

Short report

Quadriceps myopathy: a variant of the limb-girdle dystrophy syndrome

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SUMMARY The clinical and pathological features in a patient with quadriceps myopathy are presented. The pattern of progression of the disorder, during a period of 18 years observation, suggests that it represents an unusual and perhaps specific syndrome within the clinical spectrum of the limb-girdle muscular dystrophies.

Hereditary myopathy restricted to the quadriceps muscles was first described by Bramwell in 1922.¹ There have been several subsequent reports²⁻⁶ and Erb described a similar case in 1891.⁷ In several reports it has been suggested, on the basis of similar cases, that these patients suffered from chronic polymyositis^{5,8}, or chronic spinal muscular atrophy,⁹⁻¹¹ rather than muscular dystrophy. Only in the two brothers reported by Van Wijngaarden *et al*⁶ was the diagnosis of myopathy confirmed by enzyme histochemical methods, and in these patients there was electromyographic evidence of involvement of other muscles, suggesting a link with limb-girdle dystrophy, as was proposed by Walton in 1956.³ In this paper we describe a patient with quadriceps myopathy in whom the clinical features were observed during a period of 18 years. Our observations are consistent with the concept that quadriceps myopathy represents an unusual presentation of muscular weakness within the clinical spectrum of the limb-girdle muscular dystrophies.

Case report

A 53-year-old man (LH 914682) presented with severe restriction of mobility. As a child, he could not run as quickly as other children and he was excused gymnastics at school. In the Army he had difficulty climbing up into lorries. He was first examined by one of us (KWGH) when he was aged 34 years. At this time there was marked symmet-

rical weakness of the quadriceps muscles without clinical signs of involvement of other muscles. His weakness slowly progressed and, at age 48 years, he had to stop work because of extreme weakness of his thighs and difficulty walking. His muscles ached a little after exercise. In the 2 years before presentation he had also noted difficulty raising his arms above his head but he had no other complaints.

Examination revealed a man who could only walk with a stick. There was slight lower facial weakness on both sides but no involvement of the ocular or bulbar muscles. Neck flexion was weak but extension was normal. In the upper limbs the deltoid muscles were somewhat weak (MRC grade 4) but the triceps were markedly wasted (grade 1). In the lower limbs the most marked weakness was in the quadriceps muscles which were also very wasted (grade 1). There was some weakness of hip flexion. Extension of the hips was normal. He had some difficulty lifting his legs from the bed when lying flat but could rise up from lying and sitting with only slight difficulty.

He also showed weakness of the extensors of the foot (grade 3). The triceps jerks and knee jerks were absent but the other tendon reflexes were present, although diminished. There was no myotonia. Sensation was normal.

Investigation revealed no haematological abnormality and the blood electrolytes were normal. The blood creatine kinase (CK) was 1640 u/l (normal <160 u/l). An EMG revealed short duration polyphasic motor unit action potentials in the deltoid and biceps muscles with a full interference pattern during slight effort. In the quadriceps the few motor unit action potentials that could be recorded showed similar abnormalities. There were no fibrillation or fasciculation potentials. The motor and sensory nerve conduction velocities in the median, ulnar and lateral popliteal nerves were normal. An ischaemic lactate test was normal. The ECG was normal.

Four siblings were alive and three had died; none had muscular disease. Two daughters aged 32 and 23 years,

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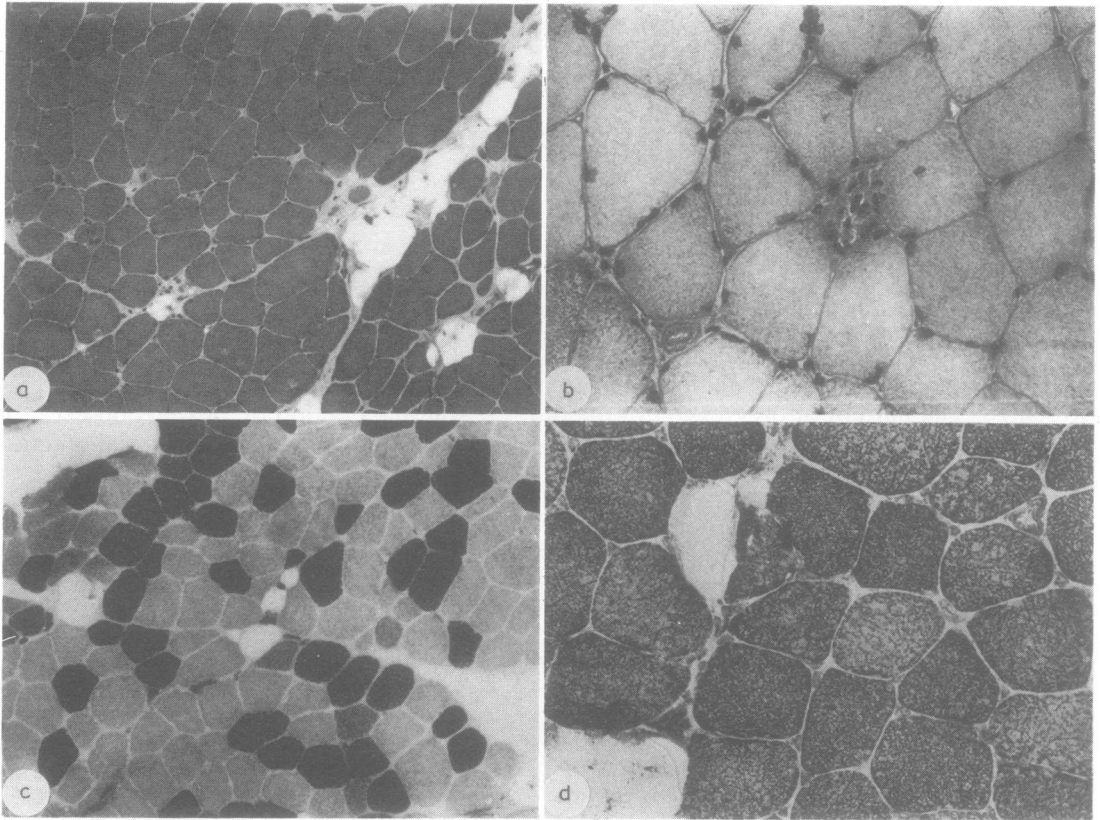


Fig (a) There is increased variation in fibre size with small zones of fat replacement and widening of the interfascicular planes by adipose tissue. Haematoxylin and eosin. $\times 90$. (b) A necrotic fibre and central nucleation. This abnormality closely resembles that illustrated by Denny-Brown,² Walton,³ and Turner and Heathfield.⁵ Oil red O-haematoxylin. $\times 230$. (c) Several small fibres are present. Type 1 fibres are predominant. ATPase. pH 9.4. $\times 90$. (d) Many fibres show multifocal abnormalities in the myofibrillar architectural pattern. NADH. $\times 230$.

and a son aged 30 years were examined and no abnormality was found (CK levels 49, 84–119 and 89 u/l respectively). Six grandchildren, all younger than 13 years, were normal.

Muscle biopsy A biopsy taken from the left deltoid muscle showed abnormalities consistent with a relatively non-progressive myopathy (fig A). Individual fascicles were separated by adipose and fibrous tissue. Several isolated necrotic fibres were present, but there were no inflammatory cell infiltrates (fig B).

The muscle fibres were slightly smaller than normal, and there was increased variability in fibre size (mean Type 1 fibre diameter $49 \pm 11.5 \mu\text{m}$). There was Type 1 fibre predominance which ranged from 67% to 96% in different parts of the biopsy (fig C). Centrally placed nuclei were noted in 12% of fibres (normal $< 3\%$). In NADH preparations many muscle fibres showed multifocal abnormalities in the distribution of intermyofibrillar material (fig D). Electron microscopy showed focal variations in myofibril-

lar area and packing density but no other abnormality.

Discussion

In this patient weakness was restricted to the quadriceps muscles for nearly 30 years, but after this time symptomatic weakness developed in the triceps and then in the deltoid muscles, pelvic girdle muscles and extensor muscles of the feet. Examination at this late stage of the disorder revealed slight weakness of other axial and distal muscles. However, the major abnormality was very severe weakness and wasting of the quadriceps and triceps muscles. Further investigation, including EMG, CK determination, and biopsy of a deltoid muscle, confirmed the myopathic nature of the disorder. There were no features suggestive of inflammatory myopathy. The mild histological abnormalities in our case resem-

bled those of the previously described cases.^{2-4,6} Involvement of other muscles in patients with quadriceps myopathy was recognised by Walton³ in whose patients there was also slight weakness of hip adduction and of the face, and hypertrophy of the lateral part of the quadriceps.

Turner and Heathfield⁵ in a 20 year follow up of a patient reported by Denny-Brown² commented that there was involvement of other proximal muscles, particularly of triceps and, to a lesser extent, of hip flexors and extensors, and of the lower trunk muscles. Van Wijngaarden *et al*⁶ noted EMG evidence of more widespread involvement of limb-girdle muscles in their two cases. The patient in the family reported by Espir and Matthews⁹ similarly developed more widespread weakness although quadriceps weakness was the main feature. In most of these few reported cases¹⁻⁷ as in our patient, the disorder has occurred sporadically suggesting the possibility of autosomal recessive inheritance. In the only family in whom there was a dominant mode of inheritance spinal muscular atrophy could not be excluded.⁹

It has often been suggested that limb-girdle muscular dystrophy is a heterogeneous syndrome.^{10,12} Indeed, several different disorders presenting as the limb-girdle muscular dystrophy syndrome, for example, polymyositis, spinal muscular atrophy, acid maltase deficiency¹³ and other metabolic myopathies of late onset, have been identified in recent years.¹² The histological features of the muscle biopsy in our patient and in the two cases of quadriceps myopathy previously studied by modern enzyme histochemical techniques⁶ clearly establish the myopathic nature of the muscular disorder, although they do not suggest a specific cause. The special clinical features of quadriceps myopathy suggest that this disorder is best classified within the poorly defined concept of limb-girdle dystrophy.

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