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HYPERBARIC OXIGENATION REGIMES IN THE COMPLEX TREATMENT OF PATIENTS WITH DIABETIC FOOT

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Introduction:

Diabetic foot is late complication of diabetes mellitus. As a result of neuroangiopathy and tissue hypoxia difficultly healing wounds and ulcers are developed. Even adequately treated diabetic foot may be the reason for disability and further lethal outcome. Hyperbaric oxygenation therapy is a clinical method for treatment with oxygen under high pressure which supplies tissues with 20 times more oxygen dissolved in the plasma. This is the way in which HBO leads to increase of oxygen content in the cells suffering hypoxia. Correction of results in the following effects:

1. Proliferation of fibroblasts and collagen production is stimulated.
2. Epithelisation is stimulated.
3. The increased oxygen needs meet the

increased oxygen supply.

4. The leucocytes ability to kill pathological bacteria raises.
5. Microcirculation is improved.
6. Neoangiogenesis is stimulated.

Purpose:

To analyze the results of four years experience of complex treating of diabetic foot including HBO therapy.

Materials and methods:

In the period 2003-2006 129 patients with diabetic foot were treated with HBO in the hyperbaric chamber of the Department of hyperbaric medicine as an addition to standard therapy.

The patients were selected by the following criteria :

1. No contraindications for HBO therapy
2. Patients with diabetic foot II-IV degree according Wagner classification
3. No effect of standard therapy

The severity of ischemia was defined by dopplerechographia. The infection was assessed by microbiological samples from the infected tissue.

The distribution of patients according to Wagner degrees was as followed:

- 31% (40 patients) - II degree



Fig.1. Diabetic foot of patient under HBO treatment

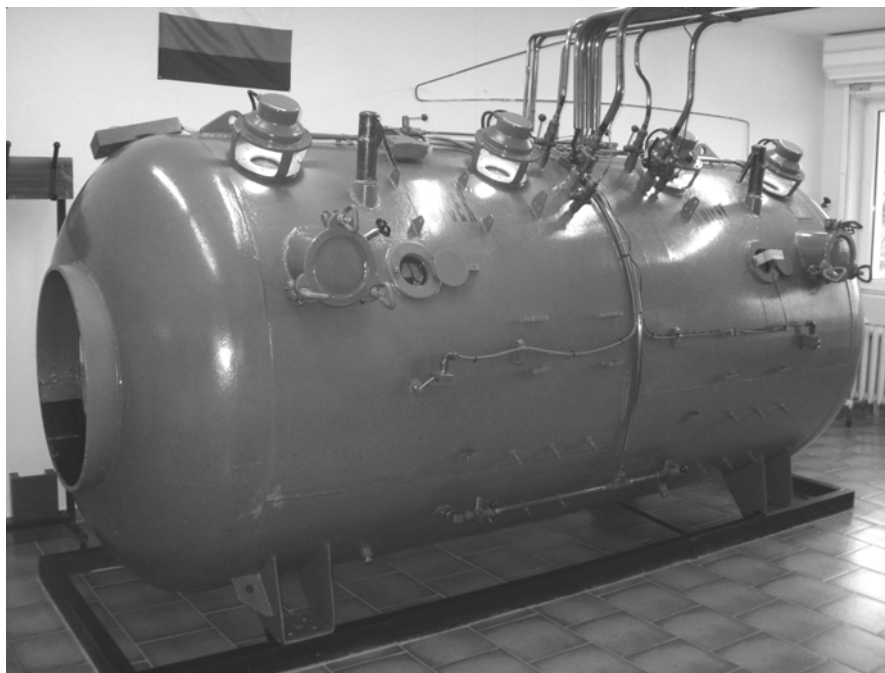


Fig. 2. Hyperbaric chamber in the Hospital Base for Active Treatment-Varna

41% (53 patients) - III degree
28% (36 patients) - IV degree

Object of the study were 129 patients with average age 66 years (from 36 to 81) - 78 males and 51 females. All of them were with diagnosis Diabetes mellitus from 5 years and more. 40 patients were with diabetic foot II Wagner degree, 53 -III degree and 36 - IV degree. Patients with I-st and V-th degree were not object of this study because in other our studies was established that these with I-st degree did not need HBO therapy and patients with V-th degree did not show

Treatments results

Wagner degree	Healing	With improvement	No effect	Total
II	34(85%)	6(15%)	-	40
III	36(67%)	13 (25%)	4 (8%)	53
IV	19(54%)	10 (27%)	7(19%)	36
Total	89 (69%)	29(22.48%)	11 (8.52%)	129

Number of HBO sessions

Group	Number of patients	HBO sessions	
		Total	Average
II	40	480	12
III	53	902	17
IV	36	811	22,52
Total	129	2193	18,8

any improvement. The patients were treated in multicompartiment hyperbaric chamber, breathing 100% oxygen under 2.5 ATA for 60 min every day 5 days per week. The number of HBO sessions is individually defined for each patient according to his state. For 129 patients 2193 HBO sessions were conducted, average 17 sessions per patient.

Results:

The results of the therapy were reported in three groups-healing, improvements and with no result. The results of the study are presented in Table 1.

The average number of the HBO sessions differs depending on the state. In the second degree the number of sessions is at least 12 while in IV- th degree is greatest 22.52.

Discussion:

Since 2000 our hospital had contract with National Health Security. This significantly raised the number of admitted patients and particularly these with diabetic foot, who had the chance to receive complex treatment - standard therapy combined with parallel HBO. We must note that the study suffers methodological problem, connected with lack of comparison - the received results with others in control group patients treated without HBO.

According to

some authors (15-21) the incidence of healing in similar groups is about 50-55%. According to Faglia the incidence of amputations in such groups is 33% to 8.6% in these treated with HBO, which is close to our results. Another author Doctor gave 46.6% for the control group to 13.3% for the group treated with HBO. Another disadvantage of the research is the lack of measurement of transcutaneous partial pressure of oxygen in the tissue. There are data that HBO therapy is effective, when supplying the wound area with oxygen partial pressure 1000mmHg.

Conclusion:

Although the methodological problems the received very good results and comparison with other similar studies confirm the HBO therapy as a good opportunity for additional therapy to the conventional treatment of diabetic foot. To be realized that a good collaboration between HBO centers and departments for registration and treatment of diabetic foot is necessary. The therapy of diabetic foot is socially significant because of prevention and slowing down the disability.

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Резюме

ГІПЕРБАРИЧНА ОКСИГЕНАЦІЯ В КОМПЛЕКСНОМУ ЛІКУВАННІ ПАЦІЄНТІВ З ДІАБЕТИЧНОЮ СТОПОЮ

Янева М.К., Бозов Ц.С, Георгієв К.П., Ставрев Д.Г.

Зроблено 4 річний огляд на лікування пацієнтів з діабетичною стопою методом гіпербаричної оксигенації, як доповнення до стандартного лікування. Лікувалися 129 пацієнтів віком від 36 до 81 року з діабетичним ускладненням II-IV ступеня по Wagner. З них 40 (31 %) з II ст., 53 (41 %) з III ст. і 36 (28 %) з IV ст. Проведено 2193 сеанси ГБО (або в середньому по 17 на людину). Стан пацієнтів оцінювали при клінічному огляді, мікробіологічному посіву пошкодженої тканини і ультразвуковим методом. Повне одужання спостерігали у 69 % пацієнтів, поліпшення – у 22,48 % і без ефекту – у 8,52 %.

Висновок - гіпербарична оксигенація

є доброю додатковою можливістю для лікування діабетичної стопи.

Резюме

ГИПЕРБАРИЧЕСКАЯ ОКСИГЕНАЦИЯ В КОМПЛЕКСНОМ ЛЕЧЕНИИ ПАЦИЕНТОВ С ДИАБЕТИЧЕСКОЙ СТОПОЙ

Янева М.К., Бозов Ц.С, Георгиев К.П., Ставрев Д.Г.

Приведен обзор 4 летнего опыта лечения пациентов с диабетической стопой методом гипербарической оксигенации, как дополнения к стандартному лечению. Лечили 129 пациентов в возрасте от 36 до 81 года с диабетическим осложнением II-IV степени по Wagner. Из них 40 (31 %) с II ст., 53 (41 %) с III ст. и 36 (28 %) и IV ст. Проведено 2193 сеанса ГБО (в среднем по 17 на пациента). Состояние больных оценивали при клиническом осмотре, микробиологическом посеве поврежденной ткани и ультразвуковым обследованием. Полное выздоровление наблюдали у 69 % пациентов, улучшение – у 22,48 % и без эффекта – у 8,52 %.

Вывод: гипербарическая оксигенация – хорошая дополнительная возможность для лечения пациентов с диабетической стопой.

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ИНТЕГРАЛЬНАЯ СИСТЕМА ПРОФИЛАКТИКИ ДЛЯ МОРЯКОВ В ПЕРИОД НАВИГАЦИИ

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Вступление

Работа плавсостава, как известно, сопряжена с воздействием на организм специфических производственных вредностей, под воздействием которых происходят нарушения адаптационных возможностей организма и развитие заболеваний внутренних органов и систем [А.М. Игнатъев 1999; А.К. Асмолов 1990; Бур-

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