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Research Article

A Comparison of Pain Levels of Patıents Receiving Major Ozone Therapy Due to Chronic Pain

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Abstract

Ozone molecule is a molecule with three atoms, which is a cousin of oxygen. It is created by the generator current applied to the oxygen molecule. In this study, we aimed to investigate the analgesic effect of ozone by comparing the pain levels of patients with severe ozone therapy. Patients of both sexes with severe pain who applied to the GETAT application research center between 2019 -2021 were included in the study. Demographic data of the patients were recorded, and pain severity was questioned with VAS. Chronic patients with a VAS score of 3 or more were included. Major ozone therapy was applied for 5 sessions by obtaining informed consent form from the patients. Starting from 10 µgr / mL, the dose was increased by 10 times in weekly sessions and increased to 50 µgr / mL. Most beneficial cr pain groups vas values; lumbar disc herniation; VAS10 to 2, fibromyalgia; 8 to 2, osteoarthritis; 9 to 3, heel spurs; 8 to 1, revical disc herniation; 8 to 4, ankylosing spondylitis; 10 to 5 decline can be listed. Major ozone therapy appears to provide a significant reduction in pain levels in patients with chronic pain. It can be used as a complementary method in appropriate patients in cases that do not respond to conventional therapy.

Key words: ozone therapy, chronic pain, vas

Introduction

Ozone molecule is a molecule with three atoms, which is a cousin of oxygen. It is created by the generator current applied to the oxygen molecule ($3O_2 + 68.4$ kcal $\rightarrow 2O_3$). It is obtained from pure oxygen that is subjected to voltage at a certain flow rate with the help of devices called medical ozone generators. The composition of medical ozone gas is a mixture of oxygen and ozone gas. The ozone dose unit used in medical applications is "gamma"; it is expressed as the ozone concentration in µg / ml, that is, 1 ml of gas. It has been shown that ozone is also produced in the human body [1].

Ozone molecule is a very unstable molecule and can easily enter into chemical reactions and easily create a biological response. Ozone gas is soluble in liquids like other gases according to Henry's law, and it is determined that it is 10 times more soluble than oxygen [2].

Ozone can also be dissolved in plasma, arterial-venous blood, water, saline and vegetable, especially olive oil, in the body [3]. Since the ozone molecule is an unstable molecule, it transforms into more stable oxygen and ozonoid molecules in a short time [4, 5] .Ozonoid molecules also turn into superoxide radicals and lipid peroxidation products [6, 7, 8]. Super oxides (half-life 2 seconds-2.5 minutes), early phase lipid peroxides (half-life 4.5 minutes-4 hours), which are responsible for the biological effects of intermediate molecules formed in ozone therapy, are held responsible for the late effect.

The mechanism of action of ozone doses is explained by the hormonal effect. It cannot be explained by pharmacological standards. Absorption, distribution metabolism and excretion are outside of its pharmacological principles [3, 9]. Ozone therapy can show an immunostimulator at low doses, an immunomodulator in medium doses, and an immunosuppressive effect at high doses. Ozone dose and biological effects do not show a linear relationship [10].

Ozone therapy is also used in the treatment of covid-19 due to its anti-inflammatory, immune modulator, oxygenation, circulation regulator, oxidant-antioxidant effects. Ozone therapy is used in prophylaxis due to its immune system and antioxidant system activation effects. It is used with antiviral effect by making oxidation effects. In the chronic period, it is used in the treatment of fibrosis remaining in the lung tissue. The most important effect of ozone therapy is that it activates the antioxidant system by creating acute oxidative stress (glutathione peroxidase, catalase, superoxide dismutase). When the antioxidant systems are strongly stable, it increases ATP production in mitochondria.

In this study, we aimed to investigate the analgesic effect of ozone by comparing the pain levels of patients with severe ozone therapy.

Method

Patients of both sexes with severe pain who applied to the GETAT application research center between 2019- 2021 were included in the study. Demographic data of the patients were recorded, and pain severity was questioned with VAS. Chronic patients with a VAS score of 3 or

more were included. Major ozone therapy was applied for 5 sessions by obtaining informed consent form from the patients. Starting from 10 µgr / mL, the dose was increased by 10 times in weekly sessions and increased to 50 µgr / mL. The criteria for exclusion were determined as follows:

Acute Bleeding Diseases (MI, SVA-first 21 days)

- Patients with GL-6-P-D enzyme deficiency.
- Pregnancy (especially the first trimester - risk of mutagenicity).
- Taking anticoagulants and ACE inhibitors
- Hyperthyroidism (because it increases metabolism)
- Thrombocytopenia and severe bleeding.
- In situations where TAS is very weak.
- Those with Organ Transplantation

Major otohemotherapy

In a single session: 50-300 cc, maximum 750 cc within 2 hours, maximum 3 liters of blood should be used in a day. Equal blood and gas volume is required for homogeneous mixing (It should be mixed at least 3-5 minutes, and reinfused for 20 (15-40) minutes on average.

The elasticity and deformability of erythrocytes increase, blood can circulate better in microcirculation, tissue oxygenation increases. A significant decrease was observed in the proinflammatory cytokines (IL-6,8,10, and Fibroblast growth factor levels of ozone therapy used in soft tissue infections of type 2 diabetes patients [8, 20].

Results

40 male and 61 female patients were included in the study. A total of 101 patients participated. There were diagnoses of chronic pain (fibromyalgia, osteoarthritis, lumbar disc herniation, ra, migraine, heel spur, cervical disc hernia, ankylosing spondylits, headache). The demographic data table of the patients is below. 60.40% of the patients are female and 39.6% are male. Except for ecchymosis caused by difficult-opened vascular access and citrate, no side effects were encountered in the patients.

Value	Age	Kg	Length	BMI	VAS 1	VAS 2
Mean	48.95	76.16	167.4	27.18	7.605	4.657
Median	47.50	75.00	165.0	26.45	8.000	4.000
Standard deviation	13.89	13.75	9.479	4.535	2.034	2.313
Minimum	18.00	40.00	150.0	12.35	1.000	1.000
Maximum	89.00	110.0	198.0	39.44	10.00	10.00

Between the vas values of the patients before and after ozone, the p test result: the vas value after the treatment was found to be statistically significantly lower.

Paired Samples T-Test					
			statistic	**df**	**p**
vas1	vas2	Student's	5.922	34.00	< .001

Most beneficial cr pain groups vas values; lumbar disc herniation; VAS10 to 2, fibromyalgia; 8 to 2, osteoarthritis; 9 to 3, heel spurs; 8 to 1, revical disc herniation; 8 to 4, ankylosing spondylitis; 10 to 5 decline can be listed.

Discussion

Although there are different opinions in different centers, it is accepted that giving ozone amount between 10µg and 80µg per mL blood for ozone dose is within the safe therapeutic range [12, 13]. The threshold value at which ozone gas begins to have an antioxidant effect in the sources has been determined as 15-20 µg / mL. The number of 6 MAH treatment sessions and the medical ozone dose to be applied; varies depending on the age, general condition and disease of the patient.

Ozone therapy has widespread use in musculoskeletal diseases. It was emphasized by Magalhaes et al. That in patients with low back pain due to disc herniation, ozone application to intradiscal and paravertebral muscles has very few side effects and can be applied as an alternative treatment before surgery or in cases where there is no response to conservative treatment [13]. A decrease in spinal discogenic pain and radicular pain was observed with intradiscal ozone application; It has been suggested that herniated material may shrink [14, 15]. In patients with rheumatoid arthritis, a decrease in TNF-α in synovial fluid and a decrease in nitric oxide rates with lipid peroxidation products have been observed in patients with different doses of ozone. It has been stated that medical ozone can be added as an alternative to the treatment of patients with rheumatoid arthritis [16, 17].

Intraarticular ozone injection has been shown to be effective on pain, functional capacity and quality of life in patients with osteoarthritis [18]. It was stated that myofascial pain syndrome, tendinitis, acute and chronic polyarthritis, morton neuroma, intraarticular and periarticular injection reduced pain, inflammation regressed and tissue oxygenation increased, but it was emphasized that further randomized controlled studies are needed [19].

Melhindo et al. studied 38 patients with acute L5 or S1 radiculopathy. The patients were randomly divided into two groups: A) 20 patients were treated with lumbal paravertebral ozone injections B) 18 patients received pharmacological treatment with anti-inflammatory - analgesic drugs. Pain intensity and treatment outcome were evaluated using the Visual Analogue Scale (VAS) and the Oswestry Disability Index. Pain relief and discomfort, oxygen-ozone injections and pharmacological treatment patients found a difference in response when compared after one week, this response was statistically different after two weeks; After 3 and 6 months, 80% of the patients who received ozone injection treatment and half of the patients who were treated pharmacologically were painless [20].

Conclusion

Major ozone therapy appears to provide a significant reduction in pain levels in patients with chronic pain. It can be used as a complementary method in appropriate patients in cases that do not respond to conventional therapy.

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