



ECP | EECP Therapy with Patients with Long Covid

COVID-19

Enhanced External Counterpulsation Offers Potential Treatment Option for Long COVID Patients

Small study of long COVID patients experienced symptom improvement following EECP therapy.

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WASHINGTON (Feb 14, 2022) -

In a small study of long COVID-19 patients, those with and without coronary artery disease demonstrated improvement of a variety of symptoms, including fatigue, breathing difficulties and chest discomfort, after undergoing 15-35 hours of enhanced external counterpulsation (EECP) therapy. The study is being presented at the American College of Cardiology's [Cardiovascular Summit](#) virtual conference on Feb. 16-19, 2022.

EECP is a non-invasive technique shown to improve cardiac and cerebral perfusion. Patients undergoing EECP arrive at the clinic to lay on a treatment table and are fitted with three sets of pneumatic cuffs on the calves, thighs and lower hip area. A 3-lead electrocardiogram is used as the mechanism for the cuffs to inflate sequentially, from the calves up to the hips during the resting phase of the heart. On the onset of the contraction phase of the heart, the cuffs deflate at the same time. This prescribed inflation and deflation pushes oxygen-rich blood throughout the heart muscle and the rest of the body. A patient undergoes a treatment session for one hour, with up to 35 treatment sessions over the course of seven weeks.

"Emerging data shows that long COVID is a disease that impacts the health of vessels, also known as endothelial function. EECP is a disease-modifying, non-invasive therapy that has previously shown to improve endothelial function in controlled clinical trials," said Sachin A. Shah, PharmD, senior author on the study and chief scientific officer at Flow Therapy, a nationwide EECP provider headquartered in Ft. Worth, Texas. "We currently believe that this is the most plausible explanation for the benefits derived from EECP and the link to long COVID."

Globally, an estimated 50% of COVID-19 patients experience lingering symptoms six months after the acute phase of COVID-19 infection, with the long-term symptoms varying in severity.

"Several of our patients were disabled to the point of not being able to work," Shah said. "Remarkably, all patients at this point were able to successfully return back to work after undergoing treatment. These patients also showed improvement in 'brain fog,' which is a common symptom of long COVID. We are excited about continuing to analyze this data and share it in the future."

Researchers included 50 long COVID patients (54±15 years old) referred to a Flow Therapy provider for EECP treatment in a retrospective analysis, including 30 patients with no history of coronary artery disease and 20 patients with coronary artery disease (CAD). All patients were assessed pre- and post-EECP therapy using the Seattle Angina Questionnaire-7 (SAQ7), Duke Activity Status Index (DASI), PROMIS Fatigue Instrument (PROMIS), Rose Dyspnea Scale (RDS) and 6-minute walk test (6MWT).

"These tests were used as they are all validated tools accepted by the International Consortium for Health Outcomes Measurement to assess fatigue, breathing difficulties and chest discomfort," Shah said.

"They have been used in clinical trials to assess disease burden and are associated with morbidity and mortality benefits," he said.

The analysis found statistically significant improvements across all validated testing tools:

- Health Status using the SAQ7 tool improved by 25 points (Range 0-100)
- Functional capacity using the DASI assessment improved by 20 points (range 0-58.2)
- Fatigue levels using the PROMIS score decreased by 6 points (Range 4-20)
- Shortness of Breath using the RDS decreased in 50% of patients
- Walking capacity (6MWT) in 6 minutes increased by 178 feet

Researchers found the change from baseline for patients with long COVID only was significant for all endpoints and no difference was evident between patients with long COVID without CAD compared to those with CAD.

According to the researchers, larger studies with a sham-control group are justified to further validate these findings.

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Session Title: Observations in Clinical Outcomes from the COVID-19 Pandemic Frontlines 1

Abstract 14980: Enhanced External Counterpulsation Improves Cognitive Function in Long Covid Patients

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Abstract

INTRODUCTION: Enhanced External Counterpulsation (EECP) has been described to help Long Covid related cardiovascular (e.g. chest pain, fatigue) and neurocognitive (e.g. brain fog) symptoms. We sought to determine whether EECP improves cognitive function.

Methods: A retrospective evaluation of a contemporary consecutive patient cohort referred to Flow Therapy for management of Long Covid. All patients subjectively reporting brain fog were assessed using the BrainCheck tool to determine degree of cognitive impairment pre- and post EECP therapy. BrainCheck is an FDA-approved, web-based battery of standardized neuropsychological tests that includes the Trail Making Test (Trails A, Trails B) for assessing executive function (cognitive flexibility), the Digit Symbol Substitution Test (DSST) for assessing attention and processing speed, the Stroop Test for assessing executive function (response inhibition), and the List Learning Test for immediate/delayed verbal memory evaluation. BrainCheck scores have a normative mean of 100 ± 15 with a clinically meaningful change ranging from 12-21 depending on age. Change from baseline to post-EECP were assessed using the paired student's t-test.

Results: A total of 51 Long Covid patients were included (49.3 ± 11.0 years, 60.8% female, 22% had CAD) with the average duration since Covid diagnosis being 9.9 ± 6.1 months. No patients were excluded. All patients completed 25-35 sessions of EECP. Baseline BrainCheck composite score was 88.0 ± 22.1 which significantly improved to 100.1 ± 16.4 post-EECP ($+11.9 \pm 18.7$, $p < 0.001$). When limiting to baseline score under 85 ($n=20$; baseline average 66.7 ± 17.6) the improvement was $+26.0 \pm 20.9$ ($p < 0.001$). EECP therapy improved the patients' performance across cognitive domains, as indicated by significant enhancements in scores from baseline in Trails A ($+6.1 \pm 19.7$), Trails B ($+5.0 \pm 11.8$), DSST ($+12.9 \pm 24.1$) and Stroop Test ($+11.2 \pm 19.1$) (all p-values < 0.05).

Conclusion: This is the first evaluation showing significant improvement in Long Covid related cognitive impairment post-EECP therapy. Further study is needed to determine if the mechanistic basis may include EECP induced improved cerebral perfusion, change in endothelial function, or a yet unelucidated pathway.

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Enhanced External Counterpulsation as a Novel Treatment for Post-acute COVID-19 Sequelae

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Abstract

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is the virus responsible for the coronavirus disease 2019 (COVID-19) pandemic. As patients recover from COVID-19, some continue to report persisting symptoms weeks to months after acute infection. These effects have been referred to as post-acute sequelae of SARS-CoV-2 infection (PASC). We report the case of a 38-year-old woman suffering from PASC symptoms following acute COVID-19 in October 2020. During her acute infection phase, she had a home recovery and reported her predominant symptoms as fatigue, headaches, body pain, and shortness of breath. After most of her symptoms were resolved, she continued to have periodic episodes of fatigue and headaches, along with random shortness of breath while at rest and during activities for months beyond the acute phase of the illness. She also noted the presence of "brain fog," as if lacking the same clarity that she had prior to her illness. These symptoms persisted for three months before the patient underwent enhanced external counterpulsation (EECP) therapy in one-hour sessions, three times per week. This therapy was chosen based on the mechanism of action of EECP benefiting patients with ischemic cardiovascular diseases. After one week, her "brain fog" had improved, with shortness of breath improving after 1.5 weeks. The patient reported returning to pre-COVID health and fitness after approximately five weeks of EECP treatment. To our knowledge, this is the first case of using EECP for post-COVID shortness of breath, fatigue, and "brain fog."

Keywords: covid-19; eecp; enhanced external counterpulsation; long covid; pasc.

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Conflict of interest statement

The authors have declared financial relationships, which are detailed in the next section.

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