cisplatin 42.5 mg/day for four days and cytotoxicarabinoisidine 3.4 g/day on the fifth day) since the first disease relapse four months before admission. He was admitted to the hospital for constitutional symptoms, 39°C fever, recurrent night sweats, fatigue, malaise, and weakness. There was no history of infection. General examination was unremarkable except for bilateral cervical adenopathy (1.5 × 1.0 cm). Haemoglobin concentration was 63 g/l, packed cell volume 17.8%, platelet count 89 × 10⁹/l, white cell count 3.34 × 10⁹/l (neutrophils 2.42 × 10⁹/l), and lactate dehydrogenase 409 U/l. The results of the following investigations were normal: glucose, cholesterol, triglycerides, and ions; renal, liver, and thyroid function tests; vitamin B12 and folie acid; and tests for Campylobacter jejuni, herpes simplex virus, herpes zoster virus, cytomegalovirus, Epstein-Barr virus, Streptococcus pyogenes, Borrelia sp, syphilis, and cerebrospinal fluid parameters.

Due to the diagnosis of relapsing Hodgkin's disease was considered. Before starting a cycle of ESHAP chemotherapy, the patient complained of bilateral hand pain and tightness, photophobia, dysphoria, and gait instability. Neurological function was assessed at that time, eight days after admission. Examination of the cranial nerves found a left sided ptosis with a total bilateral external ophthalmoplegia and fixed dilated pupils. The patient's pupillary response to a 0.05% solution of pilocarpine showed increased sensitivity consistent with a postganglionic parasympathetic lesion. (Oculomotor nerves are among the few myelinated fibres of the postganglionic nervous system and this patient likely had dysfunction in these fibres similar to that observed in the other peripheral nerves. Peripheral nerve abnormalities are encountered in about half of patients with MFS. There was dysphoria, mild dysphagia, and peripheral seventh nerve palsy. Examination of the peripheral nervous system showed loss of tendon reflexes. His muscle strength was normal, and pinprick, touch, position, and vibratory sensation were not impaired. There was obvious ataxia in all four limbs. He could walk with assistance and tandem gait was impossible. His cerebrospinal fluid protein concentration was 0.79 g/l with 2 lymphocytes/mm³. Cerebrospinal fluid culture and cytological studies showed normal lymphocytes. Subsequent investigations found increased Igg gamma antibodies to GQ1b glycolipids (titre of 4900). Standard delayed hypersensitive skin tests were performed to purified protein derivative of tuberculin (intermediate strength), Candida albicans, mumps, trichophyton, and streptokinase/streptodornase, showing failure to elicid a delayed hypersensitive skin test response to any skin test antigens. Serum immunoglobulin concentrations were increased (Igg: 19 g/l, normal 10.3 ± 2.9, Iga: 4.8 g/l, normal 1.65 ± 0.8).

Gadolinium enhanced magnetic resonance imaging of the head showed no abnormalities. There was neurophysiological evidence of an axonal sensory neuropathy (sensory conduction in the right sural and median nerves was absent; sensory and median motor compound muscle action potential was 7.1 mV with a conduction velocity of 41.5 m/s). F wave latencies from the right posterior tibial, right common peroneal, right median, and ulnar nerves were minimally prolonged two days after onset but were within normal limits by three months. The patient presented moderate reduction of facial compound muscle action potential. Right contralateral R2 amplitude: 1.5 mV, left amplitude: 1.3 mV, right latency: 3 ms, left latency: 3.2 ms. Blink reflex R1 latencies were mildly prolonged (right: 13.9 ms, left: 14.2 ms). Blink R2 response latencies were normal (right: 30 ms, left: 29 ms). Masseter reflex was normal. The amplitude of the distal sensory evoked response was greatly reduced (upper extremity somatosensory evoked potentials to median nerve stimulation at the wrist). Brainstem auditory evoked potentials were normal. Intravenous immunoglobin was given for five days at a dosage of 0.4 g/kg/day, starting 24 hours after the skin test negative result. There was no improvement of this syndrome after tumour treatment and intravenous immunoglobulins, supports the theory that partial immunosuppression and the presence of IgG anti-gQ1b are possible pathogenic mechanisms.

References


Neuromyotonia and myasthenia gravis without thymoma

Neuromyotonia is a syndrome characterised by muscle unit hyperactivity leading to muscle cramps, fasciculations, muscle stiffness, and persistent muscle contraction. In most neuromyotonia patients, the disorder is acquired. An autoimmune or paraneoplastic origin is common.” Myasthenia gravis, thyrototoxicosis, systemic sclerosis, inflammatory demyelinating neuropathies, thymoma, bronchial carcinoma, and small cell lung cancer may be associated. Here, we report a patient with neuromyotonia, associated with myasthenia gravis and anti-voltage-gated potassium channels (VGKC) and anti-acetylcholine receptor (AChR) antibodies without thymoma.

A 58 year old man of Portuguese descent presented at our neuromuscular clinic with dysesthesia and hypesthesia in the first three fingers of the right hand. Symptoms had started nine years before and had been attributed to cervical radiculopathy. Over the years, the symptoms had been fluctuating but for the past two months they had become debilitating. Therefore, the patient sought a second opinion. The patientvolunteered that although right hand pain was his main complaint, for many years his hands and feet were swollen and red. There was stiffness and loss of dexterity of all fingers. He had difficulty writing, using scissors, and using a handheld...
computer. Frequent cramps occurred in the fingers and toes. There was painful tension in the calves, the feet, and the hands. The patient also complained of excessive sweating. These symptoms had progressively worsened. One year before presenting to us, he developed ptosis of the right upper eyelid, rapidly followed by vertical and horizontal diplopia. These symptoms were fluctuating with worsening in the evening. Repetitive stimulation of the facial nerve showed a decremental response, symptoms and signs disappeared after injection of prostigmine, and anti-AChR antibodies were found. It was concluded that the patient had ocular myasthenia and the patient was treated with oral methylprednisolone. Improvement was rapid and after a few weeks treatment was stopped. Two weeks before presentation, the patient again complained of right palpebral ptosis and diplopia. The symptoms were responsive to pyridostigmine bromide. The medical history was remarkable for ophthalmal migrain, arterial hypertension, and hypercholerolemia. Treatment consisted of fenofibrate and metoprolol. The familiar and hypercholesteroloma. Treatment consisted of fenofibrate and metoprolol. The family history was non-contributory.

On clinical examination, continuous undulating movements were noted in the small muscles of hands and feet and in the orbicularis oculi muscles. Small amplitude, involuntary movements of fingers and toes were conspicuous at rest. The fingers were stiff and the patient had difficulty performing rapid alternating movements with his fingers. Tactile and pain sensation was diminished only in the first three fingers of the right hand. Tinel’s and Phalen’s signs were present at the right wrist and there was right hand grip weakness. Right upper eyelid ptosis, rapidly increasing on upward gaze was noted. Horizontal diplopia occurred in right lateral and vertical gaze directions. Deep tendon reflexes were normal and plantar responses were flexor.

Complete blood count, serum creatinine, blood urea nitrogen, liver function tests, serum electrolytes, thyroid function tests, and serum creatine kinase were normal. Rheumatoid factor was negative and there were no antibodies against striated muscle, but anti-nuclear antibodies were positive at a titre of 1:80. Prostate specific and carcinoembryonic antigens were negative. Both AChR antibodies (26 nmol/ml, normal values less than 0.5 nmol/ml) and VGKC antibodies (1091 pmol/l normal values less than 100 pmol/l) were detected. Computed tomography of the chest was normal.

Nerve conduction studies showed evidence of a severe rightsided carpal tunnel syndrome, but otherwise they were normal. Needle electromyography revealed myokymic discharges in distal muscles of upper and lower extremities (fig 1). These discharges consisted of bursts of motor unit potentials, appearing as doublets, triplets, or multiplets with intraburst frequencies of 40 to 100 Hz. Burst recurrence was irregular with an interburst frequency of 5–8 Hz. There was evidence of mild chronic denervation with slightly reduced recruitment in distal muscles. Anti-VGKC antibodies are found in approximately 40% of patients with acquired neuromyotonia they are also found in patients with other neuromuscular hyperexcitability syndromes, such as cramp fasciculation syndrome, acquired rippling muscle syndrome, facial myokymia. In a significant proportion of these patients, coexistence of myasthenia gravis and neoplastic disorders, myasthenia gravis in particular, is observed. About 20% of all reported neuromyotonia patients had thymoma; 70% thereof also had myasthenia gravis and anti-AChR antibodies and 20% had anti-AChR antibodies without overt myasthenia gravis. The absence of anti-striated muscle antibodies and of radiological evidence of mediastinal tumour in a patient with neuromyotonia of nine years duration illustrates that the association of autoimmune neuromyotonia and myasthenia gravis can occur without thymoma.

Figure 1 Myokymic discharges recorded at rest with a concentric needle electrode from the right dorsal interosseous muscle, shown at two different sweep speeds.

Acute attacks and brain stem signs in a patient with glutamic acid decarboxylase autoantibodies

Glutamic acid decarboxylase (GAD) is a major autoantigen in type 1 diabetes mellitus and stiff-man syndrome. Patients with progressive cerebellar ataxia and GAD autoantibodies (GAD-Abs) have been reported, and the pathogenetic role for GAD-Abs in suppressing cerebellar γ-aminobutyric-acid (GABA)-ergic transmission has been discussed. We present a woman who eventually developed progressive cerebellar ataxia, but had stroke-like episodes and brain stem involvement during her clinical course.

A 63 year old woman suffered dizziness of sudden onset accompanied by nausea and vomiting. Her physician found horizontal gaze evoked nystagmus. A few days later, she noticed transient horizontal diplopia, after which spontaneously all her symptoms gradually subsided. Two months later, she experienced intermittent vertigo when she turned her head and then unsteadiness of gait. Her past medical and family histories were unremarkable. On examination, she was fully conscious and had no general physical abnormalities. There was coarse horizontal nystagmus, coarser on the left side. On phonation, her posterior pharyngeal wall shifted rightward, indicating paralysis of the right side of the posterior pharyngeal wall (signe de rideau, Verney). She had ataxia in her left arm and leg and walked throwing the left leg outward. Although lesion in the left dorsolateral lower brain stem was suspected, MRI and MR arteri and venous images were unremarkable. A routine blood examination, as well as glucose tolerance and thyroid function tests, detected no abnormalities. CSF analysis was normal with negative oligoclonal IGE bands and a

References

and GAD-Abs. Patients with progressive cerebellar ataxia and presence of organ specific autoantibodies had coarse nystagmus. Although she does not have brain stem involvement as hemiparesis of the pharyngeal constrictor muscles can be used as prognostic markers for the activation of the immune system. They have been correlated with acute inflammatory processes and serum concentrations of adhesion molecules can be used as prognostic markers for the clinical outcome in patients with ICH. Therefore, we investigated whether ventricular cerebrospinal fluid (CSF) and serum concentrations of adhesion molecules can be used as prognostic markers for the clinical outcome and survival of patients with ICH. For this purpose, we studied prospectively 10 patients with acute ICH and ventricular tap. Estimated blood volume of the patients who survived (n = 6) and who died (n = 4) from cerebral causes within eight weeks after the onset of ICH. Patients with prior cerebrovascular diseases and patients who subsequently died of non-cerebral causes were excluded from this pilot study. Data were analysed using the SPSS statistical program (SPSS, Chicago, Illinois, USA). The Wilcoxon test was applied to compare the two patient groups. The two patient groups (surviving versus non-surviving) did not differ statistically with regard to age, sex, location and size of ICH, and initial Glasgow coma scale and Scandinavian stroke scale scores. As fig 1 shows, the CSF concentrations of sICAM-1 and sVCAM-1 were below 13.7 ng/ml (mean (SD) 8.7 (4.7) ng/ml) and of sVCAM-1 below 35.4 ng/ml (11.5 (13.1) ng/ml) in the group of patients who survived (n = 6). However, in patients with a lethal outcome (n = 4), initial ventricular CSF concentrations of sICAM-1 were above 18.3 ng/ml (25.5 (9.3) ng/ml) and of sVCAM-1 were above 44.5 ng/ml (76.8 (45.0) ng/ml). These differences were significant (the CSF concentrations of sICAM-1 (p < 0.01) and of sVCAM-1 (p < 0.01) were significantly lower in patients who survived than in those who died due to coma were required in all patients. All of them were being treated at the neurological intensive care unit after neurological application of a ventricular drainage to treat acute hydrocephalus. Paired serum and CSF samples from the ventricular drainage were obtained within eight hours after the initial symptoms attributed to ICH and within three hours after operation. Concentrations of soluble ICAM-1 (sICAM-1) and sVCAM-1 were determined by enzyme linked immuno-sorbent assay (ELISA). In corresponding clinical examinations, the Scandinavian stroke scale and Glasgow coma scale scores were determined. The patients were categorised into two groups: patients who survived (n = 6) and patients who died (n = 4) from cerebral causes within eight weeks after the onset of ICH. 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sVCAM-1 (p < 0.01). However, the concentrations of adhesion molecules in serum did not differ significantly (non-surviving: 444 (152) ng/ml for sICAM-1, 1422 (465) ng/ml for sVCAM-1; surviving: 463 (110) ng/ml for sICAM-1, 1147 (382) ng/ml for sVCAM-1).

This is the first study to investigate soluble adhesion molecules in CSF and serum in patients with ICH with ventricular tamponade. We found a strong correlation between clinical outcome and the concentrations of soluble adhesion molecules in the CSF of patients with acute ICH and ventricular drainage. Moreover, we found more than threefold increases of sICAM-1 and of sVCAM-1 in the CSF of patients with lethal outcome as compared with CSF from survivors. In the CSF, concentrations of adhesion molecules from patients with multiple sclerosis (sICAM-1: 2.8 ng/ml, range 0.9–12.7; sVCAM-1: 4.2 ng/ml, range 0.2–21.5) and from healthy donors (sICAM-1: 5.2 (2.2) ng/ml) as determined in our laboratory by identical test systems. The finding that the soluble adhesion molecules were increased in CSF but not in serum may indicate that the process leading to poor outcome occurs predomi-
nately in the brain. There are two possible explanations for the origin of increased CSF concentrations of soluble adhesion molecules. Firstly, brain tissue destruction may lead primarily to the release of adhesion molecules due to necrotic destruction. Secondly, ICH may initiate an inflammatory process leading to secondary brain damage, as has been suggested in human ischaemic stroke, as well as for experimental ICH and subarachnoid haemorrhage in animal models. With regard to the second hypothesis, it would be interesting to investigate the effects of early anti-inflammatory treatment in patients with ICH and an initial highly increased concentration of adhesion molecules in their ventricular CSF samples. In this condition, early application of corticosteroids may be useful to suppress the deviating inflammatory reaction. The block-age of ICAM-1 and VCAM-1 by systemic treatment with monoclonal antibodies would probably not be helpful, as the pathogenetic concept is to block the migration of inflamma-
tory cells into the central nervous system. However, based on our results, it can be speculated that these cells are already inside the central nervous system and thus out of reach of these antibodies.

With these data of only 10 patients, it cannot finally be concluded whether the increased soluble adhesion molecules in CSF are indicators of the fatal process or are responsible for the initiation of secondary brain damage.

Acknowledgements

Dr B Engelhardt is gratefully acknowledged for critically discussing the manuscript.

References


Ondine’s curse in a woman with Leber’s hereditary optic neuropathy

Leber’s hereditary optic neuropathy (LHON) is a maternally inherited disease of mitochondrial DNA. Several mutation sites have been described. All have been associated with visual loss, but mutations at nucleotide position 11778, 3460, and recently 14484, have also been associated with a multiple sclerosis (MS)-like disease.

We report a woman with undiagnosed LHON who presented with life threatening ventilatory failure. A 39 year old woman who had had bilateral synchronous severe visual loss to perception of light some two years earlier (see below), was admitted after a two week illness with a purulent cough. She was confined to bed and had received oral antibiotics from her general practitioner. She had a history of chronic headaches but reported no change in their frequency before presentation. On admission she was obtunded with a Glasgow Coma Scale (GCS) score of 3/15. She was hypotensive, with a severe respiratory acidosis. Arterial blood gas (ABG) showed pH 7.04, Po2 40.9 kPa, Po4 16.2 kPa, and bicarbonate 22 mmol/l. She was admitted to an intensive care unit and ventilated with later tracheostomy. She was weaned from the ventilator after 31 days and transferred to a ward. Five days later she had a second respiratory arrest requiring fur-
ther ventilation. She was transferred to another unit 73 days after admission for con-
sideration of long term non-invasive ventila-
tion.

This patient had consumed alcohol to excess and had been admitted previously for benzodiazepine overdose and complications of alcoholic liver disease. Two years earlier she had presented to an ophthalmologist com-
plaining of two months of painless visual loss. Visual acuity was counting fingers bilaterally with central scotomata and absent pupil reac-
tions. Fundoscopy showed bilateral disc oedema, dilated capillaries around the disc margins, and venous pulsations. A CT brain scan was normal, but the patient declined further investigation and a diagnosis of possi-
ble toxic optic neuropathy was made. She had a family history of visual loss. She had three siblings in their 30s, and three children aged 9–12 years who were well.

On examination after transfer (two months after her first respiratory arrest), she was alert, oriented, and breathing room air sponta-
neously. She was unable to stand and had globally wasted limbs consistent with pro-
longed illness. She still just perceived bilaterally and both optic discs looked pale and the pupils were mid-dilated and unreac-
tive. She had a divergent gaze in the primary position with coarse gaze re-
flexes in all directions. A jaw jerk was present and she had a mild facial diplegia with intact sen-
sation. She could speak and swallow ad-
edately and was able to cough and hold her breath to command. She had a spastic quadri-
paresis with grade 4/5 power in the arms but weaker legs and a flicker of movement only at the toes. Anterior abdominal motion during breathing while lying supine was impaired. Reflexes were brisk throughout and plantar responses were extensor. There was a subjec-
tive sensory abnormality to light touch to the mid-thighs and joint position sense was severely impaired in the lower extremities, fingers. Breath sounds were quiet and chest excursion limited. She had a distended abdo-
men with a four finger breadth liver edge pal-
pable and shifting dullness consistent with ascites. ABG on air showed pH 7.31, Po2, 6.8 kPa, Pco2, 10.5 kPa, and bicarbonate 34.8 mmol/l. Four hours later she became drowsy with a GCS of 8/15. Further ABG revealed pH 7.19, Po2, 5.5 kPa, Pco2, 12.8 kPa, and bicarbo-
nate 28.3 mmol/l. After four hours of non-
invasive intermittent positive pressure ventila-
tion (NIPPV); ABG on two litres of entrained oxygen showed pH 7.44, Po2, 16.4 kPa, Pco2, 5.2 kPa, HCO3, 27.4 mmol/l. She was subsequently transferred to a ward and treated with NIPPV on room air, at a pressure of 14 cm H2O overnight and during daytime naps.

An MRI scan of her brain showed sym-
metrical high signal lesions in the brainstem in the floor of the fourth ventricle at the level of the obex and in the medulla and upper cer-
vical cord (fig 1). The remaining cerebellum was spared and in particular there were no lesions suggestive of central pontine my-
elinolysis or alcoholic damage. CSF examina-
tion was unremarkable except for a margin-
ally increased protein of 0.48 g/l. CSF and
Table 1 Frequency of relapse of Guillain-Barré syndrome (GBS) and chronic inflammatory demyelinating polyradiculoneuropathy (CIDP) following various immunisations.

<table>
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<tr>
<th>Vaccine</th>
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<th>CIDP Patients</th>
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<td>Hepatitis B</td>
<td>20</td>
<td>1 (5.0%)</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Rabies</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Pneumococcus</td>
<td>15</td>
<td>6 (33.3%)</td>
<td>12</td>
<td>2 (16.7%)</td>
</tr>
<tr>
<td>BCG</td>
<td>8</td>
<td>2 (25.0%)</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>Yellow fever</td>
<td>12</td>
<td>2 (16.7%)</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Meningococcus</td>
<td>16</td>
<td>1 (6.2%)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Cholera</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Rubella</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Diphtheria</td>
<td>5</td>
<td>2 (40.0%)</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Measles</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Smallpox</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Mumps</td>
<td>1</td>
<td>0</td>
<td>0</td>
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</tbody>
</table>

Some patients had received more than one vaccine.

Risk of relapse of Guillain-Barré syndrome or chronic inflammatory demyelinating polyradiculoneuropathy following immunisation

Reports of the rare occurrence of Guillain-Barré syndrome (GBS) or chronic inflammatory demyelinating polyradiculoneuropathy (CIDP) following immunisation and recurrence of symptoms following subsequent immunisation\(^1\) have given rise to concern over the safety of vaccine administration in this patient group. Similar concerns have been addressed and dismissed in patients with multiple sclerosis,\(^1\) but no such information exists for inflammatory neuropathy. To provide more information about vaccine safety in GBS and CIDP we audited the recurrence of neurological symptoms following immunisation.

The Guillain-Barré Syndrome Support Group, a British patient organisation, posted 3000 questionnaires to its members, asking them to identify their illness, record all immunisations administered after their illness, and describe any symptoms within six weeks of immunisation suggestive of recurrence of GBS or worsening of CIDP.

All but one of the patients who reported neurological symptoms after immunisation were contacted by telephone to confirm their history and to grade their symptoms using the modified Rankin scale.\(^7\) For the patient who could not be contacted by telephone, the patient’s consultant neurologist provided the information. Questionnaires were sent to the general practitioner for each patient who reported a “relapse” to confirm which vaccine had been administered.

A total of 1114 patients (37.1%) completed the questionnaires, of whom 927 had had GBS, 179 had CIDP, and eight were excluded because they had other diseases. Of the 927 patients with GBS, 311 had received immunisations since having GBS. Eleven (3.5%, 95% confidence limits (CL) 1.8%, 6.2%) reported symptoms including increased fatigue, weakness, numbness, and paraesthesiae, but these were usually mild and no patient required hospitalisation or treatment. In three cases symptoms came on within 24 hours of immunisation and all but one developed symptoms within one week of immunisation. One patient reported symptoms rendering him unable to walk unaided for 2 weeks, which increased his modified Rankin scale score from grade 2 to 4.

Influenza, tetanus, and typhoid were the most common immunisations associated with a relapse after GBS but the number of patients who reported symptoms was small compared with the total numbers receiving each of these vaccines (table 1). Although the results suggest that some vaccines that are administered less frequently (such as diphtheria) may be associated with a higher relapse risk, the numbers were small and most of these vaccines were administered at the same time as other vaccines.

Of the 311 patients with GBS who had received vaccines after having GBS, 29 had also received a vaccine in the six weeks before the onset of their initial illness. Two of these patients (6.9%, 95% CL 0.85%, 22.8%) had a relapse after immunisation. In three the symptoms worsened of symptoms following immunisation (CL) 1.6%, 6.2%) reported symptoms including increased fatigue, weakness, numbness, and paraesthesiae, but these were usually mild and no patient required hospitalisation or treatment.

Of the 179 patients with CIDP, 65 had been immunised after disease onset. Five reported worsening of neurological symptoms following immunisation. In three the symptoms were similar to a typical relapse of their CIDP, but only one of these patients required treatment within two months of immunisation. The other two patients with CIDP were immunised when already experiencing mild neurological symptoms, which then worsened, so that their modified Rankin scale score had increased from 1 to 4 and they became dependent on a walking stick and unable to drive.

Of the patients with CIDP who experienced a relapse after immunisation, two relapses occurred among 23 patients who received the tetanus vaccine, giving a risk of relapse of 8.7%. Two of 46 (4.3%) patients with CIDP had relapses after influenza vaccine, of whom one had simultaneous pneumococcal vaccination. Two of six (33%) patients, including the last mentioned, experienced relapses after pneumococcal vaccine. Fourteen patients with CIDP had no symptoms of relapse following immunisation with typhoid vaccine. Between one and seven patients with CIDP had no...
We thank Mr Roland Price and members of the GBS Support Group for their help in recommending these immunisations after GBS or in CIDP. This is partly because an unknown but large proportion of members are relatives or friends not former GBS or CIDP patients.

Only 11 of 311 patients with GBS (3.5%, 95% CL 1.4%, 6.2%) who had been immunised after having the disease reported a recurrence of symptoms. All of the vaccines that were associated with neurological symptom recurrence had also been received by many more patients who remained well. Some of the patients who reported symptoms after receiving vaccines had also received the same or other vaccines on other occasions without experiencing any problems. Only one respondent experienced symptoms that increased their modified Rankin scale score. The risk of relapse following tetanus toxoid, which was 8.7% (95% CL 1.7%, 17.0%) of 65 patients noted a return of symptoms following immunisation. The reports of minor symptoms or difficulties in drawing conclusions about the risk of relapse for immunisation after GBS or CIDP because our sample size was smaller. Five patients noted a return of symptoms following immunisation. The reports of minor symptoms or difficulties in drawing conclusions about the risk of relapse for immunisation after GBS or CIDP because our sample size was smaller.

We have described a patient who experienced a severe episode of hypoglycaemia induced by intravenous phenytoin, which was administered at the doses recommended for the treatment of status epilepticus. It is known that phenytoin interferes with insulin metabolism. Indeed, it may inhibit the release of glucose stimulated insulin and induce a consequent hyperglycaemia. The ability of phenytoin to inhibit insulin release has been suggested to be related to the blockage of Ca2+ uptake via external stimuli, and recurrent, brief, tonic motor manifestations lateralised to the left side.

Finally, it is important to acknowledge the difficulties in drawing conclusions from a questionnaire in which the patients reported their diagnostic classification and relapses. It is intuitively likely that more patients who experienced symptoms following immunisation responded to the questionnaire, which would overestimate the frequency of relapses. Consequently the true risks of relapse following immunisations after GBS or in CIDP may be less than those discovered in this audit.

Acknowledgements

We thank Mr Roland Price and members of the GBS Support Group for facilitating this audit and Dr A V Swan for statistical advice.

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Competing interests: none declared

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References


Hypoglycaemia induced by phenytoin treatment for partial status epilepticus

A 22 year old woman was admitted to our epilepsy unit in status epilepticus. On examination, seizures were characterised by a confused state with little response to external stimuli, and recurrent, brief, tonic motor manifestations lateralised to the left side. Familiarity of family was negative for epilepsy and metabolic disorders. Full term birth was uncomplicated and first psychomotor developmental milestones were normal. In the past medical history there was no sign of any metabolic disturbance, and no reports of cognitive dysfunction or personality disturbances. At the age of 16, the patient presented with epilepsy, which was characterised by two types of seizures: global tonic seizures, which occurred occasionally, and episodes of loss of contact without any other manifestations, which were rare. The patient was treated for many years with 20 mg of clozapam twice daily. The awake EEGs that were performed routinely during the years of treatment with clozapam showed normal background rhythm with rare epileptiform discharges, characterised by irregular 2–3 Hz spike and wave occurring in both frontal-central regions. Magnetic resonance imaging of the brain, which was performed after the age of 18 years, showed no abnormalities.

On the day of admission at the epilepsy unit, the patient had an urgent EEG that revealed continuous, rhythmic spikes or spike and wave complexes over both frontal-central regions with right predominance. Emergency drug treatment with intravenous lorazepam 4 mg was performed twice with a 15 minute interval, but there was no change in the clinical status. Therefore, after 30 minutes, intravenous phenytoin 1000 mg was given by infusion over a period of 20 minutes, and then an infusion of 750 mg of phenytoin was set up for a period of 24 hours. Clinical symptoms and EEG abnormalities rapidly improved and completely resolved after 40 minutes from the start of the administration of phenytoin.

Nine hours later, while the medical observation was still ongoing, the patient developed an episode of partial status epilepticus, which was preceded by prodromal symptoms, including tachycardia, sweating, light headedness, and irritability. On examination, there was reduction of alertness, confusion, and tachycardia of intermediate diameter and reactive to the light. No focal neurological signs were observed. EEG monitoring did not show any abnormalities. Emergency blood tests revealed severe hyperglycaemia (<20 mg/dl). Prompt correction of the hypoglycaemia was obtained by the intravenous infusion of 50 ml of 50% glucose, and a consequent recovery of consciousness occurred. Phenytoin infusion was then withdrawn and oxcarbazepine was titrated. In the following days no further episodes of hypoglycaemia were noticed. The patient was therefore investigated with the oral glucose tolerance test, which showed normal levels of plasma glucose, immunoreactive insulin, and immunoreactive insulin/plasma glucose, and with diltiazem there was no evidence show insulin resistance.

Comment

We have described a patient who experienced a severe episode of hypoglycaemia induced by intravenous phenytoin, which was administered at the doses recommended for the treatment of status epilepticus. It is known that phenytoin interferes with insulin metabolism. Indeed, it may inhibit the release of glucose stimulated insulin and induce a consequent hyperglycaemia. The ability of phenytoin to inhibit insulin release has been suggested to be related to the blockage of Ca2+ uptake via external stimuli, and recurrent, brief, tonic motor manifestations lateralised to the left side.

The authors suggested that the hypoglycaemic episode might be attributable either to an escape from the inhibitory effects of phenytoin on insulin secretion or an increased sensitivity of the tissues to insulin. The striking finding of our case is that the hypoglycaemia is induced by a therapeutic dose of phenytoin, and, to our knowledge, this is the first case of severe hypoglycaemia during treatment with phenytoin for status epilepticus. In this case we have indeed excluded a different aetiology of the hypoglycaemia. In particular, a possible effect on glycaemia produced by status epilepticus, has been considered not relevant, because the status epilepticus was partial and resolved nine hours before the onset of hypoglycaemia. However, what caused hypoglycaemia when a therapeutic dose of phenytoin was administered is unclear, and further studies are needed to fully investigate the effects of phenytoin on carbohydrate metabolism.

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Meta-analysis of \(\alpha\) synuclein/NACP polymorphism in Parkinson’s disease in Japan

\(\alpha\) Synuclein is a presynaptic protein highly and broadly expressed in the brain but its normal function is unknown. The protein is also termed non-amyloid \(\beta\) component precursor (NACP) because of its localisation in amyloid plaques of Alzheimer’s disease. However, subsequent studies failed to confirm \(\alpha\) synuclein as a component of the amyloid plaque. \(\alpha\) Synuclein/NACP is now known to be a major component of Lewy bodies in Parkinson’s disease (PD). Point mutations of the \(\alpha\) synuclein gene found in three independent PD families suggest that \(\alpha\) synuclein may participate in the aetiology of sporadic PD. To address this possibility, several groups reported case-control studies using a dinucleotide repeat polymorphism in the promoter region of the gene. The previous Japanese study by Izumi et al. found a tendency of a lower frequency of allele 1 in Japanese PD patients than in controls. To examine the trend of association, we performed a similar analysis in 165 PD patients and 155 healthy controls in Japan.

The patients with sporadic PD (97 women and 68 men, mean (SD) age 64 (9.6) years, mean age at onset 56 (11) years) had been under treatment at the neurological clinic of Utano National Hospital. The control group was matched for age (mean 63.0 (8.6) years), sex ratio (97 women and 58 men), and birth place (Kyoto and Osaka prefectures) with the PD patients. The controls were selected from the annual health examination at a city clinic. All participants were Japanese. The institutional ethics committees approved the study protocol and informed consent was obtained from each participant. The dinucleotide repeat polymorphism was analysed as reported.

We identified five dinucleotide repeat products with different lengths and termed them according to Xia et al. as follows: 253 bp, allele \(-2\); 257 bp, allele 0; 259 bp, allele 1; 261 bp, allele 2; and 263 bp, allele 3. Statistical analysis was performed by \(\chi^2\) test. The corrected \(p\) value (pc) was obtained by multiplying the \(p\) value by the number of alleles.

<table>
<thead>
<tr>
<th>Study</th>
<th>Allele* frequency</th>
<th>Genotype frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-2</td>
<td>-1</td>
</tr>
<tr>
<td>Present study</td>
<td></td>
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</tr>
<tr>
<td>PD (n=165)</td>
<td>0.009</td>
<td>0.518</td>
</tr>
<tr>
<td>Controls (n=155)</td>
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<td>0.406</td>
</tr>
<tr>
<td>(\chi^2)=9.93, df=4, (p=0.042), pc=0.21</td>
<td>(\chi^2)=6.3, (p=0.012), pc=0.072</td>
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<td>Izumi et al.</td>
<td></td>
<td></td>
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<tr>
<td>PD (n=200)</td>
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<td>Controls (n=250)</td>
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<td>(\chi^2)=8.37, df=3, (p=0.14)</td>
<td>(\chi^2)=5.05, (p=0.025), pc=0.15</td>
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<tr>
<td>Combined</td>
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<td>PD (n=365)</td>
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<td>Controls (n=405)</td>
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<td>(\chi^2)=13.9, df=5, (p=0.017), pc=0.099</td>
<td>(\chi^2)=11.4, (p=0.00073), pc=0.0044</td>
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</table>

* Nomenclature of the alleles according to Xia et al.: Alleles 1, 2, and 3 correspond to alleles 3, 2, and 1, respectively, of Krüger et al. pc (corrected \(p\) value) was obtained by multiply the \(p\) value by the number of alleles. CI, confidence interval; OR, odds ratio.

References