Hyperbaric Therapy in Chronic Fatigue Syndrome

Treatment: Hyperbaric Therapy in Chronic Fatigue Syndrome

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ABSTRACT. The aim of this study was to determine if hyperbaric oxygen treatment (HBOT) could be used as adjunctive therapy and if HBOT could increase the quality of life in such a way that the functional status would improve in patients with an infection. A randomized, controlled trial was conducted on 15 Mycoplasma sp. infected CFS (CDC 1994) patients and 14 CFS (CDC 1994) patients with no evidence of a Mycoplasma infection [who] were enrolled in a convenience randomization sample from our referral clinic. No statistical differences were found by use of univariate repeated measures although Bodily Pain as measured by the SF-36 seems to decrease after hyperbaric therapy (Greenhouse-Geisser: p = .010).

Trends were found using paired t-testing for Mycoplasma infected CFS patients. The general perceived fatigue seemed to decrease after hyperbaric therapy (General Fatigue: p = .06). Directly after one week of hyperbaric therapy general fatigue improved (p = .03) but there was a reduction of activity (reduced activity: p = .05) and general perceived health (general health: p = .04). One month later the physical role increased (Role-Physical: p = .07). Although more data is required to make firm conclusions, trends were found. Reduced fatigue, increased levels of activity and an improved reaction time improved significantly their quality of life and therefore, enhanced also their functional status and thus could be used as an adjunctive therapy.

KEYWORDS. Chronic systemic infections, hyperbaric oxygen therapy, adjunctive therapy, quality of life

INTRODUCTION

Chronic Fatigue Syndrome (CFS) was first described in the 1930s and due to its definition by exclusion, its pathogenesis has been difficult to delineate. During the last few decades an increasing number of studies have started to unravel the pathogenesis of CFS. Currently the etiology is not known and no definite pathological abnormalities have been identified, therefore CFS is still called a syndrome and not a disease or group of diseases.

The controversy around this syndrome is intense with the overriding theme being whether its origin is physical or psychological. Interestingly this very same debate has taken place for many other chronic diseases in which initially no objective abnormalities were found followed by findings which clearly establish a physical/organic basis to the disease, leading to their wide acceptance.

Up until now, many therapies have been investigated in this population with different results (1). One of the most promoted therapies seems to be 'Cognitive Behavioral Therapy (CBT) with Graded Exercise' (2). The restricted lifestyle of CFS patients has led to the suggestion that a reduction in exercise capacity contributes and prolongs their illness. It is for this reason that exercise-training programs are added to the treatment of CFS-patients (2). Different ailments, however, inhibits wide spread application. First of all, CBT has not been adequately assessed for severely affected CFS patients (3). In fact, CBT seems applicable only when a Karnofsky Performance Score (KPS)-threshold of 70 is reached (4,5).

The Karnofsky Performance Score indicates functional disability in different populations and is used as a communication tool in CFS. A KPS of 70 means that the CFS patient "cares for him/herself but is unable to carry on normal activity or do active work." This threshold (70) is in contrast with the overall score of the CFS population which is 60-65. A person with a KPS of 60-65 "requires occasional assistance but is able to care for most needs." Secondly, CBT is characterized by a high dropout rate (6).

So, in order to bring CFS patients to a threshold of 70 and in order to bring CFS patients in the ability to start up an exercise program, different strategies should be used. While CFS patients do have abnormal immune parameters which indicate infections agents (7), hyperbaric oxygen therapy could be considered. By applying HBOT, the quality of life should be influenced in those patients with distorted immune parameters. A higher quality of life suggests a higher functional status. If patients increase their area of control by more activity or less fatigability, such as more walking around or leaving the home, leading to more independence, this implies a higher functional status.

Rationale for the Use of Hyperbaric Therapy in CFS

The immune system, wound healing, and vascular tone are all affected by oxygen supply. Oxygen alone has little direct antimicrobial effect, even for most anaerobes (8) like Mycoplasma infections. It is, however, a crucial factor in immune function.

Neutrophils require molecular oxygen as a substrate for microbial killing. The oxidative burst seen in neutrophils after phagocytosis of bacteria involves a 10 to I5-fold increase in oxygen consumption (9). Here oxygen serves as a substrate in the formation of free radicals, which directly or indirectly initiate phagocytic killing. This endogenous antimicrobial system virtually ceases functioning under conditions of hypoxia (10). In short, increasing the oxygen level in tissue can allow restoration of white blood cell function and thus the return of adequate antimicrobial action. However, whether this is applicable in a normal physiological system or some other process may be involved is not known.

History of Hyperbaric Therapy

The use of hyperbaric air therapy was apparently attempted before anyone knew of the existence of oxygen (11). A physician named Henshaw first attempted to treat patients in a chamber with altered air pressure about 300 years ago (12).

Hyperbaric oxygen therapy (HBOT) involves intermittent inhalation of 100% oxygen under a pressure greater than one atmosphere. Initial widespread enthusiasm for HBOT led to its inappropriate use, resulting in a backlash against the use of HBOT (12). More recent and reputable studies have demonstrated that the technique has a role in treating specific illnesses (11).

The Undersea Medical Society that evaluates clinical applications of HBOT has categorized disorders of which it is or may be useful (11). Table 1 gives an overview of the different treatment areas suggested for HBOT: category 1 is widely accepted and category 4 has little evidence to support its use. CFS patients with chronic bacterial infections are categorized as an adjunctive therapy by the Undersea Medical Society.

Complications and Side Effects of HBOT

The complications of HBOT are related to. the changes in barometric pressure and oxygen toxicity. Patients can receive mild inner ear discomfort that may occur by using certain maneuvers. The most common complication is middle ear or sinus trauma (9) due to the change in pressure. Any air filled cavity that cannot equilibrate with ambient pressure, such as the middle ear is subject to deformity and barotraumas during pressure changes in HBOT. Other complications sometimes observed at this pressure can include nausea, tooth and sinus pain and blurred vision (9).

Hypotheses

This controlled pilot study evaluates the utility of HBOT in CFS patients infected with Mycoplasma hominis. In other words, can HBOT improve the quality of life of this subgroup of CFS patients as investigated by validated psychological questionnaires? If the quality of life improves, patients may reach a KPS-threshold of 70 and additionally, attend CBT and graded exercise to improve their functional status.

The efficacy of hyperbaric oxygen therapy in the management of chronic fatigue syndrome.

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Abstract

OBJECTIVE:

Chronic fatigue syndrome (CFS) is a chronic disease with social components that ensue secondary to the incapacity of the person to fulfill work, social and family responsibilities. Currently, there is no consensus regarding its treatment. The aim of this study was to determine the efficacy of hyperbaric oxygen (HBO2) therapy in CFS.

DESIGN:

Sixteen patients included in the study were diagnosed with CFS according to the Fukuda criteria. Patients received 15 treatment sessions of HBO2 therapy over a period of three consecutive weeks (five days per week). The outcome measures (visual analog fatigue scale (VAFS). Fatigue Severity Scale (FSS) and Fatigue Quality of Life Score (FQLS) were assessed before the treatment and after completion of the 15 sessions.

RESULTS:

HBO2 therapy was well tolerated, with no complications. After treatment, patients' scores were found to have improved with respect to VAFS, FSS and FQLS (all $p<0.005$).

CONCLUSIONS:

We ,may infer that HBO2 therapy decreases the severity of symptoms and increases the life quality of CFS patients. It may be a new treatment modality for the management of CFS. However, further studies with larger sample sizes and control groups are definitely awaited.