Use of oxygen-ozone therapy in the treatment of fibromyalgia

Rossella Balestrero,1,2 Marianno Franzini,2 Luigi Valdenassi2,3

1Medical Surgeon; 2Oxygen-Ozone Therapy Scientific Society, Gorle (BG); 3Toxicology School, University of Pavia, Italy

Abstract

Fibromyalgia (FM) is a pathology that is manifested by a spectrum of heterogeneous symptoms that are difficult to frame, from both a diagnostic and therapeutic point of view. On one hand, the clinical features are highly variable, and on the other, the pathophysiology has yet to be fully clarified. This paper aims to highlight how oxygen ozone – administered using a precise protocol from the Scientific Society of Oxygen Ozone Therapy – is able to act on several levels of the pathophysiology of FM by virtue of its intrinsic biochemical mechanisms, making it a viable option for treating the disease. The following case study – a 45 year old woman who came to our attention due to diffuse pain and a feeling of general tiredness – responded positively to a standard treatment with oxygen-ozone therapy delivered via bi-weekly sessions, for a total of 12 sessions from September to October 2016. The treatment was followed by a maintenance therapy of about one session a month. One month after the end of the 12 sessions, the patient reported a significant improvement in pain, mood, and a significant reduction in fatigue, a new feeling of well-being and an improved quality of sleep. In the light of these results, oxygen-ozone therapy emerges as a viable therapeutic option for the treatment of FM patients.

Introduction

Fibromyalgia

Fibromyalgia (FM) is a complex disease that is manifest by a spectrum of heterogeneous symptoms that are difficult to frame, from both a diagnostic point of view and as regards which therapeutic approach to use. This is due to the fact that the clinical features are highly variable, and the pathophysiology has not yet been fully clarified.

With regard to the symptomatology, FM presents itself in most patients by three key symptoms that can be present individually or in various combinations. These are: chronic widespread pain and pain elicited by pressure on trigger points, fatigue, and sleep disorders (in particular trouble getting to sleep or non-restorative sleep). In addition to these symptoms, which occur with an intensity that varies from patient to patient, but can exhibit fluctuations over time, even in the same subject, we also find mood disorders, stiffness, difficulty concentrating or memory disorders, migraines and other somatic complaints.1,2 Given this wide variability in the clinical presentation of FM, it is now considered as more of a complex range of problems, rather than a single disease.

In addition to the heterogeneity in clinical manifestations, diagnosis is rendered difficult by the fact the pathophysiology of FM is not completely understood, and as a result, the therapies currently available do not appear completely effective in most cases. Various studies have shown that numerous mechanisms take part in the genesis of this disease, including alterations in the processing of painful stimulus at a central level, neurotransmitter alterations and hypothalamic-pituitary axis changes, as well as an increased level of several cytokines.3 Finally, in recent years, oxidative stress has assumed a leading role in the pathophysiology of FM4 although it is not yet known whether its increase is a causative factor in the disease or a consequence of the patient’s general condition.5,6 In patients with FM, an increase in the concentrations of malondialdehyde have been found, alongside a low concentration of antioxidant enzymes like catalase, glutathione peroxidase and superoxide dismutase.5,7

Ozone is known to exert a mild, transient and controlled oxidative stress that promotes upregulation of antioxidant systems and modulation of the immune system.8

In accordance with this its mechanism of action is suggested as an effective therapeutic indication in the treatment of FM.

Purpose

The aim of this paper is to highlight how ozone-oxygen delivered using a precise SIOOT protocol, thanks to its intrinsic biochemical mechanisms, can act on several levels of FM pathophysiology, rendering it a viable option for treating the disease.

Fibromyalgia Survey Questionnaire and Fibromyalgia Impact Questionnaire-Revised

Because the diagnosis and FM evaluation are predominantly clinical, the results, in terms of treatment efficacy, were evaluated by comparing the FSQ (Fibromyalgia Survey Questionnaire) and FIQR (Fibromyalgia Impact Questionnaire-Revised) question-
Case Report

Description

The propositus was a 45-year-old female, who came to our attention because of diffuse pain and a feeling of general fatigue that severely limited her daily activities, to the extent that it became necessary to take a leave of absence from work. The symptoms were reported to have onset at about 20 years of age, with an exacerbation after the age of 30.

The past and recent medical history is negative for other diseases that could potentially be the cause of these symptoms. Blood tests show only a slight increase in the levels of anti-EBV antibodies.

The patient reported that they had been subjected to numerous other tests by different specialists without receiving a precise definition of their disorder. Treatments offered had included the use of muscle relaxants and gabapentinoids, but had never had any effect, and had to be abandoned after a short time. At the beginning of 2016, a diagnosis of FM was suggested, and in September of the same year the patient was seen by a consultant in oxygen-ozone therapy.

At our centre, a full examination was performed and the patient was asked to fill out the FSQ questionnaire which confirmed a diagnosis of FM: Score SSS=7, WPI=15 (total score=22). The patient then filled out the FIQR questionnaire with a final score of 58, indicating a moderate severity. From the case history, the visits and the questionnaires, the following profile emerged.

The patient was evidently suffering, with ever-present widespread pain in the neck and upper back. Stiffness, with functional limitations in executing large movements, and easy fatigability. They reported high levels of fatigue, and limitations in performing normal daily activities like working or doing housework for a long period, particularly because of the pain. They reported non-restorative sleep, and difficulty falling asleep. The patient clearly displayed the characteristics of an anxiety-depressive trait, which she confirmed herself in the questionnaire. The anxiety component definitely appeared to be dominant. Reduced, albeit slightly, ability to concentrate. The patient also complained of numbness in the hands and feet. A week before the meeting, i.e., Voltaren® injections were administered because of an exacerbation of painful symptoms, and then suspended as not effective.

From the interview a major sense of frustration emerged, mainly due to the fact there had been no improvement with any of the therapies performed up to that point. The partial benefit obtained from physical activity has failed at a time when, due to the severe pain, the patient could no longer perform it. The patient is then given an explanation about the rationale for using ozone therapy and, in the absence of contraindications; a treatment plan is suggested that the patient agrees to carry out.

Oxygen-ozone therapy

From September 2016 to October 2016, the patients underwent a first cycle of 12 biweekly sessions of GAE. These used 150 cc of a mixture per 150 mL of blood, at increasing concentrations from 30 mg/mL up to 50 µg/mL after the first two sessions, alternate with PAE 10 cc. blood and 10 cc oxygen-ozone and rectal insufflation. Proceeding then with a monthly maintenance. At the end of treatment, the patient was asked to fill out the FSQ (always with the VAS scale associated with WPI) and FIQR questionnaires again.

Results

At the end of the therapeutic cycle, the patient continued with a monthly maintenance. One month after the end of 12 sessions, a marked improvement in pain and stiffness was reported, which remained to a very limited extent in those areas previously reported as the most painful, and almost disappeared in others. We noted next to this, a significant reduction in fatigue, a general feeling of well-being and an improved quality of sleep. The mood was also clearly improved, despite the anxiety still being evident. Paresthesias are also omitted. In addition to a clearly lower FSQ questionnaire score, with a score WPI=7 and SSS=1 (total score=8), we also saw a reduction in values obtained using the VAS scale in individual areas of the body that evidenced a reduction of pain very well, and a decrease in the FIQR questionnaire score which fell to a value of 46. These factors indicated to us as a whole, that we had achieved a marked improvement in the severity of the clinical picture and consequently in the patient’s quality of life in general.

Discussion

Pathophysiology of fibromyalgia

FM is a chronic disorder with a very complex pathophysiology. Despite generalised pain being considered the cardinal symptom, others like tiredness and being easily fatigued, non-restorative sleep and mood disorders in the sense of anxiety-depression, play a significant role in determining the degree of disability characteristic of this disease. Even the pathogenesis of FM is very complex and, as mentioned earlier, many factors converge
Mechanisms of action of ozone

Oxygen-ozone therapy is a method that, by using a gas mixture called medical oxygen, exploits the inherent properties of ozone to invoke a moderate and transient oxidative stress when the ozone comes into contact with various parts of the body’s biochemistry. Nowadays, the paradoxical action of ozone – which despite being an oxidizing molecule, actually increases the antioxidant properties of the main redox systems – are well known. The mechanism behind ozone’s paradoxical action is as follows.

Soon after coming into contact with the blood, the ozone dissolves and reacts immediately with various reducing molecules like unsaturated fatty acids containing double bond (PUFA’s), oxidizing agents and other molecules, to generate reactive oxygen species (ROS). In particular, its reaction with PUFA’s generates LP and hydrogen peroxide. The toxicity of these molecules is largely neutralised by enzymatic antioxidant systems like glutathione-transferase and aldehyde dehydrogenase, which are commonly present in our body, while the products of these reactions act as secondary messengers that stimulate further synthesis of antioxidant enzymes. Obviously, the ozone must be administered in quantities that allow us to achieve a therapeutic effect that protects against radicals, and is non-toxic; the concentrations commonly used for medical purposes are fully compatible with this. Ozone also has effects on lipid, carbohydrate and protein metabolism, and induces a reduction in circulating cytokines and therefore of the inflammatory state. Besides that, ozone can also improve the circulation and therefore tissue oxygenation, helping to reduce ischaemic/hypoxic states.

Therapeutic suggestions

Current guidelines suggest a combination of drug- and non-drug therapy, where the latter term primarily means patient education, exercise and cognitive behavioural therapy. As for the drugs chosen for treating this disease, those for which there is most evidence are pregabalin, duloxetine and milnacipran, followed by amitriptyline and cyclobenzaprine. Other drugs with at least one positive clinical trial are for example, several selective serotonin uptake inhibitors, gabapentin and tramadol. However, none of the currently available drugs are fully effective across the entire spectrum of FM symptoms, which include pain, fatigue, sleep disturbances and depression. Therapeutic combinations of these drugs are another option that has yet to be further investigated in clinical trials.

In addition, with regard to non-drug options the entity responding to these therapies often exceeds results obtained with the drugs, which, apart from being ineffective, are also burdened by side effects. The greatest benefit was seen in an overall functional improvement, and these results were confirmed over time. However, availability, compliance, and maintenance over the long term are the main limitations for these forms of therapy. The latest review of FM treatment, emphasises the need to properly inform and educate patients about their disease and the usefulness of moderate aerobic exercise, such as yoga or meditation, amongst others. There are, however, studies that have compared various physical activities in an effective way to determine which is best when the choice is based on the patient’s own abilities.

In accord with these mechanisms of action, oxygen-ozone therapy is a valid therapeutic option for treating FM, and is suitable in a panorama where both the poor efficacy of the treatments proposed up to now, plus the extreme variability of the clinical picture requires a continuous adjustment of therapy, making it difficult to maintain high patient compliance. Some studies have investigated the effectiveness of ozone for treating FM, both via GAE27 or via rectal insufflation. These have reported promising...
results with high percentage response rates in treated patients. This is an improvement from the clinical point of view, which involved not only the pain aspect of the condition, but also a general improvement of other conditions, including mood. Improvements were also evident from a compliance perspective: the treatment had no side effects and, with a maintenance time of approximately one session per month, it was very well tolerated by almost all of the patients.

Conclusions

The case we followed responded positively to a standard treatment with oxygen-ozone therapy administered via biweekly GAE sessions, for a total of 12 sessions, followed by a maintenance treatment of about one session per month.

In view of the findings of studies on the pathophysiology of FM, as well as the biochemical properties of ozone, ozone-oxygen therapy thus appears to definitely be a valid therapeutic option for the treatment of patients with FM. Due to the poor efficacy of the drugs used to date, in fact and aggravated by the presence of numerous side effects, there does not appear to be an adequate treatment for the disease. In addition, studies conducted so far with non-drug therapies, such as exercise and cognitive-behavioural therapy, even though some have reported positive results, do not provide accurate guidelines or indicate the most effective practice from the others.

All these factors greatly reduce the patient’s adherence to treatment, and those who found no improvement in their quality of life, have tended to abandon them. This further fuels their depressive state. With oxygen-ozone therapy however, the patient experiences a feeling of general well-being, due certainly to a reduction of the painful symptoms, which was also well demonstrated in our clinical case, but is also the result of an improvement in the asthenia. This is due to a greater oxygenation of tissues caused by the ozone. The improvements in mood and quality of sleep are also important factors in the overall status of these patients.

Apart from this, there were no side effects in this case or in any of the patients treated in larger trials and the degree of compliance with therapy was total.

The main limitation of studies carried out in this area to date is the small number of patients on which they were conducted. The hope is that, thanks to the greater spread of this medical practice, it will be possible to undertake more studies to encourage use in a wider number of patients.

In this paper, we have taken the opportunity of presenting a clinical case we treated successfully to compile a review about FM and its treatment with oxygen-ozone therapy, to confirm, once again, its effective therapeutic efficacy.

References