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#### Maulana Azad Medical College, New Delhi 110002, India

NARENDRA P S VERMA, MD, FAID, associate professor of medicine  
SUDARSHAN P MEHTA, MD, DPH, professor of social and preventive medicine  
SRIVENKATA MADHU, MD, registrar in medicine

#### Ealing Hospital, Southall, Middlesex UB1 3HW

HUGH M MATHER, MD, MRCP, consultant physician

#### Guy's Hospital Medical School, London SE1 9RT

HARRY KEEN, MD, FRCP, professor of human metabolism

Correspondence to: Dr Mather.

## Acute encephalopathy associated with campylobacter enteritis

We report a case of acute encephalopathy accompanied by increased intracranial pressure in a child with campylobacter enteritis. This complication has not to our knowledge been previously reported.

### Case report

A previously healthy 6 year old boy was admitted to the paediatric intensive care unit, confused after a history of being unable to speak for two days. Five days before admission he suffered from abdominal pain and diarrhoea followed by a headache and temperature of 39°C. On admission he was afebrile and well nourished. His pulse was 50 beats/minute, sinus rhythm, blood pressure 100/60 mm Hg, and respiratory rate 20 breaths/minute without distress. There were no signs of meningeal irritation. On neurological examination the child looked drowsy but was arousable with bursts of irritability. He could follow only simple orders with oriented motor responses. He cried on painful stimuli but was unable to speak. His cranial nerves were intact, and sensory and cerebellar examination findings were normal. His deep tendon reflexes were hyperactive, and bilateral Babinski's sign was elicited. Funduscopic examination showed no papilloedema.

Complete blood count showed 9000 white blood cells/mm<sup>3</sup> with normal differential count, haemoglobin concentration 110 g/l, and 200 000 platelets/mm<sup>3</sup>. Biochemical values were all within the normal range. Tests on blood gases, coagulation studies, and urine analysis yielded normal results. The cerebrospinal fluid was initially clear with a pressure of 260 mm Hg, but a brisk movement of the child during lumbar puncture caused it to become macroscopically bloody; it contained 70 white blood cells/mm<sup>3</sup>, of which 80% were monocytic and 20% polymorphonuclear. Glucose concentration was 5.0 mmol/l (90 mg/100 ml); concomitant blood glucose concentration was 6.1 mmol/l (110 mg/100 ml). Results of all tests and cultures for bacteria and viruses were negative, except for repeated stool cultures, which grew *Campylobacter fetus*, confirmed by serotyping as *C fetus* subspecies *jejuni* serotype 1,18.

An electroencephalogram showed no  $\alpha$  rhythms but instead high voltage diffuse  $\delta$  activity 2-3 H admixed with a few  $\theta$  waves, consistent with acute encephalopathy. Computed tomography of the brain showed oedema with small compressed ventricles.

He was treated with dexamethasone and mannitol but no antibiotics. After three days in hospital his condition had greatly improved and he could utter a few words. After eight days he resumed his normal behaviour and speech, and neurological examination was normal. Repeated computed tomography of the brain on the fifth day after admission showed normal ventricle size and no oedema. The electroencephalogram returned to normal three weeks after his illness began, and stool cultures contained no campylobacters.

### Comment

Over the past two decades *Campylobacter* has been recognised as a major cause of diarrhoeal disease in children.<sup>1,2</sup> Extraintestinal manifestations of campylobacter enteritis, most commonly presenting as bacteraemia without localised infection, occur mainly in early infancy and compromised adults with underlying systemic diseases.<sup>3</sup> In a review of 247 cases Schmidt *et al* found that the central nervous system was affected in 12% of cases of extraintestinal disease.<sup>3</sup>

Besides seizures, a well documented neurological complication of campylobacter enteritis,<sup>4</sup> effects on the central nervous system include meningitis, meningoencephalitis, stroke, subarachnoid haemorrhage, subdural em-

pyema, and the Guillain-Barré syndrome,<sup>3</sup> all of which are associated with invasion of the central nervous system by the bacteria themselves or with localised neurological disease. The pathogenesis of systemic or extraintestinal campylobacteriosis is unclear. Neurological expression has been attributed to a neurotoxin produced by the bacteria, a process similar to that which causes shigella gastroenteritis. This theory is still controversial and has to be proved.<sup>4</sup>

Most extraintestinal neurological manifestations of campylobacter infection are associated with the subspecies *intestinalis*, whereas in our case *C fetus* subspecies *jejuni* was isolated. It has been recently reported that this subspecies can also affect the brain, and our report supports this observation.<sup>5</sup> Infection with *Campylobacter* should be considered when neurological symptoms such as seizures or increased intracranial pressure complicate gastrointestinal disease.

We express our appreciation to Dr P Lerman for interpretation and follow up of the electroencephalogram, and to the staff of the Campylobacter Reference Laboratory, Israeli Ministry of Health, for confirmation of serotype.

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#### Department of Pediatrics A, Beilinson Medical Center, Petah Tiqva 49 100, Israel

I LEVY, MD, house physician  
Y WEISSMAN, MD, senior physician

#### Pediatric Intensive Care Unit, Beilinson Medical Center, Petah Tiqva 49 100, Israel

Y SIVAN, MD, senior physician  
J BEN-ARI, MD, house physician  
T SCHEINFELD, MD, head of unit

Correspondence to: Dr Sivan.

## Lack of antibody to HTLV-I and HIV in patients with multiple sclerosis from France and French West Indies

Recent data have suggested that human retroviruses have an aetiological role in some acute and chronic neurological diseases. Human immunodeficiency virus (HIV; formerly known as lymphadenopathy associated virus or human T cell lymphotropic virus type III) was detected in brain tissue and isolated from cerebrospinal fluid of patients with encephalopathy related to the acquired immune deficiency syndrome.<sup>1</sup> We observed a high prevalence (60%) of antibodies to human T cell lymphotropic virus type I (HTLV-I) in serum from patients with tropical spastic paraparesis, a neuromyelopathy common in tropical areas where HTLV-I is endemic.<sup>2</sup> These findings were confirmed in both serum and cerebrospinal fluid from patients with tropical spastic paraparesis from Jamaica and Columbia.<sup>3</sup> Recently, Koprowski *et al* reported that American and Swedish patients with multiple sclerosis had antibodies that cross reacted with HTLV-I or HIV polypeptides and that cells from the cerebrospinal fluid of four out of eight patients contained sequences related to HTLV-I.<sup>4</sup> We report the results obtained when we tested serum from 55 patients with multiple sclerosis from two other geographical areas.

### Patients, methods, and results

We studied 96 patients with neurological disease from Paris hospitals (48 with multiple sclerosis, 10 with amyotrophic lateral sclerosis, and 38 with other neurological diseases) and seven black patients with multiple sclerosis from Martinique (French West Indies). All serum samples were tested by enzyme linked immunosorbent assay for HTLV-I (Biotech, using disrupted virions as antigen) and for HIV (Elavia-Pasteur). None of the samples was positive for antibodies to HTLV-I (estimated by the ratio in the assay and the baseline value) or to HIV. Furthermore, the mean reactivity levels of HTLV-I in multiple sclerosis, amyotrophic lateral sclerosis, and the other neurological diseases did not differ significantly when tested by one way analysis of variance.

**Comment**

The absence of antibody to HTLV-I and HIV in patients with multiple sclerosis from France and similar findings in Italian patients (L Chieco-Bianchi *et al*, personal communication) argue against these viruses having a role in the development of multiple sclerosis. Furthermore, the negative results in patients from the French West Indies, an area endemic for HTLV-I, strengthen the lack of a serological association between HTLV-I and multiple sclerosis.

Epidemiologically, the geographical distributions of multiple sclerosis and HTLV-I are quite different. Areas endemic for HTLV-I are mainly south western Japan, the Caribbean regions, and central Africa, countries where multiple sclerosis is virtually absent. In Japan the prevalence of infection with HTLV-I has a north-south gradient but that of multiple sclerosis does not.<sup>5</sup> Furthermore, HTLV-I is not endemic north of 40° latitude, either in Europe or in America, which are known as high risk areas for multiple sclerosis. If epidemiological data suggest that there is an association between multiple sclerosis and an infectious agent, probably viral, then a retrovirus other than HTLV-I and HIV might be responsible.

We gratefully acknowledge the technical help of Evelyne Vuitton and the financial support of Centre National de la Recherche Scientifique and Association pour la Recherche sur le Cancer, Villejuif.

**ADDENDUM**—Recent reports in *Nature* (10 July 1986: Hauser *et al*, p 176 and Karpas *et al*, p 177) confirm the lack of an association between HTLV-I and multiple sclerosis, based on molecular virological data.

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**Laboratory of Epidemiology and Immunovirology of Tumours, Faculty of Medicine Alexis Carrel, 69372 Lyon Cedex 8, France**

A GESSAIN, MD, research registrar  
L ABEL, MD, research registrar  
G DE-THE, MD, PHD, head of department

**Department of Neurology, Hôpital La Meynard, Centre Hospitalier Régional de Fort de France, 97200, Martinique**

J C VERNANT, MD, head of department

**Department of Neurology, Centre Hospitalier de Saint-Germain en Laye, 78100 Saint Germain en Laye, France**

P RAVERDY, MD, professor

**Department of Neurology, Hôpital Tenon, 75020 Paris, France**

A GUILLARD, MD, professor

Correspondence to: Professor De-The.

## Muscle damage induced by isotretinoin

Since the introduction of isotretinoin (13-cis-retinoic acid), a synthetic analogue of vitamin A, for the treatment of nodulocystic acne and several disorders of keratinisation an increasing number of adverse reactions have been reported. About 15% of patients treated with isotretinoin have developed musculoskeletal symptoms and on rarer occasions increased creatine kinase activities.<sup>1</sup> A causal relation between the drug and increased creatine kinase activity has not been established, however, owing to lack of adequate data.

We describe two patients with nodulocystic acne who showed clinical and electromyographic evidence of muscle damage during treatment with isotretinoin. In one patient the muscle damage was confirmed by histological and ultrastructural findings. We believe that this is the first neuromuscular study to show muscle damage induced by isotretinoin.

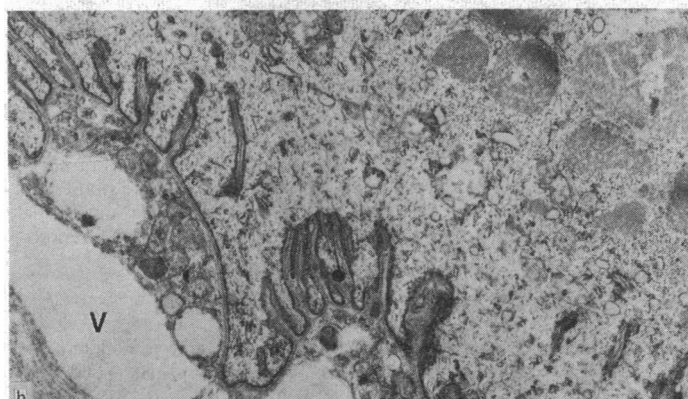
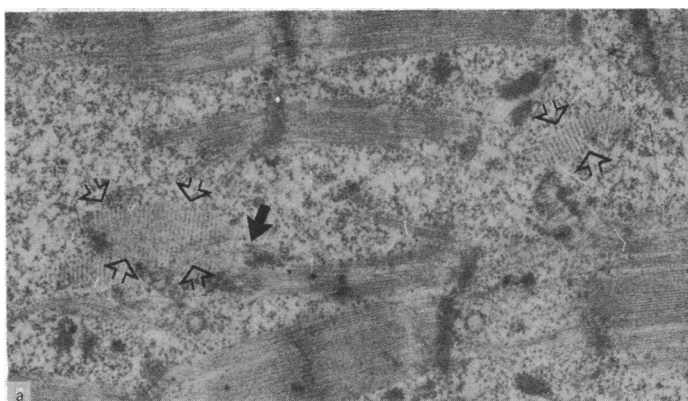
**Case reports**

Two young men (aged 16 and 20) presented with recalcitrant nodulocystic acne unresponsive to various types of treatment, all of which had been discontinued

several weeks previously. At presentation, apart from severe acne lesions over the face, chest, and back, physical examination and a complete neurological evaluation were unremarkable. Results of laboratory investigations were normal. Treatment with oral isotretinoin 40 mg daily (0.5 mg/kg body weight) was started.

At follow up examination four weeks later both patients complained of muscle pain and moderate weakness, which had developed a few days after treatment began. There was no history of excessive physical activity, intercurrent illness, additional drug or alcohol intake, or passing of dark red urine. One patient (case 1) had muscle tenderness on palpation of both thighs. The other (case 2) had tenderness on palpation of both shoulders and arms and moderate weakness of deltoid muscles without wasting. Complete blood counts and results of biochemical tests were normal. In case 1 creatine kinase activity was 918 IU/l (normal  $\leq 203$  IU/l) and aldolase activity was 8.8 IU/l (normal  $\leq 7.6$  IU/l). In case 2 muscle enzyme activities were normal. Electrodiagnostic studies showed normal motor and sensory nerve conduction velocities in both patients. Needle electromyography disclosed the presence of short duration and low amplitude action potentials, mainly in proximal muscles—the so called “myopathic pattern.”

Isotretinoin was discontinued and during the next few days muscle pain gradually abated. At follow up examination one month later both patients had normal strength, muscle enzyme activities, and needle electromyograms.



(a) Several elliptical bodies composed of parallel bands are seen between normal muscle fibrils (arrow heads). The bodies seem to impinge on irregular Z bands (arrow),  $\times 18\,000$ . (b) Myoneural junction. Only primary clefts are seen in the folded sarcolemma. A large vacuole (V) is present in the nerve terminal,  $\times 24\,000$ .

**PATHOLOGICAL FINDINGS**

A biopsy sample of deltoid muscle was obtained in case 2. Light microscopy showed nothing abnormal except for slight variation in the size of muscle fibres. Electron microscopy showed elongated, elliptical, non-membrane bound bodies between the muscle fibrils. They were composed of parallel alternating bands 30 nm wide and had a diameter of 0.2  $\mu\text{m}$  and length of 4-5  $\mu\text{m}$ . They did not seem to be related to any cytoplasmic organelles, although they appeared to impinge on altered irregular Z bands (figure (a)).

Severe changes were noted in the myoneural junction. The folded sarcolemma contained only primary clefts. The nerve terminal appeared atrophic with abundant organelles and myelin figures and lacked synaptic vesicles. A large empty vacuole was seen within the Schwann cell cytoplasm impinging on the nerve terminal (figure (b)).

**Comment**

Both patients developed reversible muscle damage during treatment with isotretinoin. The findings on electron microscopy in case 2 are unique and