Case Report

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Hyperbaric Oxygen Therapy for the Treatment of Chronic Prostatitis/Chronic Pelvic Pain Syndrome: Case Report

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Hyperbaric oxygen therapy (HBOT) was conducted on two male patients with chronic prostatitis/chronic pelvic pain syndrome who were resistant to conventional medical therapies. Both patients underwent 20 sessions of 100% oxygen inhalation (2.0 atmosphere absolute for 90 min/day, five days/week for four weeks) in a hyperbaric chamber. The follow-up period was three months. Although the patients reported a slight improvement in the pain domain of the National Institutes of Health-Chronic Prostatitis Symptom Index (NIH-CPSI) after HBOT, no changes were noted in the other domains of NIH-CPSI and International Prostate Symptom Score. No adverse events were encountered during or after HBOT.

Keywords: Hyperbaric oxygenation; Prostatitis

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Chronic prostatitis (CP) is one of the most common urologic conditions. Up to 10% of the male population may complain of the symptoms of CP at some point throughout their lifetime [1]. The estimated prevalence of prostatitis-like symptoms is 2.2-9.7%, and the mean prevalence is 8.2% based on epidemiological studies [2]. Therefore, CP may adversely impact public health and reduce the quality of life (QOL) because of its two main clinical features: pelvic pain and lower urinary tract symptoms (LUTS).

The National Institutes of Health (NIH) classified CP into four types: type I, acute bacterial prostatitis; type II, chronic bacterial prostatitis; type III, CP/chronic pelvic pain syndrome (CP/CPPS); and type IV, asymptomatic prostatitis [3]. CP/CPPS is the most common form of symptomatic prostatitis and is defined by the presence of pelvic pain for at least three of the preceding six months, with no other identifiable causes detected [4].

Many approaches for managing CP/CPPS are available, including pharmacological and non-pharmacological interventions, but no universal cure for the condition has been identified. Recently, hyperbaric oxygen therapy (HBOT) has been proposed for the treatment of CP/CPPS based on its tissue healing effects, including anti-inflammatory effects, increased fibroblastic activity, reduced interstitial fibrosis, reversal of vascular alterations, and microbicidal effects [5,6]. In addition, few trials have been conducted to elucidate the effects of HBOT on interstitial cystitis/bladder pain syndrome (IC/BPS), which may be considered a subset of CP/CPPS because of the similar pathogenesis and clinical presentation shared between CP/CPPS and IC/BPS.

Therefore, the authors have planned and conducted a pilot study of HBOT in two CP/CPPS patients.

CASE REPORT

This case report forms a part of the early pilot study approved by the local ethics committee (Yonsei Wonju Severance Christian Hospital, CR221021); written consent was obtained from each patient.

Study design: adult males aged 18 to 60 years diagnosed with CP/CPPS type III according to the NIH classification, characterized by the following were included in the study: (1) a history of pain or discomfort perceived in the pelvic region (National Institutes of Health-Chronic Prostatitis Symptom Index [NIH-CPSI] greater than 15), and (2) absence of any other lower urinary tract pathology for at least three of the last six months as confirmed by computed tomography and cystoscopy. The patients received HBOT following the protocol: 90-min daily session of 100% O_2 breathing in a monoplace or multiplace hyperbaric chamber (IBEX Medical Systems) pressurized at two atmosphere absolute (ATA). This regimen lasted five days a week for four consecutive weeks (20 sessions) [7]. The NIH-CPSI and International Prostate Symptom Score (IPSS) were measured before HBOT and again three months after starting treatment to analyze the clinical efficacy. NIH-CPSI consisted of nine questions addressing three domains (pain, urinary function, and QOL) with a score of 0-14, 15-29, and 30-43 were considered mild, moderate, and severe pain, respectively [3]. The IPSS was comprised of seven questions related to LUTS. A score of 0-7, 8-19, and 20-35 indicated mild symptoms, moderate symptoms, and severe symptoms, respectively [8]. The adverse event of HBOT was evaluated during the study period. Conservative medication, namely an alpha-blocker, was allowed during the study period.

Case 1: a 45-year-old male without any co-morbidities visited the hospital with a complaint of pelvic pain and LUTS. He had undergone standard medical treatment using an antibiotic (quinolone) and alpha-blockers at the primary urology clinic since he was diagnosed with CP/CPPS in 2021. While the patient reported an improvement in the pain domain of NIH-CPSI from 4 at baseline to 0 after HBOT, no changes were noted in the other domains of NIH-CPSI and IPSS (Table 1). No adverse events occurred during or after HBOT.

Case 2: a 56-year-old male with co-morbidities including asthma, chronic kidney disease, and hepatitis B visited the hospital due to pelvic pain and LUTS. Despite receiving conventional treatment, the symptoms had been recurrent since his diagnosis with CP/CPPS in 2010. The patient reported a slight improvement in the pain domain of NIH-CPSI from 17 at the baseline to 15 after HBOT. On the other hand, no changes were observed in the other domains of NIH-CPSI and IPSS (Table 1). No adverse events were reported during or after HBOT.

DISCUSSION

CP/CPPS encompasses typical clinical symptoms, including pelvic pain (e.g., perineum, scrotum) associated with urinary symptoms. While the primary etiology of CP/CPPS remains unclear, its pathophysiology involves various factors, including prostatic inflammation triggered by bacterial prostatitis, unknown antigens, or possibly an autoimmune process, as well as endocrine, muscular, neuropathic, and psychological mechanisms [3,9,10].

Although tools, such as the NIH-CPSI, have been developed to measure the symptom severity and disease impact, a wide variety of interventions are used to treat CP/CPPS, each addressing different pathophysiological or symptomatic frameworks because no reliable treatments have been identified. Antibiotics and anti-inflammatory medications are the mainstay of CP/CPPS treatment, but their effects on prostatitis symptoms may be clinically unimportant compared to a placebo [11].

In the field of urology, HBOT is a well-known treatment for hemorrhagic cystitis secondary to urological malignancies, such as bladder and prostate cancer. In addition, HBOT has been used to treat infectious diseases, including Fournier's gangrene and emphysematous cystitis [12]. Recently, multiple studies have been conducted to elucidate the effectiveness of HBOT in patients with IC/PBS, which have a similar pathogenesis and clinical presentation to CP/CPPS [7]. Loran et al. [5] reported that HBOT with extremely high-frequency therapy showed a positive trend in the urination parameters in the patients with benign prostatic hyperplasia (BPH) with CP compared to the group of BPH without prostatic inflammation. Zadoev et al. [6] reported that HBOT effectively impacted the spermatic morphological and functional characteristics in male infertility. Therefore, an early pilot study was planned to elucidate the effects of HBOT on CP/CPPS.

Regarding the treatment of CP/CPPS, the proposed

Table 1. Baseline characteristics of the participants and the effects of hyperbaric oxygen therapy

	Case 1	Case 2
Age (y)	45	56
BMI	22	22
Date of diagnosis (y)	2021	2010
Co-morbidity	None	Chronic kidney disease, asthma, hepatitis B
Smoking	Current smoker	Ex-smoker
Alcohol consumption	Current drinker	Current drinker
NIH classification	IIIA	IIIB
NIH-CPSI		
At the baseline		
Pain domain	4	17
Voiding domain	10	7
Quality of life domain	11	10
Overall	25	34
Three months after the baseline		
Pain domain	0	15
Voiding domain	7	6
Quality of life domain	11	10
Overall	18	31
IPSS		
At the baseline		
Voiding symptom	11	8
Storage symptom	8	7
Overall	19	15
Three months after the baseline		
Voiding symptom	9	11
Storage symptom	5	4
Overall	14	15
Overall adverse event	None	None

BMI: body mass index, NIH: National Institutes of Health, NIH-CPSI: National Institutes of Health-Chronic Prostatitis Symptom Index, IPSS: International Prostate Symptom Score.

mechanisms of HBOT include the anti-inflammatory and bactericidal effects on the prostate. HBOT provides 100% oxygen under increased atmospheric pressure, leading to arterial oxygen tension exceeding 2,000 mmHg in damaged prostatic tissue. This increased arterial oxygen tension directly affects bacteria by producing oxygen radicals. In addition, the indirect effects include enhanced microbicidal activity of leukocytes and anti-inflammatory effects due to increased dissolved oxygen in the infected tissue [12]. This study found that HBOT ameliorates the pain symptoms in men with CP/CPPS.

CP/CPPS is a common condition in urology that adversely affects the QOL of men. On the other hand, there is greater uncertainty regarding the effectiveness of pharmacological and non-pharmacological treatments [11,13]. In addition, CP/CPPS is a chronic, recurrent condition even after treatment. Moreover, these patients can transition to a refractory condition [14]. Therefore, there is a need for alternative treatments for CP/CPPS. Based on those findings and the present results, this study postulated that HBOT could be a feasible option for treating CP/CPPS to relieve recurrent or refractory symptoms.

Although HBOT has been performed for infectious and inflammatory diseases in urology, the evidence for CP/CPPS is scarce. In addition, the HBOT protocol for treating CP/CPPS, regarding the duration, number of treatment sessions, and appropriate ATA, has not been established. Future trials should be conducted to evaluate the clinical effects and protocol of HBOT according to higher methodological standards.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

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AUTHOR CONTRIBUTIONS

Y.L. and J.H.J. paticipated in data collection and wrote the manuscript. Y.S.C., T.W.K., H.C.C., H.C., H.K. participated in the study design. K.J.K. and J.H.J. participated in the study design and coordination and helped to draft the manuscript. All authors read and approved the final manuscript.

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REFERENCES

1. Collins MM, Stafford RS, O'Leary MP, Barry MJ. How common is prostatitis? A national survey of physician visits. J Urol 1998;159:1224-8.
2. Krieger JN, Lee SW, Jeon J, Cheah PY, Liong ML, Riley DE. Epidemiology of prostatitis. Int J Antimicrob Agents 2008;31 Suppl 1:S85-90.
3. Litwin MS, McNaughton-Collins M, Fowler FJ Jr, Nickel JC, Calhoun EA, Pontari MA, et al. The National Institutes of Health chronic prostatitis symptom index: development and validation of a new outcome measure. Chronic Prostatitis Collaborative Research Network. J Urol 1999;162:369-75.
4. Clemens JQ, Meenan RT, O'Keeffe Rosetti MC, Gao SY, Calhoun EA. Incidence and clinical characteristics of National Institutes of Health type III prostatitis in the community. J Urol 2005;174:2319-22.
5. Loran OB, Dunaevskii IaL, Vishnevskii AE, Vashkevich VI. [The joint use of hyperbaric oxygenation and EHF therapy in benign prostatic hyperplasia and its combination with chronic prostatitis]. Urol Nefrol (Mosk) 1997;2:32-4. Russian.
6. Zadoev SA, Evdokimov VV, Rumiantsev VB, Osmolovskii EO. [Hyperbaric oxygenation in the treatment of patients with chronic congestive prostatitis and lower fertility]. Urologiia 2001;1:27-30. Russian.
7. Tanaka T, Kawashima H, Makino T, Kamikawa S, Kato N, Nakatani T. Hyperbaric oxygen therapy for interstitial cystitis resistant to conventional treatments. Int J Urol 2007;14:563-5.
8. Barry MJ, Fowler FJ Jr, O'Leary MP, Bruskewitz RC, Holtgrewe HL, Mebust WK, et al. The American Urological Association symptom index for benign prostatic hyperplasia. The Measurement Committee of the American Urological Association. J Urol 1992;148:1549-57; discussion 1564.
9. Cho IC, Min SK. Proposed new pathophysiology of chronic prostatitis/chronic pelvic pain syndrome. Urogenit Tract Infect 2015;10:92-101.
10. Nickel JC. Is chronic prostatitis/chronic pelvic pain syndrome an infectious disease of the prostate? Investig Clin Urol 2017;58:149-51.
11. Franco JV, Turk T, Jung JH, Xiao YT, Iakhno S, Tirapegui FI, et al. Pharmacological interventions for treating chronic prostatitis/chronic pelvic pain syndrome. Cochrane Database Syst Rev 2019;10:CD012552.
12. Tanaka T, Minami A, Uchida J, Nakatani T. Potential of hyperbaric oxygen in urological diseases. Int J Urol 2019;26:860-7.
13. Franco JV, Turk T, Jung JH, Xiao YT, Iakhno S, Garrote V, et al. Non-pharmacological interventions for treating chronic prostatitis/chronic pelvic pain syndrome. Cochrane Database Syst Rev 2018;5:CD012551.
14. Higazy A, Shorbagy AA, Shabayek M, Radwan A, Halim GN, Osman D, et al. Short course of dutasteride in treatment of a refractory category IIIB chronic prostatitis (A placebo-controlled study). Prostate Int 2022;10:213-7.