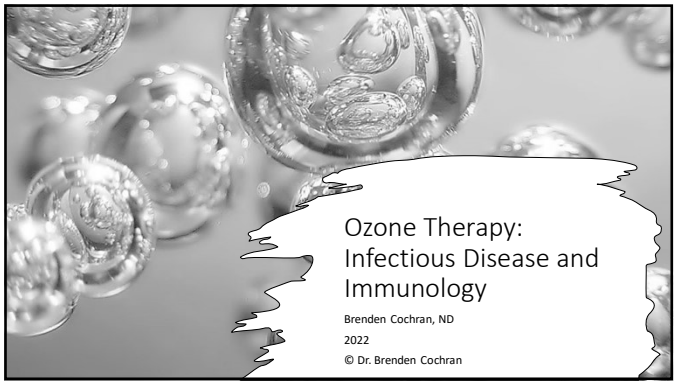
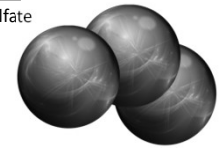


1

What is Ozone?

- VERY STRONG OXIDANT!
- Natural gas (O3). 3 atoms of Oxygen
- Powerful sterilizer in vitro:
  bacteria, viruses, fungus and odors
  - https://www.oxidationtech.com/ozone/pathogens.html
- 3rd most potent oxidant after fluorine and persulfate
- O3 is very reactive (oxidation)
- Medical ozone vs. other ozone
- Half-life of 1 hour at room temperature

Ozone O3



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2

Medical Ozone

- Must be free of contaminants
- Since ozone is so reactive it will easily oxidize plastic, rubber, metal, latex, etc.
- Contains less than 5% of ozone where most is pure medical oxygen
- Generated by passing pure oxygen through a high voltage gradient.
- Must use a Medical Ozone Generator!

$$3O_2 + 68{,}400 \text{ cal} \rightarrow 2O_3$$

Cakir, Ruhi. General Aspects of Ozone. Intech. http://dx.doi.org/10.57772/57470

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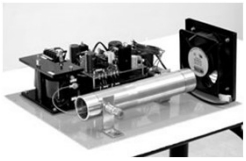
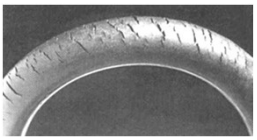
3

Only USE MEDICAL Ozone Generato





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4

Dosing

- **Low dose** = (5-10 mcg/ml)
  - Immune modulator
  - Support anti-oxidant pathways
- **Medium dose** =(10-20 mcg/ml)
  - Neurological and cardiovascular
  - Immune modulator
- **High dose** = (20-70 mcg/ml) Immune stimulant
  - Viral/Bacterial/Fungus
- **NOTE HIGHER DOSAGES (40-70 mcg/ml) can be immune inhibitory.**

Madrid Declaration on Ozone Therapy 2nd ed. International Scientific Committee of Ozone Therapy

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Ozone and Erythrocytes

- Hemolysis has been found when erythrocytes are suspended normal saline and treated with 10-30 mcg/ml ozone
- This dynamic is NOT seen when administered in whole blood due to enzymes and buffering found in blood constituents.
- However, high dosages >70 mcg/ml or very fragile patients can see hemolysis.

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Pharmacology

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7

Oxidation Therapies Vs. Oxygenation Therapies

Oxygenation therapies (EWOT, HBOT, Aerobic Exercise) deliver more oxygen deprived areas.

Oxidation therapies (HDIVC, Ozone) don't provide more oxygen. They directly improve oxygen utilization by increasing the NAD/NADH ratio.

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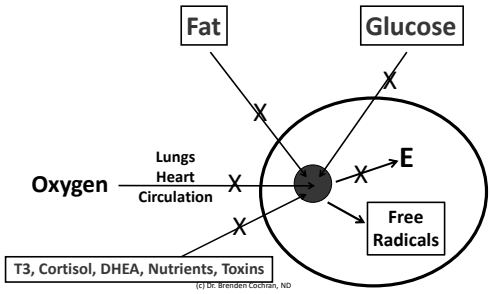
Decreased Oxygen Utilization



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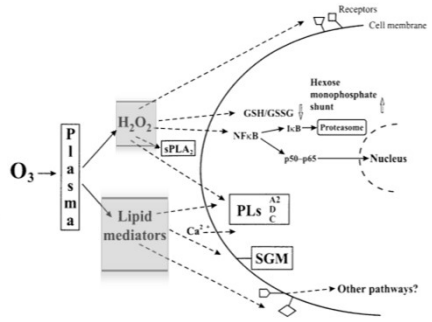

Bocci, V. Biological and Clinical effects of ozone. Has ozone therapy a future in medicine? British Journal of Biomedical Science 1999, 36; 270-279

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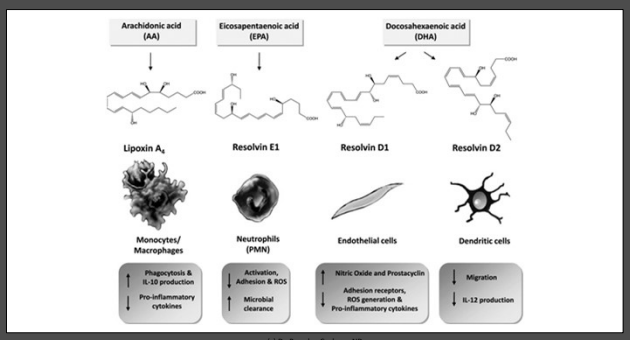

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Immune

- Formation of ROS in the plasma
  - A rapid process which causes a 5-25% reduction in antioxidant capacity for 15-20 minutes.
    - Due to efficient recycling of oxidized compounds
  - Shifts and increase in H202 extracellular to increase gradient of H202 to move intracellular
  - Reacts with PUFA to form LOP(lipid oxidation products).
    - LOPs have a short half-life but can signal bone marrow, spleen, liver and other immune system with peroxidative stress.
    - This can up-regulate antioxidant enzymes (oxidative stress adaptation)

Bocci, V. Ozone. A New Drug 2nd Ed. 2011. Department of Physiology University of Siena

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Ozone (oxidant) upregulating antioxidants Literature

- Bocci V. Does ozone therapy normalize the cellular redox balance? Med Hypotheses 1996;46:150–154.
- Sharma YK, Davis KR. The effects of ozone on antioxidant responses in plants. Free Radic Biol Med 1997;23:480–488.
- Leon OS, Menendez S, Merino N, Castillo R, Sam S, Perez, et al. Ozone oxidative preconditioning:a protection against cellular damage by free radicals. Med Inflamm 1998;7:289–294.
- Barber E, Menendez S, Leon OS, Barber MO, Merino N, Calunga JL, et al. Prevention of renal injury after induction of ozone tolerance in rats submitted to warm ischaemia. Mediat Inflamm 1999;8:37–41.
- Larini A, Bianchi L, Bocci V. The ozone tolerance: I. Enhancement of antioxidant enzymes is ozone dose-dependent in Jurkat cells. Free Radic Res 2003;37:1163–1168.

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Immune

- Inducing leukocyte activity
  - Increased production of cytokines such as interferon beta, gamma
    - Several interleukins (IL-1, IL-2, IL-8, TGF-B)

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Immune

- Ozone is a disinfectant in vitro, **NOT** in vivo!
  - Cannot sterilize blood
- Can inactivate aerobic and anaerobic bacteria, lipid-enveloped virus and fungi.
- Thus Ozone is activating Neutrophils and stimulating multiple cytokines.

Cakir, Ruhi. Generaly Aspects of Ozone. Intech. http://dx.doi.org/10.57772/57470

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Immune (TH1/TH2) Balance

- ***Ozone helps with hormesis of this balance.***
- ***Immunization can throw this off***

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ROS/LOP and the chronically ill

- In the individual that their disease is not too advanced you will see upregulation of SOD, GSH and catalase.
  - Thus more antioxidant rich enzymes
  - So this oxidation primes your system be more efficient with antioxidants
- However! The person who has advanced disease doesn't have sufficient antioxidant enzymes thus this would worsen their condition!

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High Dose IVC vs. H2O2 vs. Medical Ozone

ASC – High Dose IV:

- IV → ASC High Dose – "Pro-drug for H2O2 production"
- Plasma
  - ASC + Fe or Cu → H2O2
  - Some reduced by plasma catalase and GSH peroxidase
- ECF
  - ASC + Fe or Cu → H2O2
- Cell
  - Cytokine release / Immune stimulation PLUS:
    - Normal cell: H2O2 reduced by catalase to H2O
    - Abnormal cell: H2O2 → potential cell damage

H2O2 IV:

- IV → H2O2
- Plasma
  - H2O2 –catalase/Mn→ H2O+O2 →Plasma cytokine stimulation:
    - IL-1, IL-6, IFNa, TNF, NO
    - **ALL H2O2 is dismutated in the venous circulation in seconds**
- ECF
  - No H2O2 left But Increased Cytokine cascade → Immune stimulation
  - **No H2O2 delivered to the cells**

Ozone IV:

- IV → Ozone → H2O2 & LOPs
- Plasma
  - H2O2 –catalase/Mn→ H2O+O2 →Plasma cytokine stimulation:
    - IL-1,IL-2, IL-6, IL-8, IFNa, TNF, NO, TGF-B
    - **ALL H2O2 is dismutated in the venous circulation in seconds**
- ECF
  - No H2O2 left But Increased Cytokine cascade → Immune stimulation
  - **No H2O2 delivered to the cells**
  - **Lipid mediator stimulation**

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So clinically:

- The very sick patients you need to support their antioxidant pathways FIRST!
  - Low dosage ozone 5-10 mg/ml
  - Glutathione and precursors (Se, NAC, B5, Mg)
  - Alpha lipoic acid
  - Low dose Vitamin C
  - Vitamin E
  - CoQ10
  - Curcumin (remember this also helps the person with chronically low glutathione levels)

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Dangers

- Too high concentration ozone
- Not proper anti-coagulation and equipment
- Direct IV ozone can be DANGEROUS, remember 10-60 cc gas can cause pulmonary embolism
- Deaths associated with using improper ozone generators.

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Dangers

- Don't ever inhale ozone!
  - **The bronchial-pulmonary system is very sensitive to ozone.**
  - **The anti-oxidant pathways are much weaker than other tissues in the eyes, nasal and bronchial pathways.**

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21

Summary

- Ozone pharmacological action is believed to be due to LOPs and H202.
- Medical ozone is safe and effective with proper use and materials.
- Proper work up is necessary
- Medical ozone is mostly <5% ozone.
- Ozone does NOT sterilize in vivo

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Acute and chronic bacteria, virus and fungi:

- Does not directly sterilize blood!
  - Most pathogens are sensitive to ozone suspended in water or saline.
  - However, research has shown suspended aqueous medium with 5-10% human plasma bacteria remain with up to 325 mcg/ ml ozone.
    - This strength ozone would be so high it would destroy blood cells and denature proteins!

Bocci, V. Ozone. A New Drug 2nd Ed. 2011. Department of Physiology University of Siena

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Immune: Bacteria

- Bacteroid
- Campylobacter
- Clostridium
- Corynebacterium
- Escherichia
- Klebsiella
- Legionella
- Mycobacteria
- Propriobacteria
- Pseudomonas
- Salmonella
- Shigella
- Staphylococcus
- Streptococcus
- Yersinia

Sunnen, Gerard. Townsend Letter June 2020.

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Immune: Virus

- Hepatitis B & C
- HIV 1 & 2
- Influenza A & B
- West Nile
- Togaviridae
- Eastern and Western Equine encephalitis
- Rabies
- Filiviridae (Ebola, Marburg)
- Coronaviridae (Covid-19, SARS, MERS)
- Adenoviridae

Sunnen, Gerard. Townsend Letter June 2020.

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Immune: Fungus

- Actinomycoses
- Aspergillus
- Candida
- Cryptococcus
- Epidermophyton
- Histoplasma
- Microsporum
- Trichophyton

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Acute and chronic bacteria, virus and fungi:

Chronic osteomyelitis and Bed sores:
- Bocci's treatment with Major autohemotherapy and topical ozonated oils

Helicobacter Pylori:
- Sensitive to ozone. (Baker et. Al, 2002), but no clinical studies.

Giardia and Cryptosporidium:
- Compared to standard metronidazole ozone showed the best outcomes with improvement in 66.1% and cure in 40.3 % (n=186) (Giardia)
- Cryptosporidium 79% cure rate with 10 days oral capsules ozonated oil.

Bocci, V. Ozone. A New Drug 2nd Ed. 2011. Department of Physiology University of Siena

Mendez, Peres. Ozone therapy in malabsorption syndrome caused by Giardia lamblia parasite. Revista Cubana de Investigaciones Biomedicas. 2003.

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Acute and chronic bacteria, virus and fungi:

Fungi:
- Tinea due to Trichophyton rubrum or Candida albicans
  - Phase III Trial (n=400) 1-2 drops ozonated oil x 3 months led to cure in 90.5%

Vaginal infections:
- Ozonated water and oil for treatment of Chlamydia, Candida, and Trichomonas.

Malaria:
- No sufficient data

Bocci, V. Ozone. A New Drug 2nd Ed. 2011. Department of Physiology University of Siena

Mendez, Peres. Et al. Efficacy of ozonized sunflower oil in the treatment of tinea pedis. 2002 Mycoses 45:329-332

Mendez, Peres, et al. Therapeutic efficacy of topically Oleozon in patients suffering from onychomycosis, Myocoses in press

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Acute and chronic bacteria, virus and fungi:

HIV:
- Can help support chronic oxidative stress adaptation, support hyperlipidemia, support hormone and general euphoria.
- No conclusive evidence on lowering viral counts or "cure"

Chronic Hepatitis B and C:
- Clinical trial by Prof. Nabil Mawsouf of 60 patients with chronic HCV treated with 150 ml blood in AHT twice weekly for 3 months.
  - Showed up to 95% decline of viral load and improvement in transaminase levels
  - No side effects reported
  - Hepatitis B not much research due to effectiveness of the vaccination

-Bocci, V. Ozone. A New Drug 2nd Ed. 2011. Department of Physiology University of Siena
-Mawsouf, N. et al. Ozonetherapy in HCV infections, in Ozonhandbuch. Grundlagen Pravention, therapie, Ecomed, Landsberg, in press

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Acute and chronic bacteria, virus and fungi:

Herpes Simplex
- IM injections ozone Minor Autohemotherapy + ozonated oils topically
- Some small clinical studies

Herpes Zoster especially PHN
- Anesthetics and ozone effective in preventing PHN and resolving pain in 3-4 days. Used AHT and injections by ganglion
- Study by Oliwin in 1997 found minor AHT without zone with 10 ml blood was effective in eliminating clinical sequelae in 8/12 thoracic pain, 9/9 ophthalmic and 1 lumbar.

Consider Minor AHT with or without ozone and topical treatments for Herpes Zoster patients.

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Acute and chronic bacteria, virus and fungi:

HPV

- Direct gas injections
- Topical ozonated oils
- Vaginal instillations of ozonated water
- No conclusive studies mostly cases

Common Cold

- Typically lasts 4-9 days, can reduce to 3-4 days with:
  - Nasal aspiration of ozonated waters every 3-5 hours. (Burn for 10-15 seconds)
  - Nasal ozonated oils inhaled.

Bocci, V. Ozone. A New Drug 2nd Ed. 2011. Department of Physiology University of Siena

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31

Ebola?

Rowen et al., Afr. J. Infect. Dis. (2016) 10 (1): 49– 54
http://dx.doi.org/10.4314/ajid.v10i1.10

RAPID RESOLUTION OF HEMORRHAGIC FEVER (EBOLA) IN SIERRA LEONE WITH OZONE THERAPY

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Abstract

Background: Ebola Virus Disease (EVD) has ravaged three countries in West Africa. The mortality rate is extremely high, and it is perceived not only as threat to all of Africa but to the entire world. There is no known treatment to date other than administration of convalescent blood or experimental monoclonal antibodies, which both often fail. Ozone therapy (OT) has been in clinical use for decades and has been found to have physiological effects, which should directly inactivate the virus itself, as well as modulate its damaging effects. We present the scientific background and the possibility of ozone therapy as a cure or prevention for EVD in five consecutive patients.
Materials and Methods: Ozone therapy administration by a combination of direct intravenous gas administration, rectal gas administration and ozonized water was administered to three patients with known acute EVD, one with apparent acute infection, and one case of extremely high risk. Treatment was carried out for up to ten days despite first total remission of symptoms. Vitamin C and glutathione supporting supplements were administered.
Results: Four symptomatic patients, three with test positive EVD confirmation and one (who suffered Ebola contaminated needle stick contamination three days earlier) without lab confirmation all resulted symptoms within 2-4 days and fully recovered. All four ill cases had an immediate recovery course upon initiation of therapy. The single case of non-symptomatic high-risk exposure treated preventively did not develop symptoms.
Conclusion: Ebola virus may have a very narrow window of redox infectivity capacity, which can be easily exploited with OT. OT may be a useful modality in EVD and other viral diseases and should be immediately studied to save lives that might otherwise be lost.

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32

REVIEW

Ozone and oxidation therapies as a solution to the emerging crisis in infectious disease management: a review of current knowledge and experience

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Abstract

Medicine faces crisis with emerging "super bugs," lethal viruses (Ebola), and stealth pathogens such as tick-borne infections. Thousands are dying worldwide of once easily treatable diseases. Ozone therapy, extensively studied, may be a valuable adjunctive or stand-alone therapy. Ebola again ravages Africa with over 2000 already dead, carrying a 65% mortality rate. The world desperately needs safe, inexpensive and effective anti-infective therapy to which microbes will not develop resistance. Oxidation therapies have shown an extremely high safety profile, lacking credible reports of significant injury beyond vein irritation. Ozone therapy, the most studied and least expensive to perform, is in itself a germicide, not an antibiotic, and improves several physiological parameters essential for infection defense. Recent reports indicate very favourable responses to both bacterial and viral disease, inclusive of Ebola. Despite lack of commercial profitability (not patentable), medicine would do well to revisit its pre-antibiotic era oxidation therapy roots, especially ozone in the current crisis.

Key words: ozone therapy; Ebola; infection therapy; antiviral; antimicrobial; antibiotic; germicide; immune modulation; biofilm; Lyme disease

doi: 10.4103/2045-9912.273962
How to cite this article: Rowen RJ. Ozone and oxidation therapies as a solution to the emerging crisis in infectious disease management: a review of current knowledge and experience. Med Gas Res. 2019;9(4):232-237.

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33

Covid-19

Science, Public Health Policy, and The Law
Volume 2:4-22
July, 2020
Clinical and Translational Research

An Institute for Pure and Applied Knowledge (IPAK) Public Health Policy Initiative (PHPI)

IPAK PHPI

A Novel Approach to Treating COVID-19 Using Nutritional and Oxidative Therapies

David Brownstein, M.D. [4], Richard Ng, M.D. [1], Robert Rowen, M.D. [1], Jennie-Dare Drummond, PA [1], Taylor Eason, NP [1], Hailey Brownstein, D.O. [1], and Jessica Brownstein [¶]

Abstract

Objective: This report is a case series of consecutive patients diagnosed with **COVID-19** treated with a nutritional and oxidative medical approach. We describe the treatment program and report the response of the 107 **COVID-19** patients.
Study Design: Observational case series consecutive.
Setting: A family practice office in a suburb of Detroit, Michigan.
Patients: All patients seen in the office from February through May 2020 diagnosed with **COVID-19** were included in the study. **COVID-19** was either diagnosed via PCR or antibody testing as well as those not tested diagnosed via symptomology.
Interventions: Oral Vitamins A, C, D, and iodine were given to 107 subjects (99%). Intravenous solutions of hydrogen peroxide and Vitamin C were given to 32 (30%) and 37 (35%) subjects. Thirty-seven (35%) of the cohort was treated with intramuscular ozone. A dilute, nebulized hydrogen peroxide/saline mixture, with Lugol's iodine, was used by 91 (85%).
Main Outcome Measures: History and physical exam were reviewed for **COVID-19** symptoms including cough, fever, shortness of breath, and gastrointestinal complaints. Laboratory reports were examined for **SARS-CoV-2** results. Symptomatic improvement after treatment was reported for each patient consisting of *first improvement, mostly better*, and *completely better*.
continued on next page

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34

Covid-19

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International Immunopharmacology
journal homepage: www.elsevier.com/locate/intimp

Short communication

Oxygen-ozone (O_2-O_3) immunoceutical therapy for patients with COVID-19. Preliminary evidence reported

Marianno Franzini[a,b], Luigi Valdenassi[c,d], Giovanni Ricevuti[e], Salvatore Chirumbolo[f,*], Markus Depfenhart[e], Dario Bertossi[e], Umberto Tirelli[e,g]

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[f] Department of Surgery, Dentistry, Paediatrics and Gynaecology Unit of Maxillo-Facial Surgery, University of Verona, Verona, Italy

ARTICLE INFO

Keywords:
Ozone therapy
Immunoceutical
Oxygen
COVID-19
Pneumonia
D-dimer
IL-6

ABSTRACT

Objective: This study evaluated the potential efficacy of a novel approach to treat COVID-19 patients, using an oxygen-ozone (O_2-O_3) mixture, via a process called Oxygen-Ozone- Immunoceutical Therapy. The methodology met the criteria of a novel, promising approach to treat successfully elderly COVID-19 patients, particularly when hospitalized in intensive care units (ICUs) **Experimental design:** We investigated the therapeutic effect of 4 cycles of O_2-O_3 in 50 hospitalized COVID-19 subjects suffering from acute respiratory disease syndrome (ARDS), aged more than 60 years, all males and undergoing non invasive mechanical ventilation in ICUs.
Results: Following O_2-O_3 treatment a significant improvement in inflammation and oxygenation indexes occurred rapidly and within the first 9 days after the treatment, despite the expected 14-20 days. A significant reduction of inflammatory and thromboembolic markers (CRP, IL-6, D-dimer) was observed. Furthermore, amelioration in the major respiratory indexes, such as respiratory and gas exchange markers (SaO_2/s_{in}, PaO_2/FiO_2 ratio), was reported.
Conclusion: Our results show that O_2-O_3 treatment would be a promising therapy for COVID-19 patients. It leads patients to a fast recovery from ARDS via the improvement of major respiratory indexes and blood gas parameters, following a relatively short time of dispensed forced ventilation (about one to two weeks). This study may encourage the scientific community to further investigate and evaluate the proposed method for the treatment of COVID-19 patients.

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Autoimmune:

<u>Weakest amount of research is in Autoimmune disease:</u>

Rheumatoid arthritis

- Case studies of improvement with 25% reduction in pain with minor autohemotherapy

Multiple Sclerosis

- No studies

<u>DON'T PUSH OXIDATIVE THERAPIES during Autoimmune Flare!</u>

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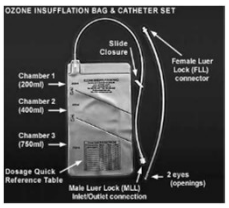
36

Rectal Insufflation:

- 100-800 ml ozone gas (10-50 mcg/ml) or ozonated water
- Measured increase in oxygen and LOPs in portal vein, jugular vein 30-60 min. after use. Parameters returned to baseline in 24 hours.
- Possible equivalent to Ozone AHT.
- No serious adverse reports
- Best use: GI infections or people who can't do MAH



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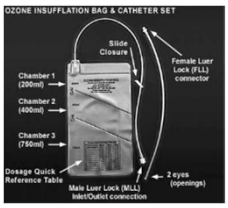
Vaginal Insufflation:

- 100-800 ml ozone gas (10-25 mcg/ml) Or ozonated water
- No serious adverse reports
- Best use: HPV, Vaginitis, Yeast infections



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Strongly consider mask: 2097 or 2128

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Rectal Insufflation

Improvement

- 94 patients
- 100% = 5.3%
- 75% = 19.1%
- 50% = 20.2%
- 20% = 32.9%
- None = 22.3%
- >50% = 44.6%

Side Effects

- Total = 0
- Severe = 0
- Moderate = 0
- # Pts w SE = 0

Presented at AAOT 2019

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Limb bagging:

- Use a PVC free bag. Use coban wrap to secure
- Tinea, staph infections, rashes

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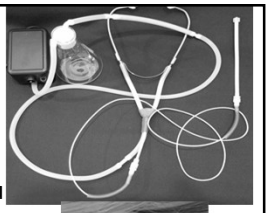
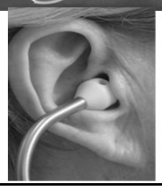
Ear Insufflation:

- Continuous flow (80-100 mcg/ml).
- 10-15 minute sessions. DO NOT EXCEED 15 minutes.
- (If you don't have stethoscope you can to straight injection insufflations with 60 ml syringes. (120 ml each ear slowly, used damp cotton ball in ear canal opening).
- Best use: Ear infections, Sinusitis





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42

Nasal Insufflation:

- Continuous flow (40-60 mcg/ml).
- 10-15 minute sessions. DO NOT EXCEED 15 minutes.
- (If you don't have nasal cannula you can do straight insufflations with 60 ml syringes. Must BE VERY CAUTIOUS not to directly inhale into lungs.
- Best use: Sinusitis, MARCONS, Mold

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43

Ozonated Oils:

- Made with coconut, sunflower, olive, etc. oils.
- Best use: topical rashes, tinea

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44

Ozone minor autohemotherapy:

- 3-5 ml blood is mixed with 3-5 ml ozone and then re-injected intramuscular
- 5 – 40 mcg/ml ozone
- Mix blood and ozone without anticoagulant in syringe
- Frequency 2-3 times per week
- Rational: Protein therapy that once injected likely activates local monocytes and neutrophils, then once absorbed into the lymphatics upregulates cytokines.
- **Anecdotal data only.**
- No adverse SE reported.
- **Best use:** HSV 1&2

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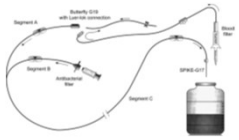
45

Ozone major autohemotherapy:

- 50 – 250 ml blood taken from patient mixed with ozone (10 – 40 mcg/ml)
- Some techniques use 1:1 (blood:ozone)
- Some techniques use 1:2 (blood:ozone)
- EXTREMELY important to use PVC and DHEP Free plastics (hard plastic). It is preferred to use sterile GLASS. (REMEMBER OZONE is unstable and reacts easily!)
- If ozone is bubbled through blood, the gas at the top is O2



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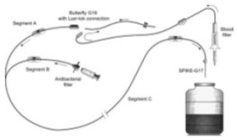
46

Ozone major autohemotherapy:

- Large quantities >100 blood, need a separate line to draw blood.
- Anti-coagulant must be used:
  - 3.13-3.8% Citrate or Heparin
  - 10 ml citrate per 90-100 ml blood
  - 15-20 IU Heparin per ml blood
- Don't use the same line to infuse, this increases the risk of clotting in the line!
- Always use a **blood admin set!** This catches, blood clots! A regular line will always clot due to filter size.



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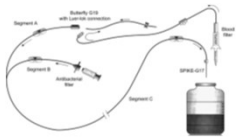
47

Ozone major autohemotherapy:

- Never run in rapidly!
- Always us anti-coagulant
- Use glass when possible especially large Volume
- DON'T use anti-oxidants on the same day
- Selecting anti-coagulants
  - **Sodium Citrate:** Can be a safer choice
    - Caution with Hypocalcemia.
  - **Heparin:** May cause dyscoagulation
    - Severe hemorrhage for patients on: anticoagulants, antiplatelet, thrombolytic agents, hepatic disease, low prothrombin.
    - Can induce thrombocytopenia and platelet micro-aggregation using ozone concentrations near 80 gamma.
    - Heparin increases growth factor release from platelets and cytokines from leukocytes



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48

MAH

Improvement
- 1,605 patients
- 100% = 4.6%
- 75% = 22.7%
- 50% = 23.2%
- 20% = 26.7%
- None = 22.5%
- >50% = 50.5%

Side Effects
- Total = 0
- Severe = 12 (0.73%)
- Moderate = 29 (1.76%)
- # Pts w SE = 41 (2.5%)

Presented at AAOT 2019

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49

DIV

Improvement
- 181 patients
- 100% = 4.4%
- 75% = 13.8%
- 50% = 13.8%
- 20% = 25.9%
- None = 22.5%
- >50% = 41.9%

Side Effects
- Total = 0
- Severe = 6 (3.3%)
- Moderate = 65 (35.9%)
- # Pts w SE = 139 (76.7%)

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50

Side Effects

- DIV: Moderate = 35.9% Severe = 3.3% **Total = 39.2%**
- MAH: Moderate = 1.76% Severe = 0.73% **Total = 2.49%**
- Sauna: Moderate = 0.48% Severe = 0 **Total = 0.48%**
- Rectal Insufflation: Moderate = 0 Severe = 0 **Total = 0**
- Saline: Moderate = 0 Severe = 0 **Total = 0**

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Hyperbaric Ozone "Multiple Pass High Dose"

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52

Development:

Originally developed by Dr. Lahodny.
- Finding wounds and infections changing in days vs. weeks.
- Increased stem cell production

- See cellulitis disappear in 2-3 days
- Astonishing Lyme disease results seen in the ozone community

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53

Indications:

- **Antioxidant supportive (Lower doses 10 mcg/ml or less)**
  - Paradoxical up regulation of antioxidants
  - Immune regulation

- **Pro-oxidant (40+, Most doing 70 mcg/ml) (200 ml blood x 70 mcg/ml x 10 passes = 140 mg)**
  - Virus, Lyme, Cancer
  - Cytokine stimulation
  - Stem cell stimulation

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54

Indications:

- Lyme (10+ treatments)
- Chronic EBV, CMV, HHV-6, Influenza, etc. (10 + treatments)
- Chronic M. pneumonia, C. pneumonia, Chronic Strep (PANS/PANDAS),etc. (6-10 treatments)
- Increase stem cell production (6-10 treatments)
- Oxygenation of system

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55

Advantages:

- Closed system
- Can be easy to use depending on the machine you have
- Faster results
- Clinical results in as little as 1 treatment.

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Disadvantages:

- Expensive for the patient (Average cost $650 - $1500 per treatment)
- 1-2 hours time with a tech
- Doesn't work well in poor veins due to catheter size and pressure.
- Using larger doses of heparin
- Less evidence, no research trial yet on this treatment

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57

Work up and treatment outline:

History
Physical Exam
History of bleeding disorders
Labs: (Within 4-6 weeks minimum, maybe sooner)
- **CBC**
- **CMP**
- **Quantitative G6PD**
- Lipids
- *PTT, PT, INR (Highly recommended)*
- Possible clotting factors if suspect in history

Medications? And timing….

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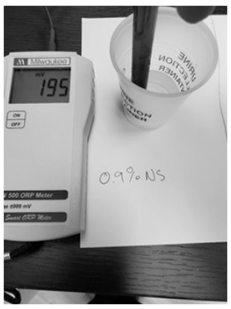
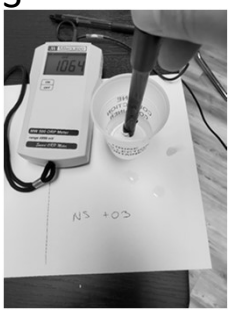
0.9% NS



O3



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59

0.9% NS

0 ppm

150-180 mlO3

Shake the bag

4.2 ppm
Or
1050 mcg

https://sensafe.com/exact-micro-7-photometer/

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60

Contraindications

G6PD deficiency
Thrombocytopenia < 50,000
Severe cardiovascular instability
Hemochromatosis
Active convulsions
Acute massive hemorrhage
Toxic hyperthyroidism
Active infusions or treatments with iron or copper

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61

Caution

- Patients on blood thinning medications. Use less heparin.
- Patients with history of clots (may need more heparin)

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62

63