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Case report

Clinical, histological and radiological responses to methylprednisolone in HIV-associated rod myopathy

André M.S. Silva [a], Rodrigo H. Mendonça [a], Cristiane A.M. Moreno [a], Eduardo P. Estephan [a], Paulo V.P. Helito [b], Mary S. Carvalho [a], Edmar Zanoteli [a,*]

[a] Department of Neurology, Medical School of the University of São Paulo, São Paulo, Brazil
[b] Department of Radiology, Medical School of the University of São Paulo, São Paulo, Brazil

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Abstract

Skeletal muscle involvement as a neurologic manifestation in individuals with HIV is rare, especially as rod myopathy. We describe a 41-year-old male with HIV infection who presented progressive proximal muscle weakness and limb-girdle atrophy. A muscle magnetic resonance image showed bilateral fatty infiltration and post-contrast enhancement in the arm and thigh muscles. The muscle biopsy revealed intracytoplasmic aggregates with appearance of nemaline rod bodies with Gomori trichrome staining and electron microscopy in most fibers. The patient underwent six cycles of intravenous methylprednisolone pulses, presenting clinical improvement. Post-treatment muscle biopsy showed fewer nemaline bodies and muscle magnetic resonance image depicted a pronounced reduction of muscular edema. These findings corroborate that deposition of nemaline bodies in these patients might be related to an immune response triggered by the virus.

Keywords: Sporadic late-onset nemaline myopathy (SLONM); Rod myopathy; HIV infection; Inflammatory myopathy; Muscle MRI

1. Introduction

Sporadic late-onset nemaline myopathy (SLONM) is a rare acquired muscle disease leading to slowly progressive muscle weakness and nemaline rods on muscle biopsy that usually affects young adults [1]. In contrast to the congenital hereditary forms of nemaline myopathy, there is no genetic cause related to this disorder. Some cases are associated with monoclonal gammopathy and HIV infection – especially in earlier stages, and despite the absence of muscle inflammation, an immune dysfunction might cause SLONM [2]. However, the disease mechanism, pattern of muscular involvement in image studies, and treatment are not well understood [1–3].

2. Case report

We evaluated a 41-year-old white Brazilian male with a three-year history of HIV diagnosis and no AIDS-defining illnesses that presented in our clinic with slowly progressive muscle weakness over the past two years. He was under treatment with lamivudine, tenofovir and atazanavir for one year. He had normal motor childhood development and had no familial history of muscle diseases. The motor exam revealed limb-girdle weakness and atrophy with Medical Research Council (MRC) grade 4 + in the neck flexors, grade 5 in the neck extensors, grade 4 in the proximal muscles from the upper extremities (shoulder and arm muscles) and grades 2 and 3 in proximal muscles from the lower extremities (hip extensors weaker than hip flexors) with normal deep tendon reflexes and no sensitive damage. He was able to walk 200 meters in the six-minute walk test (6MWT).

The serum creatine kinase level was 304 U/L (normal range 26 to 192 U/L). Tests for antinuclear antibodies, monoclonal gammopathy, and hepatitis antibodies were negative. His viral load was undetectable, and the CD4 count was 702 cells/mm^3, at the first evaluation. Electroneuromyography was consistent with myopathic findings. A muscle magnetic resonance image (MRI) showed bilateral atrophy and fatty replacement in deltoids, rotator cuff, thoracic muscles, gluteus, and thigh muscles (mainly in the posterior compartment) (Fig. 1A, C, E, and G). Muscular edema and post-contrast enhancement were present in biceps, triceps, rectus femoris, vastus medialis, vastus lateralis, biceps femoris, semimembranosus, and semitendinosus (Fig. 1B, D, F, and H). A biceps brachii muscle biopsy from

* Corresponding author. Department of Neurology, Medical School of the University of São Paulo, Av. Dr. Enéas de Carvalho Aguiar, 255, 5° andar, sala 5084, Cerqueira César, 05403-900 São Paulo, SP, Brazil. Fax: +55 11 26617152.
E-mail address: edmar.zanoteli@usp.br (E. Zanoteli).

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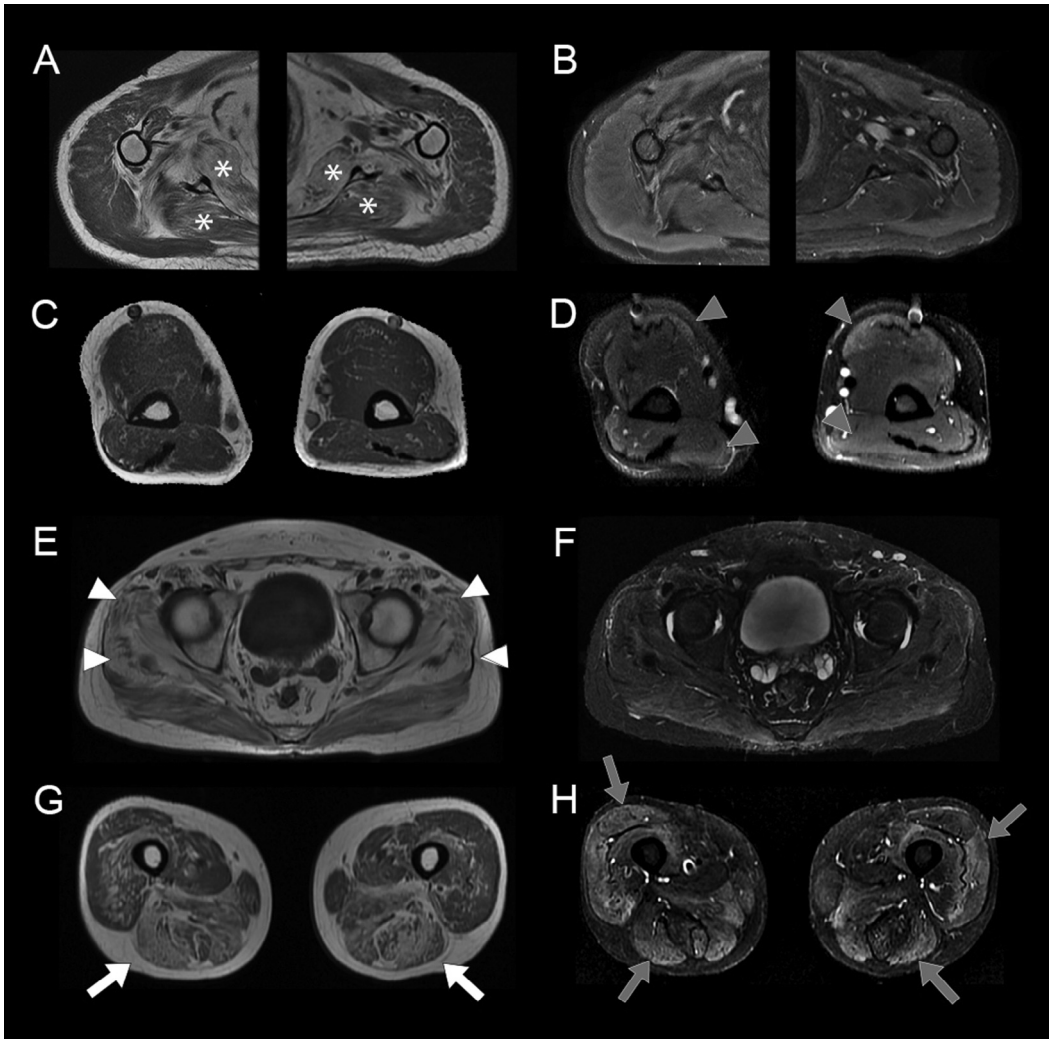

Fig. 1. Axial T1WI and fluid sensitive (T2WI with fat saturation and STIR) MRI images of the shoulder (A and B), arms (C and D), hips (E and F) and thighs (G and H) depicting the pattern of muscular fatty atrophy and edema. The atrophy predominates at the rotator cuff (asterisks), gluteus muscles (white arrow heads) and thigh posterior compartment (white arrow). Fluid sensitive sequences showed mild muscular edema at the biceps brachii and triceps brachii muscles (gray arrowheads) and more evident edema at the anterior and posterior thigh compartments (gray arrows).

the left arm was performed and revealed a myopathic aspect with myofibrillar disorganization and intracytoplasmic punctate aggregates with appearance of nemaline bodies in most fibers, shown with the modified Gomori trichrome stain and electron microscopy (Fig. 2A, B). Cytochrome c oxidase (COX) and succinate dehydrogenase (SDH) stains were unremarkable. The fiber type distribution in ATPase stain was normal. Immunohistochemical for CD4 and CD8 lymphocytes, macrophages and major histocompatibilty complex class I (MHC-I) did not add more information.

The patient underwent intravenous methylprednisolone pulses (1 g per day for 5 days) every month, for six months. The muscle strength improved progressively. After the sixth cycle, the MRC was grade 5 in the proximal muscles from the upper limbs and grade 4 + in the lower limbs; it was grade 3 only in the gluteus maximus. The time of Gower's maneuver decreased from 23 (previous to the treatment) to 9 s. The 6MWT improved from 200 to 260 m. A post-treatment muscle biopsy performed in the right biceps brachii suggested an overall improvement with decreased fiber size variation and endomysial connective tissue, and fewer nemaline bodies, with less fibers containing rods – reduced from approximately 60% to 15% of fibers (Fig. 2C). The percentage of compromised fibers was determined by photographing aleatory fields with a 40× objective and counting manually at least one hundred fibers. Muscle MRI performed after treatment depicted a pronounced reduction of muscular edema (Fig. 2G). After six months of completing corticosteroid therapy he had no serious medical complication.

3. Discussion

Skeletal muscle involvement as a neurologic manifestation in individuals with HIV is rare, especially SLONM [4,5]. Since the first report by Dalakas et al. in 1987, only a few cases of rod myopathy in HIV patients have been described [3,4,6]. Physiopathological mechanisms are poorly understood including the cause of the disorganization of Z-disc structures and the