Successful Treatment of Chronic Osteomyelitis in a 68-Year-Old Woman Using IV Major Ozone Therapy: A Case Report

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- Osteomyelitis is a severe infection of bone and bone marrow.

Pyogenic Osteomyelitis

- Pyogenic osteomyelitis almost always caused by bacteria, rarely by fungi
- The organism may reached the bone
  - (1) through the blood stream (hematogenous)
  - (2) by extension of contiguous infection
  - (3) by direct traumatic (including surgical)

The last two pathways account for most cases in developed countries.

In developing world hematogenous osteomyelitis is more frequent.

Pyogenic Osteomyelitis

- If unrecognized or inadequately treated , the infection may persist to become chronic (about %20 of cases)
- Many infections resolve spontaneously, or aborted by antibiotics
- Almost any pathogen may be responsible but most often Staphylococcus aureus (%80-90)

- Proximal phalanx of big toe osteomyelitis is rare but can cause significant morbidity and disability.

- In diabetic patients with chronic penetrating skin ulcers, the risk of developing osteomyelitis in the toes and feet is significantly increased.

CASE REPORT

- 68-year-old woman with chronic osteomyelitis in the left big toe's proximal phalanx, which did not respond to aprox. 6 month long conventional treatment.
- Risk factors: Diabetes mellitus, hypertension and hypercholesterolemia, PAD
- The patient presented to our clinic with pain and swelling in the left big toe and foot.

Diagnostic

- X-Ray
- Laboratory
- Arterial Doppler
- CT angiography

Tetkik Adi	Sonuç	Durum	Birim	Referans Arali
WBC	7.94		10^3/µL	4 - 10
RBC	4.67		10^6/µL	4 - 5.6
HGB	12.6		g/dL	12 - 16
HCT	40.2		%	36 - 46
MCV	86.1		fL	80 - 97
MCH	27.0		pg	27 - 31
MCHC	**31.3**	**(D)**	**g/dL**	**31.8 - 35.4**
PLT	268		10^3/µL	150 - 450
MPV	11.0		fL	9.1 - 11.9
IG%	0.1		%	0 - 0.6
LYMPH#	2.44		10^3/µL	0.6 - 3.4
MONO#	0.34		10^3/µL	0.29 - 0.95
NEUT#	5.03		10^3/µL	2 - 6.9
EO#	0.12		10^3/µL	0.03 - 0.59
BASO#	0.01		10^3/µL	0.01 - 0.07
LYMPH%	30.7		%	19.1 - 47.9
MONO%	**4.3**	**(D)**	**%**	**5.2 - 15.2**
NEUT%	63.4		%	41.0 - 70.7
BASO%	0.1		%	0.1 - 1.2
PCT	0.29		%	0.17 - 0.32
PDW	13.0		fL	10.1 - 16.1
RDW-SD	**50.9**	**(Y)**	**fL**	**37.1 - 45.7**
RDW-CV	**16.4**	**(Y)**	**%**	**12.1 - 14.3**
P-LCR	32.2		%	17.5 - 42.3
NRBC#	0.00		10^3/µL	-
IG#	0.01		10^3/µL	0 - 0.06
NRBC%	0.0		%	0 - 0
EO%	1.5		%	0.6 - 7.6

Tetkik Adi	Sonuç	Durum	Birim	Referans Araligi
TSH	1,054		ulU/mL	0.35 - 4.95
FT4	0.93		ng/dL	0.70 - 1.48
Vitamin B12	198		pg/mL	187 - 883
Folat (Folik asit)	8.7		ng/mL	3.1 - 20.5
Ferritin	18.81		ng/mL	4.63 - 204
CEA	3.74		-	Sigara İçmeyen Sigara İçen 0 - 5
CA 19-9	13.41		U/mL	0 - 37
CA 15-3	23.2		U/mL	0 - 31.3
CA 125	9.9		U/mL	0 - 35
Insulin (açlık)	12.1		mIU/mL	2.6 - 24.9
HOMA-IR	**5,94**	**(Y)**	-	**0 - 2.5**

Tetkik Adi	Sonuç	Durum	Birim	Referans Araligi
Glukoz (AKŞ)	**199**	**(Y)**	**mg/dL**	**74 - 109**
Kan Üre Azotu	14		mg/dL	8 - 23
Kreatinin	0,6		mg/dL	0.5 - 0.9
Ürik Asit	4,9		mg/dL	2.4 - 5.7
Kolestrol	192		mg/dL	< - 200
LDL	109		mg/dL	< - 130
HDL	61		mg/dL	> - 65
Trigliserid	112		mg/dL	< - 150
SGOT (AST)	18		U/L	0 - 35
SGPT (ALT)	22		U/L	0 - 33
ALP	62		U/L	35 - 130
Total Bilirubin	0,3		mg/dL	0 - 1.2
Total Protein	7,6		g/dL	6.4 - 8.3
Albumin	4,9		g/dL	3.5 - 5.2
Kalsiyum	10		mg/dL	8.4 - 10.2
Fosfor	3,9		mg/dL	2.5 - 4.8
Sodyum (Na)	141		mmol/L	136 - 145
Klor (Cl)	**97**	**(D)**	**mmol/L**	**98 - 107**
Potasyum (K)	4,4		mmol/L	3.5 - 5.1
Demir	66		µg/dL	50 - 170
UIBC	283		µg/dL	135 - 392
TIBC	349		mg/dL	250 - 500
Transferrin Satürasyonu	18,9		%	14 - 45
Amilaz	50		U/L	28 - 100
LDH	180		U/L	125 - 243
CK	136		U/L	20 - 200
GGT	30		U/L	0 - 40
Magnezyum	1,6		mg/dL	1.6 - 2.4
ASO	4		IU/mL	0 - 200
CRP	0.0797		mg/dL	0.0 - 0.5
RF	3		IU/mL	0 - 13.9

CT Angiography

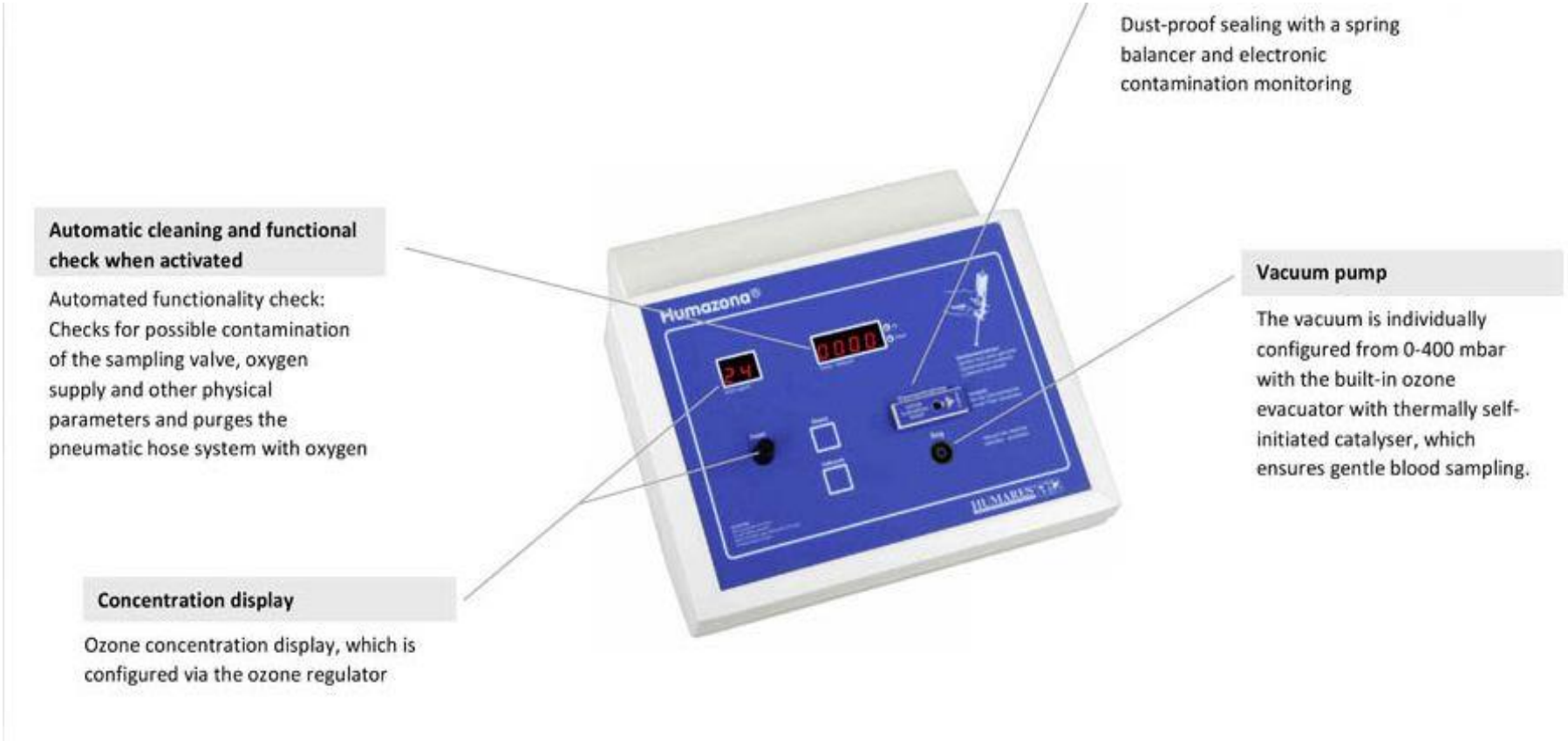
- CT angiography showed arterial insufficiency in the left lower extremity.
- Left internal iliac artery < %50 stensosis
- Left popliteal artery %20 stenosis
- Left anterior tibial artery %50 stenosis
- Left dorsalis pedis artery almost total oclusion

Treatment

- The patient was started on intravenous major ozone therapy, which consisted of 10 sessions twice weekly, followed 5 sessions twice monthly maintenance therapy.

- Each session 100 ml venous blood, together with an anticoagulant, is taken to an ozone-resistant bottle and exposed to 100ml - 30 microgram/ml ozone-oxygen mixture for a few minutes, soon after which it is re-infused into the venous circulation.

- In medical use the gas produced by medical ozone generator is administered in precise therapeutic doses

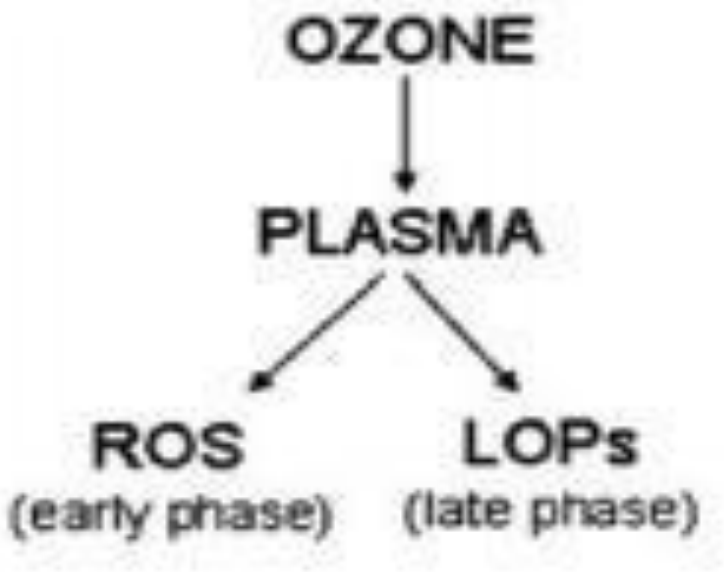


Medical ozone generators use photometer which allows to measure precise ozone concentrations (1-80 microgram/ml) in the ozone-oxygen mixture.

Acute Oxidative Stress

- When blood contacts with ozone, it reacts with blood cells and plasma in seconds.

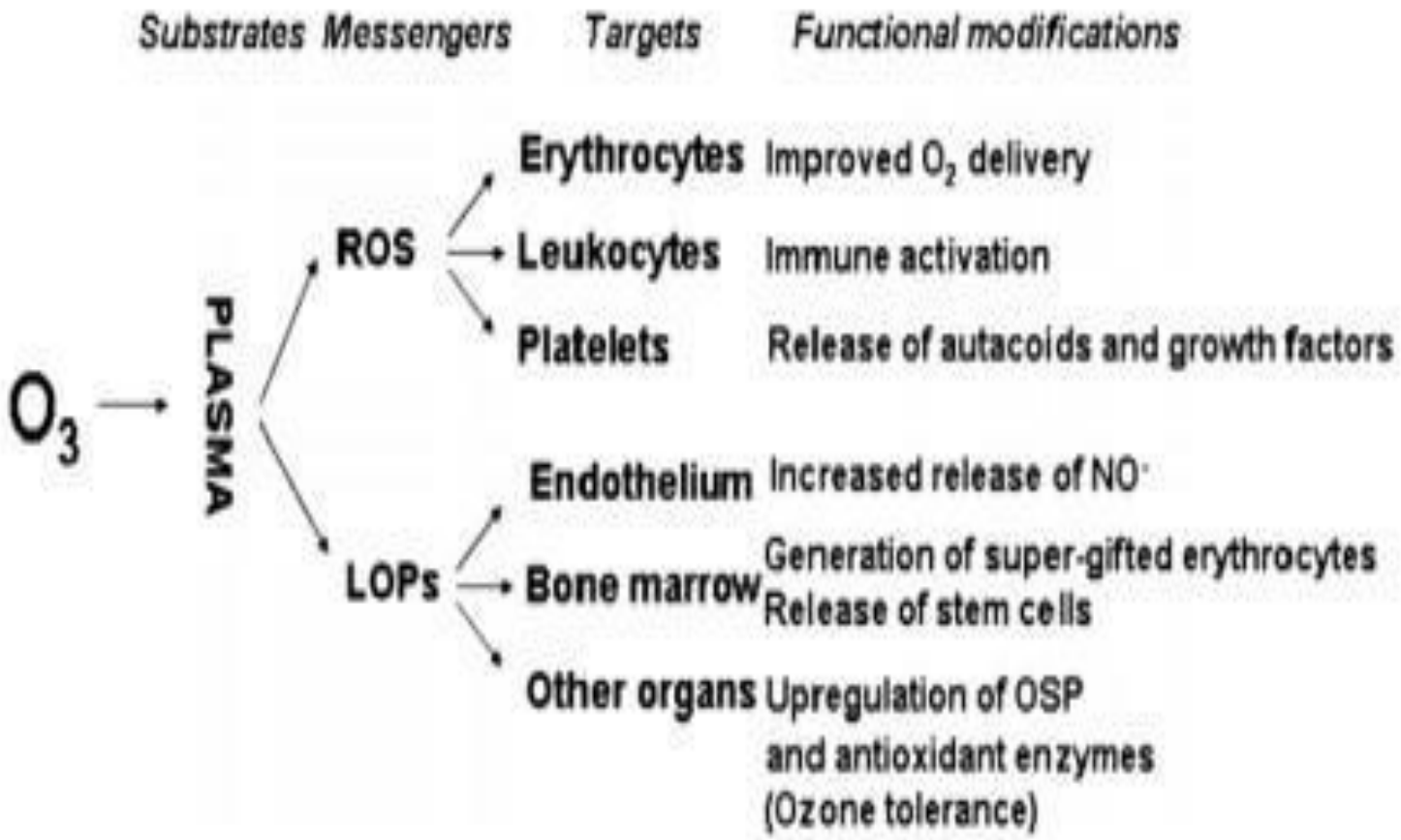
- This reaction can also be defined as an acute oxidative stress or a “therapeutic shock”.



During this reaction many messengers such as hydrogen peroxide, reactive oxygen species (ROS) and lipid oxidation products (LOPs) produced in blood sample and delivered by circulation to whole body.

ROS and LOPs are responsible for the biological and therapeutic effects of ozone.

Ozone, A New Medical Drug , V. Bocci



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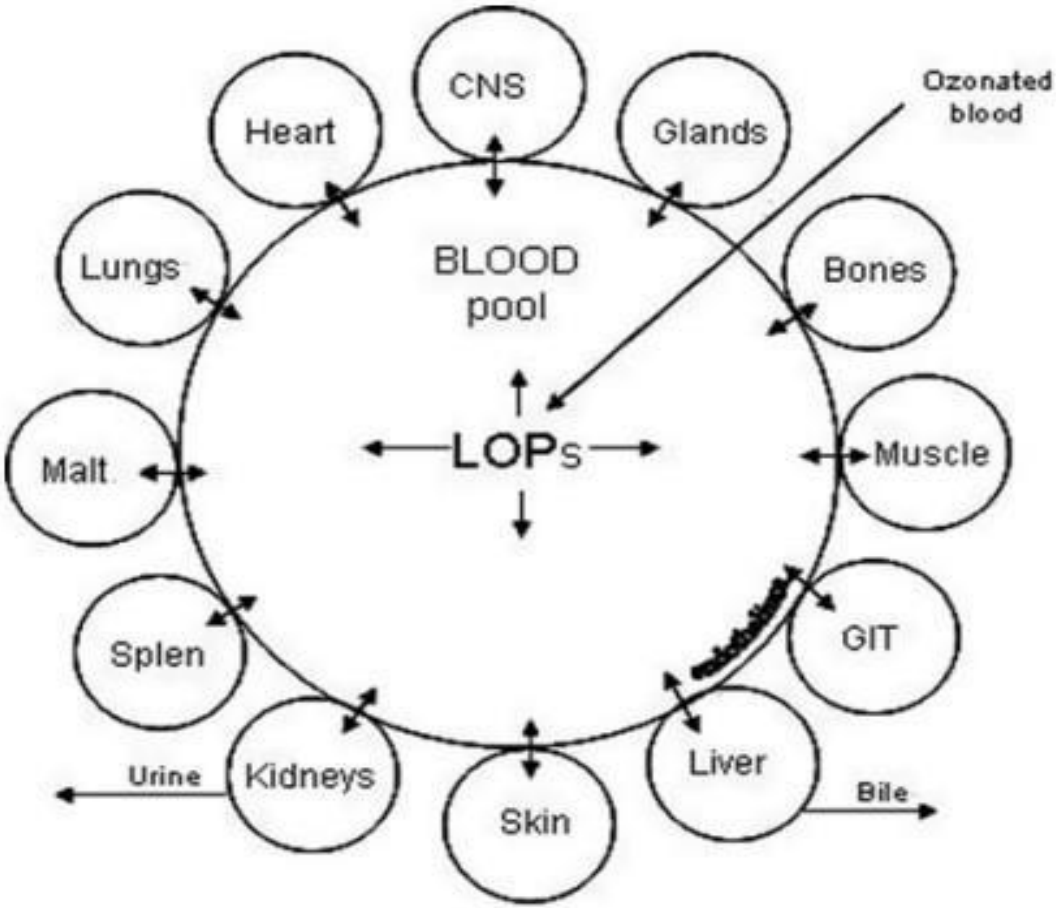

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Result

- Gradually, the swelling in the left big toe and foot subsided, and the patient stopped taking oral antibiotics.
- There were no signs of re-infection during the follow-up visits and an X-ray follow-up demonstrated total recovery, with no signs of osteomyelitis


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Conclusion

- Ozone therapy is a promising alternative treatment for chronic osteomyelitis, especially in patients who have not responded to conventional treatment methods.
- The therapy is safe, well-tolerated, and can be considered as a viable option in patients with chronic osteomyelitis who have limited treatment options. However, further studies are needed to confirm the efficacy of ozone therapy and its optimal dosing and administration regimens.