CASE REPORT

Prospects for treating SARS-Covid-2 with Oxygen-Ozone Therapy

Helga Cosolo* **Chiara Riva Cavalletti De Rossi°**

Abstract - Observation of the healing process achieved by means of a traditional pharmacopoeia synthesis and adjuvant Oxygen-Ozone Therapy, supported by negative instrumental investigations (chest X-ray, chest CT, thoracic ultrasound, spirometry, and haematochemical analysis) in a patient symptomatic for COVID 19 infection.

Keywords: MAJOR AUTOHAEMOTHERAPY (MAH), OXYGEN-OZONOTERAPY, SARS-CoV-2, COVID19

Key messages:

- Oxygen ozone therapy, with an innovative broader therapeutic connotation, can be a strategy to support drug therapies in patients with COVID 19.
- It is a licensed, inexpensive, rapidly effective medical practice with few side effects.

Introduction

Oxygen-Ozone Therapy (OOT) is a well-established and experimentally proven medical practice with a rich bibliography, which shows a not insignificant decisive potential. It is confirmed that the appropriate use of pro-oxidants, such as ozone, leads to a paradoxical reparative effect on the organism. Such a method activates the depressed cellular and humoral immune system, briefly corrects hypoxia by preventing vascular problems and even averts DIC (Disseminated Intravascular Coagulation), accelerates healing times, ensuring prompt patient recovery, and greatly reduces clinical costs of hospital management.

Precisely in the period of maximum clinical criticality, when COVID19 was absolutely aggressive and almost implacable, the physiopathogenetic mechanisms of the viral infection being unknown, with the most acute symptomatological spectrum, OOT was proposed as a valid and effective therapeutic strategy in patients who did not respond to other therapies on the basis of the acknowledged translational potential supported by medical practice. This approach draws its scientific basis from the recognised capacity of O2-O3 to possess immunomodulatory, anti-inflammatory, thrombolytic and anticoagulant action, and to catalyse and amplify the pharmacological action of antiretrovirals and hydroxychloroquine.

Patients with severe dyspnoea, systemic hypoxia requiring respiratory assistance, already recovered respiratory functional autonomy after the first administration of ozone, improving day by day until a gold standard of swab negativity seven days after the end of the four Major Autohemotheraphy cycles.

Materials and methods

Ozone generator from medical oxygen i.e. MEDICAL 99 IR portable unit for oxygen-ozone therapy (equipment certified as "medical device as per directive 93/42/EEC and class 2a medical device") in conformity with Italian Society for Oxygen-Ozone Therapy protocols.

MAJOR AUTOHEMOTHERAPY KIT

- 400ml SAN-O_3 BAG:

* Lt.Col., MD, Surgery Unit, "Celio" Military Hospital, Rome.
° Dentistry - C.O.C.I. (Odontostomatological Cenacolo Middle Italy)

Corriesponding: Email: cosolohelga@yahoo.it

"Closed System" between Bag/Transfusion set/Patient (elimination of possible environmental contamination of the patient) containing ACD-A anticoagulant solution complete with needle free connectors and blood collection set, first system to be authorised by ISS-Istituto Superiore di Sanità (Higher Institute of Health) suitable for blood collection and processing, phthalate free (plasticisers), ozone inert (no particle detachment).

- Transfusion set with 175 micron filter complete with MLL connector;
- 18 G needle;

Absence of needles except for the one dedicated to taking the patient's blood (to eliminate the infectious risks of accidental puncture).

- Automatic connections ensure hermetic closure after detachment of the syringe;
- SANO$_3$ makes it possible to perform all the operations necessary for Major Autohemotherapy in total absence of blood clots and gas emboli;
- PLATFORM SCALE.

Clinical case

Male patient, 45 years old, non-smoker, allergic to pollen, no G6PDH deficiency, negative remote pathological history. He first manifested symptoms during his out-of-area service, with dyspnoea and fever at onset on 3 May 2020. After two days, onset of diffuse myalgias, dry cough, anosmia and headache.

First treated on site with Azithromycin 500 mg, Nitazoxanide 500 mg and Paracetamol 1000 mg for 9 days at full dose. When the symptoms worsened the therapy was supplemented with Mesporine 2 g, Hydrocortisone 25 mg, Clexane 4000 I/U. On the tenth day, the treatment protocol was replaced at the Policlinico Militare del Celio where the patient was admitted to the Special Emergencies Functional Unit with: piperacillin-tazobactam 2 g IV, enoxaparin 4000 U/I S.C. for two, lopinavir-ritonavir 200 mg-50 mg 2 tabs per os in die, diflucan 400 mg in a single administration. He underwent on-site chest X-ray, which confirmed bilateral pneumonia. A nasopharyngeal swab using the SARS-CoV2-RT-PCR Real Time method was carried out for COVID19 with a positive result on 5 May 2020.

He was transferred by high bio-containment flight to Italy and admitted to the Special Emergencies Functional Unit 1 of "Celio" for assessment on 12 May 2020. On admission, the objective examination is conducted with the limitations associated with bio-containment measures and the use of PPE. The patient appears to be in fairly good general condition and in good haemodynamic compensation, alert, oriented in space and time, dyspnoeic and apyretic (during antipyretic therapy), without any particular objective findings except for the respiratory system, where he shows: "Dyspnoea at rest. Symmetrical hemithorax, difficult expansion and dry cough, difficulty in phonation with strident cough at speech, hypomobile bases, VM and TVF hypotransmitted at mid-basal level".

He underwent haemogasanalysis, blood count and clinical chemistry, sputum culture (positive for Candida Albigans and Enterobacter cloacae), chest CT scan ***(Fig. 1)***. Start of treatment with OOT on 14 May for three consecutive days in combination with the described pharmacological therapy.

Experimental phase

Start of oxygen ozone therapy treatment on 14 May for three consecutive days.

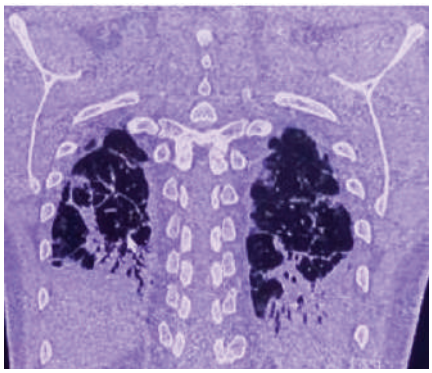

Fig. 1 - CT scan of the chest in basic condition - At the lower lobes irregular consolidation of the parenchyma with evidence of aerial bronchogram, multiple areas of "ground glass" thickening.

- The intermediate cubital vein of the right arm is harvested;
- The transfusion set is positioned below the level of the bag and the collection set, sampling begins up to level C of the drip chamber, the transfusion set flow regulator is closed, blood collection continues in the bag in the quantity determined by the operating protocol applied, and the red clamp is closed;
- The 50 cc syringe previously filled with O O_{23} at a concentration of 35µg/ml is connected, and the ozone mixture is inserted into the bag placed on the platform scale; every 50 cc of blood is ozonated with 50 cc of O O_{23} until 150 cc is reached.
- Once 150cc of peripheral blood has been ozonated with 150cc of O2O3 mixture at 35 µg/ml, before reinfusing the ozonated blood, it is checked for air bubbles and/or clots in the bloodstream;
- The Transformer Flow Regulator is opened;
- A slow infusion 60/80 gtt/min is given.

If the protocol is scrupulously observed, there are no side effects. If a more rapid infusion is carried out, there may be vagal reactions such as dizziness, or chills due to probable hypoglycaemia, in which case just slow down the flow and give a candy.

Results

Confirming the clinical recovery, the outcome of the instrumental, radiological examination, such as HIGH RESOLUTION THORAX CT, ***(Fig. 2)*** shows that: "... currently all previously reported alterations are resolved. No layers of pleural effusion are evident. Within the limits of the non-contrast diagnostics, no significant lymphadenomegaly in the ilo-mediastinal area are appreciable".

Haemoanalytical examinations, including haemogasanalysis ***(Table 1)***, show the course of progressive clinical improvement up to recovery with a recovery of immunological function and complete recovery of respiratory function. The spirometric examination ***(Tab.2)*** shows the complete state of recovery as the control CT scan (Picture 2) does three months after the onset of SARSCoV-2 disease. Clear improvement in symptoms: total remission of dyspnoea, improved exercise capacity in the absence of fatigue, absence of asthenia, recovery of the sense of taste and smell and appetite. No side effects of any kind appeared. The therapeutic results achieved persisted about two months after admission ***(Fig. 3)***. SARS-CoV2 swab as at 30-05-2020 negative.

Tab. 1 - Table of vital parameters.

	initial value	Treatment 1	Treatment 2	Treatment 3
Body temperature	37,2	36,8	36,00	35,5
Glycaemia	86,00	117	84	85
Creatinine	0,83	0,80	0,82	0,91
Leukocytes	60,7	85,5	70,8	64
Lymphocytes	27,8	8,5	19,6	22,2
Protein C	6,2	1,0	0,25	1,54
D-dimer	146	45	45	-
pO_2	84,2	83,2	89,1	99,1

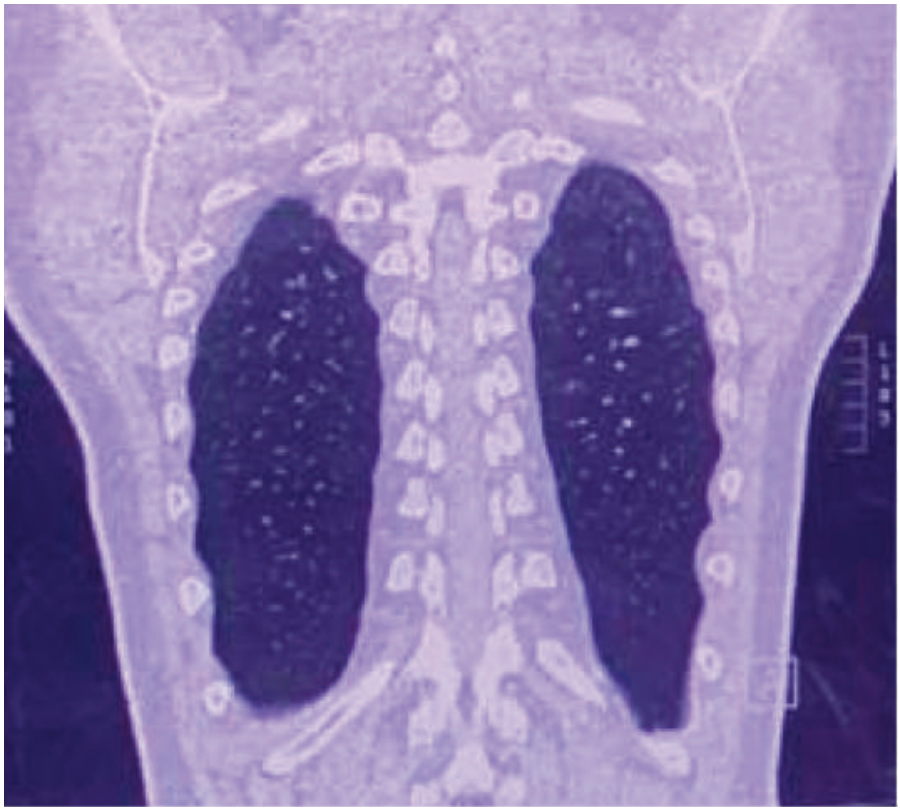

Fig. 2 - Control CT scan three months after disease onset

Considerations

In this clinical case, an example of many others, it was possible to appreciate the very high therapeutic power of medical ozone, which acted as a virus-static by preventing the adhesion of the spike protein on the body's cells, not only in the lungs but also in the glandular parenchyma, vascular endothelium and encephalon. At the same time, it acted as a broad-spectrum bactericide and anti-fungal.

While most critics could naturally argue that drugs produce the same effects, one may add that there are important differences. In fact, ozone has no side effects at controlled dosages specific to the type of pathology being treated; it is not addic-

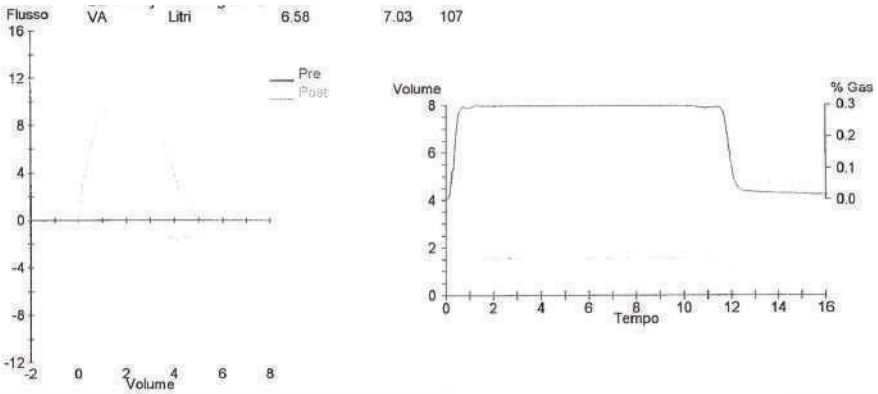

Fig. 3 - Spirometry for post Covid evaluation, fitness for service, PFT within normal, DCCO within normal (Patient: Age: 45 - Height: 171 cm - Weight: 78.0 kg - BMI: 26.67 - Sex: M)

tive; it does not induce pharmacological resistance; it fights and eradicates infections (viral, bacterial, fungal, parasitic and opportunistic pathogens resistant to traditional pharmacopoeias). In addition, as in this case, it strengthens and boosts the immune system, regenerates tissues by stimulating their cellular stroma, improves microcirculation, prevents the formation of thrombi and septic emboli, has antioxidant action, and provides oxygen to noble organs such as the brain and heart and to the body as a whole.

Moreover, it works in synergy with drugs.

Ozone contributes to the evolution of medical therapy from the noblest of natural gases: oxygen-ozone is pure, eclectic, of extraordinary efficacy subject to the physician's ability to know how to use it with science and conscience, with skill and attention to the patient and his personal response to treatment. Ozone is therefore alive; it requires great (non-emotional) sensitivity on the part of the doctor administering it and requires respect. When that perfect balance

Tab. 2 - Respiratory function.

Spirometry		**Ref**	**Pre Meas**	**Pre % Ref**	**Post Meas**	**Post % Ref**	**Post % Chg**
FVC	Litres	4.34	5.51	127			
FEV1	Litres	3.56	4.75	134			
FEV1/FVC	%	79	86	109			
PEF	L/sec	8.71	11.87	136			
FEF25%	L/sec	7.56	9.36	124			
FEF50%	L/sec	4.74	9.01	190			
FEF75%	L/sec	1.95	3.33	170			
FEF25-75%	L/sec	4.08	7.28	178			
Lung volumes							
TLC	Litres	6.58	6.83	104			
RV	Litres	2.00	1.32	66			
RV/TLC	%	32	19	61			
FRC N2	Litres	3.32	2.59	78			
VC	Litres	4.52	5.51	122			
IC	Litres		4.24				
Diffusion							
mL/mmHg/min	mL/mmHg/min	29.9	38.2	128			
DL Adj	mL/mmHg/min	29.9	38.2	128			
DLCO/VA	mL/mHg/min/L	4.54	5.43	120			
DL/VA Adj	mL/mHg/min/L	4.54	5.43	120			
VA	Litres	6.58	7.03	107			

between dosage, type of administration and the patient's personal response is achieved, definitive healing is achieved more quickly.

Conclusions

The data of our patient treated with Oxygen-Ozone adjuvant drug therapy testifies to the validity of this experimental treatment, which has now become commonplace in many university polyclinics and above all in the *restitutio ad integrum* of health at the level of all the systems compromised by the SARS-CoV-2 infection. Given the inexpensiveness of the treatment and the absence of side-effects, the speed of recovery and full recovery in the first follow-up, it can be considered a safe and reliable treatment that is no longer life-saving but in ordinary therapy in all stages of the disease: from pauci-symptomaticity to complete multi-organ impairment up to DIC. This presentation of the clinical case examined represents a compendium on the direct and indirect mechanisms of action of ozone at the vascular level of the microcirculation, mainly affecting the arterial, pre-capillary, capillary and post-capillary districts. In fact, when the damage to the glycocalyx has not yet become irreversible and when the endothelial cell is still in the phase of an effective response in repairing the damage at the level of the structure of the so-called matrisome, the prompt and immediate use of systemic ozone therapy has allowed a prompt restoration of the patient's clinical condition, avoiding the deterioration of the microcirculation characterised by altered coagulation, haemolysis, lymphopenia and self-induced cytotoxic damage.

Disclosures:

The Author declares that he/she has no relationships relevant to the contents of this paper to disclose.

Manuscript received October 24, 2022; revised February 20, 2023; accepted February 23, 2023.