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Clinical Trial

PARASPINAL MYOSITIS FROM LONG COVID AND IN POST-VACCINATION ONSET SITUATIONS: PRELIMINARY EXPERIENCE WITH OZONE THERAPY

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ABSTRACT

The Authors report their experience in the treatment of three cases of paraspinal myositis using oxygen-ozone therapy through paravertebral muscle infiltrations. In two cases, myositis developed in patients suffering from Long Covid, while the third case involved a recently vaccinated non-Covid patient (third dose). Patients included in the study were treated with intramuscular paravertebral infiltrations of an oxygen-ozone mixture, following informed consent, over ten therapeutic sessions: two per week. The results obtained were clinically assessed and subsequently confirmed by Magnetic Resonance Imaging seven days after the completion of treatment, demonstrating improvement in the imaging findings and substantial clinical recovery in the treated patients.

KEYWORDS: *paraspinal myositis, long Covid, post-acute Covid syndrome, ozonetherapy*

INTRODUCTION

Symptoms of Long Covid, which persist even after recovery from the acute phase of Covid infection, are numerous and varied. They include tiredness, chest pain or tightness, memory and concentration problems (commonly referred to as "brain fog"), insomnia, palpitations, dizziness, tingling sensations, joint and/or muscle pain, mood disorders such as depression and anxiety, tinnitus, digestive disorders, diarrhea, stomach pain, loss of appetite, cough, headache, sore throat, changes in smell or taste, skin rashes, and various symptoms that worsen after physically or mentally demanding activities, as well as fever (1-6). Reports of paraspinal myositis are increasingly documented in the literature (7-12). Additionally, during the period from January 2021 to February 2022, we clinically diagnosed and subsequently confirmed by Magnetic Resonance Imaging (MRI) eight cases of post-Covid myositis, six of which had bilateral involvement of the paraspinal muscles (Fig. 1), one showed unilateral involvement (Fig. 2), and there was a rare case of myositis of the left superior rectus muscle (Fig. 3). Furthermore, we recorded a ninth case of paraspinal myositis that arose after the third dose of the vaccine.

The causes of paraspinal myositis are to be found in the hematogenous spread and the direct invasion of the skeletal muscles through the Ace2 receptor, which have been proposed as pathogenic mechanisms that can lead to the genesis of such myositis. However, immune-mediated mechanisms are the most widely accepted, a hypothesis strengthened by similar cases described following the administration of the vaccine to underlie an autoimmune origin of the process (13-17). The diagnosis is initially clinical with subsequent confirmation by imaging, in particular the MRI examination without and with intravenous contrast medium administration that allows to appreciate the localization in

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the paraspinal muscles in the different planes of space. The therapy currently proposed is only based on anti-inflammatories.

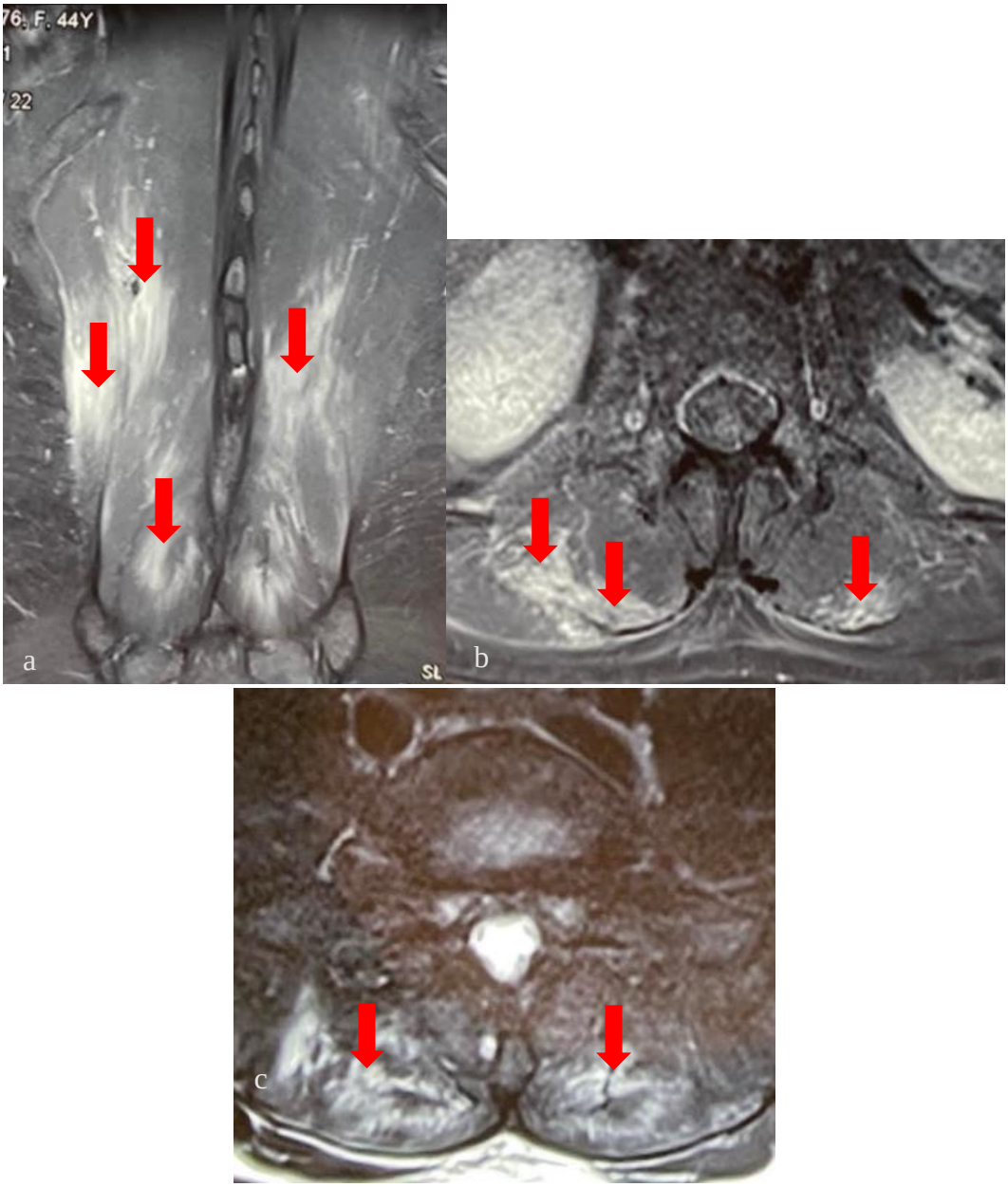

Fig. 1. *(**A-C**): bilateral paraspinal myositis (**arrows**).*

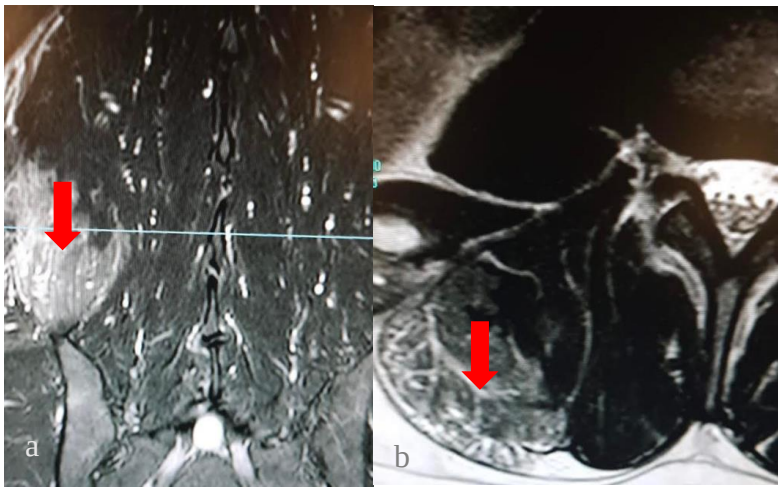

Fig. 2. *(**A-B**): right unilateral paraspinal myositis (**arrows**).*

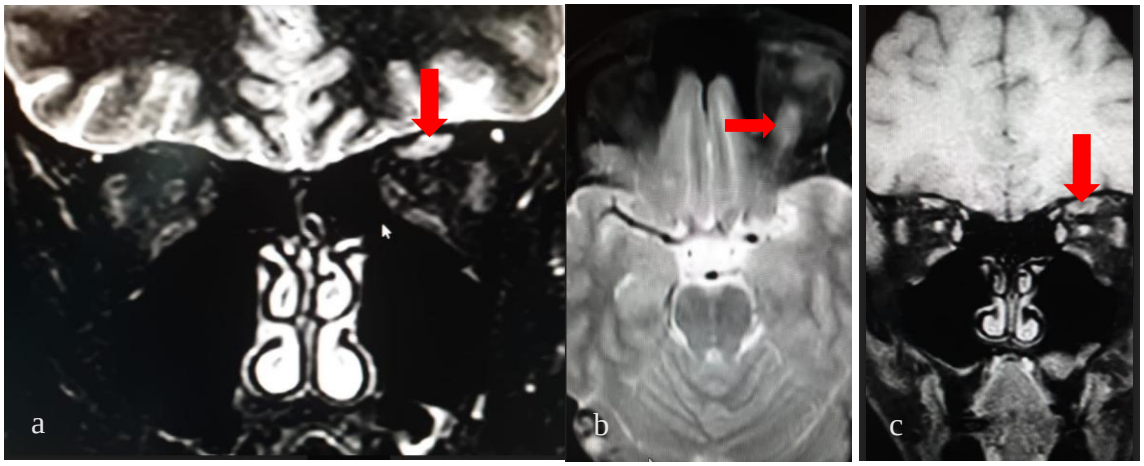

Fig. 3. *(**A-C**): myositis of the left superior rectus muscle (**arrows**).*

MATERIALS AND METHODS

The authors report their experience in treating three cases of paraspinal myositis among a group of eight patients. In three of these cases, we proposed oxygen-ozone therapy (18-22), and the patients accepted this therapeutic option after providing informed consent. Two patients were affected by Long Covid (both females aged 52 and 57), while the third was a non-Covid patient (aged 72) who had recently received the third vaccination dose. Diagnosis in all cases was confirmed through MRI investigation, which documented an inflammatory state of the bilateral paraspinal musculature extending from the level of the last dorsal metameres up to S1.

Patients were treated with paravertebral intramuscular infiltrations, using a 23 G needle (3 cm) with a blue color code, in the tract of muscle affected by the alteration of signal intensity evident in the MRI examination, injecting 2 cc of gaseous mixture for single-shot along the paravertebral muscle at a concentration of 20 µg/ml, with a notable reduction in pain symptoms already from the first therapeutic sessions.

We performed 10 therapeutic sessions every two weeks, at the end of which we repeated a control MRI examination, which highlighted in all three cases a clear improvement in the iconographic picture with partial resolution of the alteration of signal intensity of the paravertebral muscle affected by the disease (Fig. 4-6).

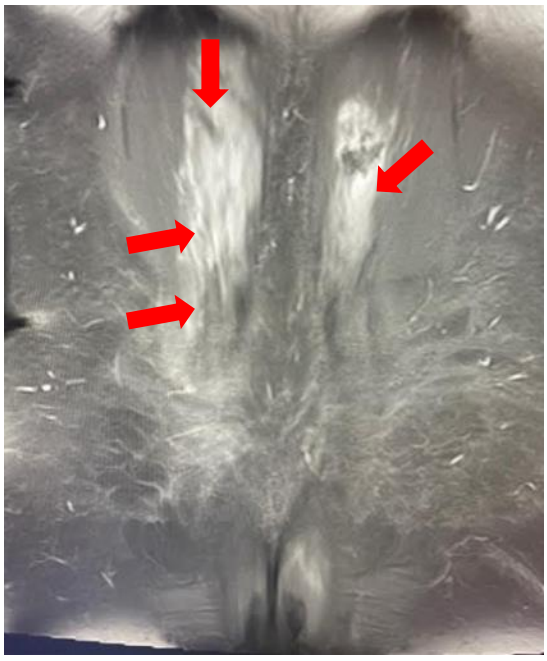

Fig. 4. *Bilateral paraspinal myositis (**arrows**) in a patient with Long Covid.*

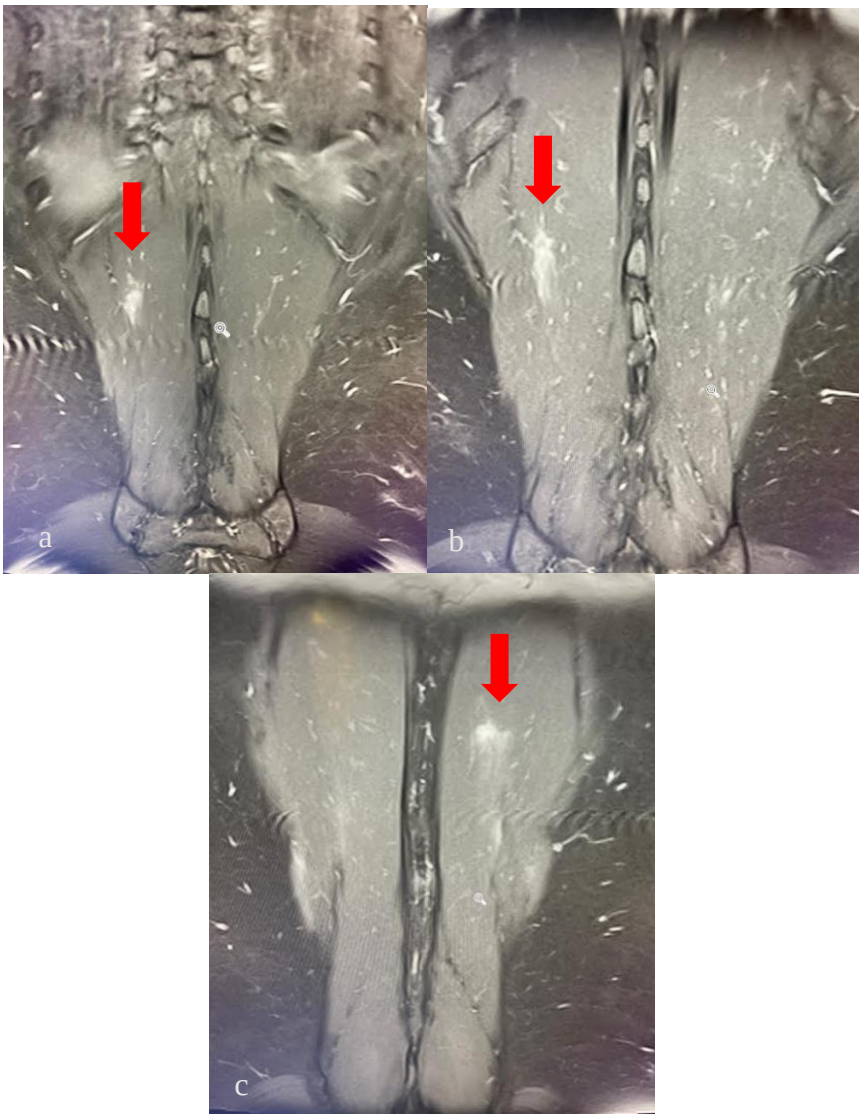

Fig. 5. *(**A-C**): Check-up 7 days after the last infiltration with oxygen-ozone therapy (small residues are evident at the level of the paravertebral muscles bilaterally) (**arrows**).*

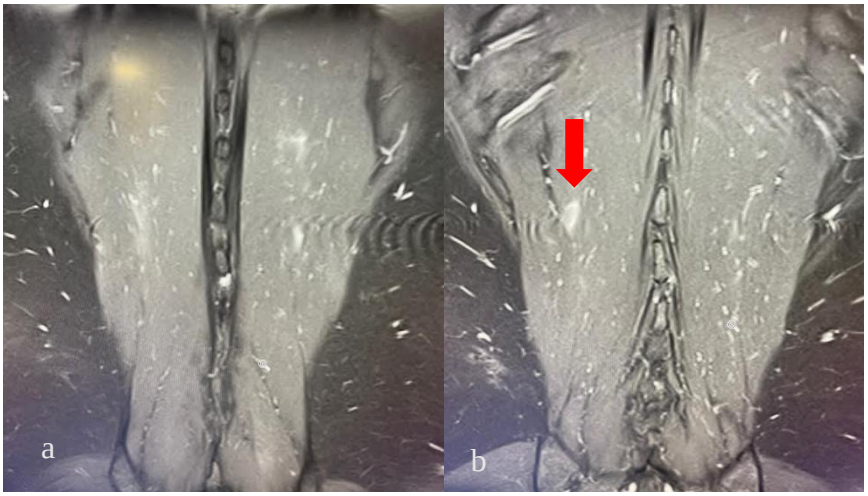

Fig 6. *(**A-B**): one-month check-up: almost complete picture resolution, excluding a minimal residue in the right paravertebral (**arrow**).*

RESULTS

Myositis is defined as inflammation of muscle tissue, which can arise from various causes: infectious (due to viruses, bacteria, or parasites), autoimmune (such as polymyositis and dermatomyositis), iatrogenic (drug-induced), or idiopathic (rare cases with no identifiable cause). Clinical symptoms of myositis include asthenia (muscle weakness), myalgia (muscle pain), muscle cramps, and muscle atrophy (reduction in muscle mass). Diagnosing myositis necessitates a thorough clinical examination, complemented by an in-depth patient history, laboratory tests, imaging, and possibly muscle biopsies.

With early diagnosis and treatment, a definitive cure is achievable in most cases. Treatment is etiology-specific, targeting the underlying cause. For autoimmune forms, high doses of corticosteroids should be initiated, with immunosuppressive agents added if necessary. In infectious myositis, rest and specific anti-inflammatory and antibiotic therapies are recommended. In cases of drug-induced myositis, the responsible medications should be promptly discontinued. Anti-inflammatories and pain relief medications are frequently utilized in cases of ossifying myositis, with abnormal bone tissue generally reabsorbing within weeks; surgical intervention is necessary if it does not. The Covid pandemic has led to a rise in post-Covid myositis cases, particularly in the paraspinal muscles (1-17).

Given the known anti-inflammatory and immunomodulatory effects of ozone therapy (18, 19), we proposed this treatment option for three patients suffering from paraspinal myositis (20-22). After obtaining informed consent, we initiated oxygen-ozone therapy for the three patients. All three displayed similar symptoms, characterized by significant myalgia and acute, disabling back pain.

The therapeutic regimen was also largely consistent: in two cases (one female aged 57 and one male aged 72), paracetamol at 1000 mg twice daily was prescribed, while the last patient received ibuprofen at 600 mg as well. During the oxygen-ozone injections, all patients continued their initially prescribed medication for the first week, which was later discontinued in light of clinical improvements associated with ozone treatment. A follow-up MRI was conducted one week after the treatment cycle for all patients, and one patient underwent an additional check-up one month later. Control MRI scans, in the face of a clinical improvement in the patients, allowed us to appreciate an improvement in the iconographic picture as well and in particular in the patient in whom we performed a second check-up one month later we were able to document the almost total normalization of the MRI picture.

DISCUSSION

Although our case study is limited to only three cases in light of the results obtained with complete resolution of the painful symptoms, we believe that oxygen-ozone therapy performed with paravertebral intramuscular technique is an excellent therapeutic option in the treatment of post-Covid and post-vaccination paraspinal myositis.

CONCLUSIONS

In conclusion, the encouraging results from our case study suggest that oxygen-ozone therapy may serve as a promising treatment modality for paraspinal myositis, particularly in patients experiencing complications related to Long Covid and post-vaccination reactions. Although our analysis is based on a limited sample size, the significant clinical improvement and corresponding MRI findings underscore the potential efficacy of this therapy. Given the growing prevalence of myositis in the context of Covid-related illnesses and vaccination, further investigation is warranted to establish more comprehensive treatment protocols and guidelines. Future studies with larger cohorts will help clarify the long-term benefits and mechanisms of action of oxygen-ozone therapy, potentially offering relief to patients suffering from debilitating myositis and contributing to the advancement of post-covid care strategies.

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