several days and pain was progressing over hours during bouts without fluctuations.[7]

We conclude that structural lesions of sympathetic nerve fibres should be considered when (1) the headache profile is not typical for cluster headache and paroxysmal hemicrania, and (2) autonomous symptoms precede and outlast headache.

KAI G KAHL
MARKUS NAUMANN
KLAUS V TOYKA
Department of Neurology, Julius-Maximilians-Universität, Würzburg, Germany

MONIKA WARMUTH-METZ
Department of Neuroradiology, Julius-Maximilians Universität, Würzburg, Germany

Correspondence to: Dr M Naumann, Neurologische Klinik, Julius-Maximilians-Universität Würzburg, Josef-Schneider Straβe 11, 97080 Würzburg, Germany

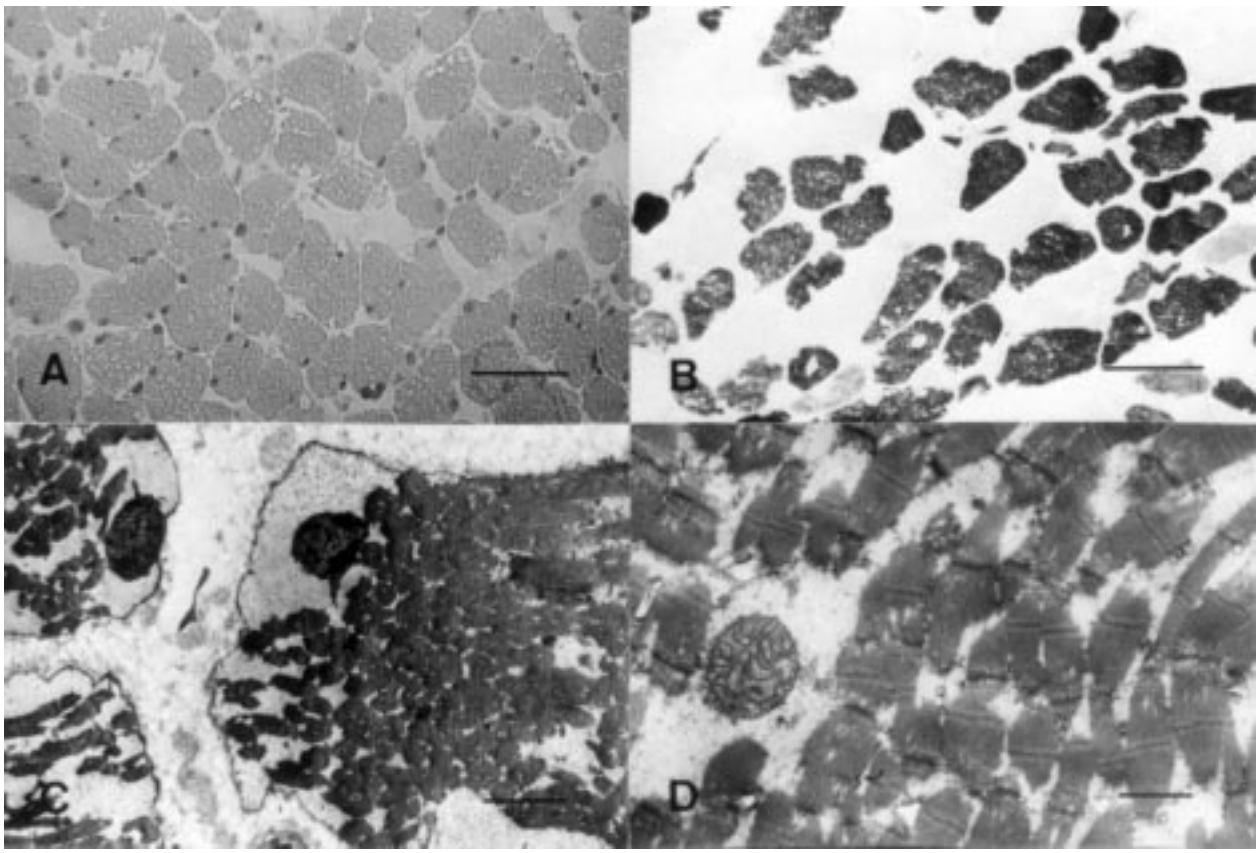
1 Guillon B, Levy C, Bousser MG. Internal carotid artery dissection: an update. *J Neurol Sci* 1998;**153**:146–58.
2 Anson J, and Crowell, RM. Cervicocranial arterial dissection. *Neurosurgery* 1991;**29**:89–96.
3 Leira, EC, Bendixen, BH, Kardon, RH, *et al*. Brief, transient Horner's syndrome can be the hallmark of a carotid artery dissection. *Neurology* 1998;**50**:289–90.
4 Cusimano MD, Sekhar LN. Pseudocerebrospinal fluid rhinorrhea. *J Neurosurg* 1994;**80**:26–30.
5 Anggard A. Parasympathetic control of blood circulation and secretion in the nasal mucosa. *Rhinology* 1975;**13**:147–53.
6 Lung MA. The role of the autonomic nerves in the control of nasal circulation. *Biol Signals* 1995;**4**:179–85.
7 Olesen J. Headache Classification Committee of the International Headache Society. Classification and diagnostic criteria for headache disorders, cranial neuralgia, and facial pain. *Cephalalgia* 1988;**8**(suppl 7):1–96.

White muscle disease in humans: myopathy caused by selenium deficiency in anorexia nervosa under long term total parenteral nutrition

Selenium is an essential trace element that is known to be a component of glutathione peroxidase, a scavenger of hydroperoxides.[1] Its deficiency causes a decrease in glutathione peroxidase function, thereby resulting in oxidative damage to many organs. The two major clinical signs in patients with selenium deficiency are skeletal myopathy and cardiomyopathy. White muscle disease, named because of its characteristic acolouration of the muscle is a myopathy caused by selenium deficiency in animals in the areas where the soil is low in selenium.[2] In humans, it was demonstrated that Keshan disease, dilated cardiomyopathy in the Keshan area in China, was caused by selenium deficiency.[3] In addition, there are reports that selenium deficiency occurs in patients who are nourished by total parenteral nutrition alone for a long time because of inflammatory bowel disease or resection of the intestine due to various intestinal diseases.[4 5] We experienced a case of anorexia nervosa with skeletal myopathy caused by selenium deficiency under long term parenteral nutrition.

A 28 year old woman was admitted to our hospital with a 7 year history of anorexia nervosa receiving parenteral nutrition intermittently. At admission, she complained of general fatigue, but had no muscle weakness or myalgia. On physical examination, she was markedly emaciated (weight 22 kg, height 158 cm). Her skin was dry and her nail beds appeared pale. Because her voluntary food intake was not sufficient to maintain an adequate weight, we started parenteral nutrition. A month after initiation of parenteral nutrition, her body weight had increased from 22 kg to 27 kg and her presenting complaint of general fatigue had disappeared. Instead, she had begun to complain of proximal muscle pain and weakness in all four limbs, and soon after, she had difficulty in walking or standing up.

Laboratory studies showed a rapid rise in creatine kinase to 5638 (normal 35–169) IU/l. Other myogenic enzymes such as myoglobin and aldolase were also raised. Serum electrolytes were all within the normal range. Serum thyroxin and thyroid stimulating hormone concentrations were normal, but serum triiodothyronine was slightly decreased because of impaired conversion of thyroxin caused by malnutrition. Serum selenium concentration markedly decreased to 13 (normal 107–171) μg/l, and glutathione peroxidase also decreased to 145 (normal 280–450) IU/l. Serum vitamin E decreased to 0.35 (normal 0.75–1.41) mg/dl despite being added to the parenteral nutrition. Because serum vitamin E concentration often parallels the serum selenium concentration, these antioxidants will compensate for each other. The forearm ischaemic exercise test showed a normal response. Chest radioraphy showed neither congestive changes nor enlargement of the heart. On an echocardiogram, the wall motion of the left cardiac ventricle was normal. Electromyography of proximal limb muscles showed myopathic patterns. Motor



Microscopic (A,B) and electron microscopic (C,D) findings of muscle biopsy from the left biceps of this patient. (A) Haematoxylin and eosin staining. There were many atrophic changes and intrafibral vacuoles. bar=10 μm. (B) Routine ATPase reaction. Predominance of the type II fibre as well as many vacuoles in the fibres. bar=10 μm. (C) Subperimysial and intermyofibrillar clefts composed of amorphous matrix material were found in muscle fibres. Myofibrils showed thinning and interruption. bar=4 μm. (D) There were intermyofibrillar clefts, containing numerous small granules and enlarged mitochondria with normal cristae. bar=1 μm.

and sensory nerve conduction velocities were normal.

The biopsied muscle from her left biceps seemed pale. Histological studies showed severe atrophy of all muscle fibres examined, type II fibre predominance, increased extramyofibrillar fluid without fibrosis, and many vacuoles in the myofibrils (figure A, B). The vacuoles were unstained by oil red O, periodic acid Shiff, or acid phosphatase, and were made up of subperimysial and intermyofibrillar clefts consisting of amorphous matrix material seen by electron microscopy. Myofibrillar architecture was destroyed and associated with loss and thinning of myofibrils. Some mitochondria were enlarged in size, but neither abnormal cristae nor inclusions were seen (figure C, D). These clefts and destroyed architecture of myofibrils would be caused by the intermyofibrillar and intramyofibrillar focal oedema that might be induced by unmetabolised hydroperoxides.

Within several days after a simple change from total parenteral nutrition to oral diet alone, without selenium supplementation, her muscle pain gradually improved. The serum creatine kinase concentration gradually decreased and was normal in a month. Two months later, she was able to walk alone and stand up from a chair. The concentrations of serum selenium and glutathione peroxidase tended to improve with oral diet alone.

Selenium is relatively abundant in meat, fish, and cereals, but there is very little in total parenteral nutrition or liquid formula diets. A patient nourished by total parenteral nutrition alone for a long period may risk selenium depletion, so selenium supplementation is recommended. In 1979 Van Rij *et al* reported a patient with a perforated small intestine showing skeletal myopathy during month long parenteral nutrition.[4] Since then, there have been about 20 cases of selenium deficiency during total parenteral nutrition in the literature worldwide, but most cases received total parenteral nutrition because of the surgery for intestinal diseases or inflammatory bowel diseases. As far as we know, there is no report dealing with a patient with anorexia nervosa accompanied by selenium deficiency, although total parenteral nutrition is a popular method to ameliorate the nutritional state in severely emaciated patients with anorexia nervosa. The phenotypic difference for manifestation of either skeletal myopathy or cardiomyopathy is not understood at present. The living environment, the selenium content of the whole body, and the level of other antioxidants such as vitamin E, seem to influence one another.

Sudden death occurs occasionally in patients with anorexia nervosa because of arrhythmia and heart failure. Because selenium deficiency can cause cardiomyopathy and sudden death, we should carefully monitor for selenium deficiency in anorexia nervosa, especially in patients on long term total parenteral nutrition.

HIROYUKI ISHIHARA
FUMIO KANDA
TATSUO MATSUSHITA
KAZUO CHIHARA
Third Division, Department of Medicine, Kobe University School of Medicine, 7–5–1 Kusunoki-cho, Chuo-ku, Kobe 650–0017, Japan

KYOKO ITOH
First Department of Pathology

Correspondence to: Dr Hiroyuki Ishihara

1 Rotruck JT, Pope AL, Ganther HE, *et al*. Selenium: biochemical role as a component of glutathione peroxidase. *Science* 1973;**179**:588–9.
2 Lannek N, Lindberg P. Vitamin E and selenium deficiencies (VESD) of domestic animals. *Adv Vet Sci Comp Med* 1975;**19**:127.
3 Keshan disease research group. Observations on effect of sodium selenite in prevention of Keshan disease. *Chin Med J (Engl)* 1979;**92**:471–6.
4 Van Rij AM, Thomson CD, McKenzie JM, *et al*. Selenium deficiency in total parenteral nutrition. *Am J Clin Nutr* 1979;**32**:2076–85.
5 Mansell PI, Rawlings F, Allison SP, *et al*. Reversal of a skeletal myopathy with selenium supplementation in a patient on home parenteral nutrition. *Clin Nutr* 1987;**6**:179–83.

Selective mutism, speech delay, dysmorphisms, and deletion of the short arm of chromosome 18: a distinct entity?

Elective (or selective) mutism is a rare psychiatric disorder. Diagnostic criteria in both ICD-10[1] and DSM-IV[2] include: (*a*) consistent failure to speak in specific social situations in which there is an expectation for speaking (for example, at school) despite speaking in other situations (for example, at home); (*b*) the disturbance interferes with educational or occupational achievement or with social communication; (*c*) it is not better accounted for by a communication disorder or by a lack of knowledge of the spoken language required in the social situation; (*d*) it has a duration of at least 1 month.[3]

It typically starts at preschool age, is more common in girls, and is seen in all social strata with shyness, withdrawal, sensitivity or resistance, and internalising behaviour problems as the most common personality features.

We followed up a 7.5 year old girl who was the third child from non-consanguineous parents. She was born normally at 37 weeks of an uneventful pregnancy, with a birth weight of 3,5 kg, length 47 cm, and head circumference 34.5 cm. The American pediatric gross assessment record was 9 at 5 minutes. Family history was non-contributory. There was neither family history of psychiatric illness nor of language abnormalities.

Developmental milestones were normal; she acquired head control at the 3rd month of life, sat at 7 months, and walked at 13 months. On the other hand, she presented speech delay as she used single words meaningfully as late as 24 months and was able to pronounce her first phrases at 3 years. Behavioural anomalies were first registered by her parents between 3 and 4 years, when they noted a reluctance to speak in front of other people. By the age of 4, she used to speak regularly only to one her friends, and she did not talk to nursery staff or to other children. At home, she normally spoke to her parents and her sister but would not speak to them in front of others.

She first came under our care at the age of 6 years. Physical examination showed a pattern of facial dysmorphisms involving flattened nasal bridge, short upper lip, broad philtrum, everted lower lip, and micrognathia. Short and broad fingers were also noted. Muscular tone and deep tendon reflexes were normal. No abnormal pyramidal, extrapyramidal, or cerebellar signs were present. She had no dyspraxia. Her height was below the 10th percentile, weight on the 15th percentile, and head circumference on the 10th percentile.

The autism diagnostic interview,[4 5] administered by her mother, showed a score of 9 in the area of communication (cut off level of 8), but she scored 6 in the areas of qualitative impairments in reciprocal social interaction (cut off of 10), and 0 in repetitive behaviours and stereotyped patterns (cut off of 3). Social and imitative play seemed inadequate, but no language abnormalities such as echolalia, neologisms, or pronominal reversal were present. Her social interactions were reciprocal although she usually only smiled at her parents, did not have easy peer relationships, and directed no language towards the hospital staff. However, she was able to engage in good eye contact. Clumsy attempts to interact with other children where made by the patient when she was not directly observed by medical stuff.

The patient was also evaluated by the Wechsler intelligence scale for children which showed a performance IQ of 79, and verbal IQ of 70.

Biochemical tests for aminoacidopathies, mucopolysaccharidosis, and lysosomal disorders were normal, as was selective screening for organic acidaemias. An isoelectric focusing test for sialotransferrine was normal. Molecular tests for fragile X syndrome were negative. Brain MRI examination, EEG recording, and audiometric tests were normal. Karyotype analysis of blood cells showed an abnormal chromosomal pattern with deletion of the short arm of chromosome 18, 46XX, del(18), p(11.1) in all metaphases examined. Karyotype analysis was normal in her parents.

Simons *et al* recently reported the first patient affected by elective mutism associated with deletion of the short arm of chromosome 18, del (18), p (11.1).[3] Their patient had had developmental abnormalities but these could not account for her social communication disorders, and peculiar dysmorphisms were present.We also had the opportunity to study a girl affected by elective mutism in whom karyotype analysis showed an identical deletion of the chromosome 18. Speech delay, facial dysmorphisms such as flattened nasal bridge, broad philtrum, and micrognathia were the main clinical findings. Auxological indices were in the low average range; particularly, skull circumference was on the 10th percentile. No familiar trait of microcephaly was present in her family, and short stature appeared when the height of our patient was compared with the midparental height (data not shown). Psychological testing showed verbal skills and performance in the low range (table). We compared our patient with the one reported by Simons *et al* (table).[3] With the exception of the round face, not seen in our patient, clinical findings of both patients overlapped. Moreover, both patients had speech delay, a similar neuropsychological profile, and the same 18 chromosome abnormality. All these findings allow us to hypothesise that the association of such signs is not by chance and it may be indicative of a distinct clinical entity.

Elective mutism is most probably a heterogeneous syndrome and several aetiological factors such as minimal brain dysfunction, somatic or psychological trauma, particularly during speech development, and a particular family structure especially the mother-child relationship, have been suggested. As a consequence clinical features are variable and speech delay and dysmorphisms can be found in a subgroup of patients only.[6] Moreover, in most patients elective mutism is a transient disorder as it usually disappears