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SYNDROME OF CONTINUOUS MUSCLE FIBER ACTIVITY

CASE REPORT WITH 11-YEAR FOLLOW-UP

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SUMMARY - A 16-year-old male patient who presented with muscle stiffness and dysphonia is described. Electromyography revealed continuous motor activity that was unaffected by peripheral nerve block or general anaesthesia, but was abolished by curare. The patient had a marked improvement after using phenytoin. The follow-up 11-years later corroborates with the proposed benignity of this syndrome, in spite of being dependent on medication.

KEY WORDS: muscle stiffness, continuous muscle fiber activity, Isaacs' syndrome.

Síndrome de atividade contínua da fibra muscular: relato de caso com seguimento de 11 anos

RESUMO: É relatado o caso de um paciente de 16 anos de idade do sexo masculino com quadro de rigidez muscular e disfonia. Eletromiografia revelou atividade motora contínua que não era alterada por bloqueio do nervo periférico ou anestesia geral, mas era abolida por curare. O paciente apresentou acentuada melhora após o uso de fenitoína. O seguimento do caso 11 anos mais tarde vem corroborar o proposto caráter benigno desta síndrome, apesar de o paciente ainda depender da medicação.

PALAVRAS-CHAVE: rigidez muscular, atividade de fibra muscular contínua, síndrome de Isaacs.

In 1961 Isaacs described two patients with progressive muscle stiffness who showed a state of permanent muscle contraction, global decreased muscle power, absent tendon reflexes, diffuse fasciculations and absence of myotonic responses during muscle percussion. Electromyography revealed spontaneous discharges that persisted when general anaesthesia or local nerve block were done but disappeared after curare injection. Both cases presented remarkable improvement after the use of sodium hydantoinate[13]. Since that time other similar cases have been reported, including three cases in Brazil[5,16,24].

The purpose of this report is to describe one more case of this rare and polymorphic entity with a 11-year follow-up.

CASE REPORT

AOM, a 16-year-old man was seen in 1981 with a four months history of muscle stiffness associated with difficulty in speaking. Physical examination showed marked muscle stiffness (Figure 1) with delayed muscle relaxation, carpopedal spasms, facial myokymias; the axial muscles presented a rubber consistency; percussion myotonia and tendon reflexes were absent and sensory examination was normal. The following laboratory studies were normal or negatives: hemogram, serum electrolytes, urinalysis, transaminases, bilirrubines, serum alkaline phosphatase, antinuclear antibodies, rheumatoid factor and thyroid function studies. The creatine phosphokinase was mildly

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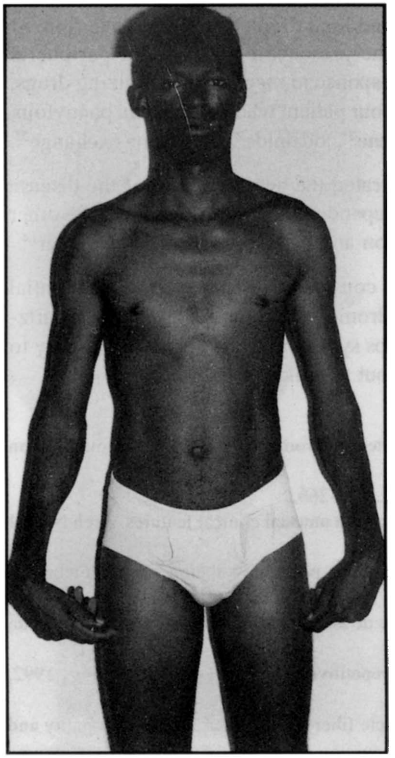

Figure 1. Patient AOM. Note contraction of muscles with hands held in flexed position.

increased. Concentric needle EMG of the biceps, abductor pollicis brevis, extensor carpi radialis and abductor digiti minimi revealed continuous spontaneous muscle activity with normal motor units. The abductor digiti minimi electric activity was not affected by peripheral nerve block (ulnar nerve using 2% lidocaine) or by general anaesthesia, but was completely abolished by an intravenous injection of curare. The nerve conduction studies were normal. The patient was treated with 100 mg of diphenylhydantoin t.i.d. with marked clinical improvement. He was seen again eleven years later. He had discontinued his medication and his physical exam and EMG study were essentially the same of the pre-treatment period. Diphenylhydantoin was started again and his condition improved as previously and the latest EMG showed marked depression of the motor activity at rest.

COMMENTS

Our patient presented the clinical and electromyographic features of the syndrome of continuous muscle fiber activity (SCMFA). The SCMFA is a heterogeneous group that have in common a sustained involuntary muscle contraction due to hyperactivity of the peripheral motor nerve[2]. In the literature it also appeared as Isaacs' syndrome, neuromyotonia, pseudomyotonia, neurotonia and myokymia with delayed muscle relaxation. The majority of SCMFA cases are idiopathic[2] as in our patient, but association with inflammatory, neoplasic, autoimmune diseases and drugs, with or without peripheral neuropathy, have been described[2,7,16,18,20,27,29] and hereditary forms as well[1,9,17].

The clinical picture consists of muscle stiffness[1-6,22,24,31], weakness, fasciculations[8,11,13,15,26,29], hyperhydrosis[5,8,11,13,21,24,26], dysphagia[8,13,24,26], dysphonia[11,24,28], dyspnea[8,11,13,16,24,26,29], myokymias[2,5,8,18,26,29,30], carpopedal spasms[8,19,21,29], calf hypertrophy[21,22,31] and in a case the symptoms were confined to the lower limbs[3]. The tendon reflexes are normal, hypoactive or absent, the latter being more common[1-30], and percussion myotonia can not be elicited[1,4,5,8,11-13,23,28]. Routine laboratory exams are normal[3,5,13,18,19,24,26,27,29] except for a possible mild increase in the creatine kinase[1,8,10,11,21,31] as happened in our patient, lactic dehydrogenase[11] or aldolase[1,8]. Sakai et al[21] reported increased GABA levels and Ashizawa et al[1] found raised homovanillic acid, both in the CSF.

The nerve conduction studies may reveal normal parameters[2,3,10,18,19,22,31] or may demonstrate slowing conduction or prolonged distal latencies[2,6,9,11,26,29] if peripheral neuropathy is present. Concentric needle exam shows continuous motor unit activity[1-5,7,22,24-31], sometimes with high frequency discharges[2,15]. The abnormal activity is suppressed by curare[1,2,7,10,11,13,26] and may be reduced by peripheral nerve block depending on its origin[26] and it is not affected by sleep[13] or general anaesthesia[2,10,11,13,26], but was decreased by an epidural block in Sakai's patient[21]. The hyperactivity may originate in the proximal[9], distal[29] or both proximal and distal parts[27] of the peripheral nerve, or even in proximal parts of the motor unit[1,21]. The pathophysiology of the spontaneous electric ativicty is unknown but ephatic activation[2], or dysfunction of membrane ion channel[2,9] have been suggested. Recently an autoimmune hypoimmune hypothesis has been proposed. The authors related the increase in nerve-terminal excitability to the action of antibodies anti-slowly activating potassium channels, and his patient did improve after plasma exchange[22].

There are very few pathological studies in the literature. The muscle might be normal[1,5,8,11,26] or reveals variation in fibre size with proliferation of sarcolemmal nuclei[13], small atrophic angulated

fibres with or without type I grouping[3,4,8,9,17,28,31]. Walsh[26] found lipid droplets in the muscle fibre of his patient. The nerve histopathology will depend upon the presence or absence of peripheral neuropathy[2]. In general these patients present an excellent response to membrane stabilizing drugs, e.g., phenytoin and/or carbamazepine[1,2,7-13,17,19,25,26,30,31], as did our patient when was put on phenytoin. There are reports of good responses to valproic acid[2], dantrolene[21], tocainide[9] and plasma exchange[22].

The follow-up of our patient 11-years later demonstrated the benign course of the disease as have been described previously[12,30], though he was still dependent on medications. On the other hand, one of Isaacs' patient developed spontaneous remission and was drug-free 14-years later[14].

To sum-up, SCMFA is a rare entity that should be considered as part of the differential diagnosis of patients with stiff-muscle, e.g. stiff-man syndrome, myotonic disorders, Schwartz-Jampel syndrome, hypothyroidism, fasciculations and cramps syndrome and stiffness secondary to complex repetitive discharges[2,6,23] and sometimes it points out to a hidden tumour[2,27].

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