

External Counter Pulsation (ECP) : Vascular Therapy and Daily Care 體外反搏治療：血管治療及日常保健

Book of abstracts 研究摘要



Contents 目錄

1. Angina

- 1.1 Enhanced External Counterpulsation in the Treatment of Chronic Refractory Angina: A Long-term Follow-up Outcome from the International Enhanced External Counterpulsation Patient Registry 2
- 1.2 Enhanced External Counterpulsation: An Innovative Physical Therapy for Refractory Angina 4
- 1.3 Enhanced external counterpulsation: A unique treatment for the "No-Option" refractory angina patient 6
- 1.4 Enhanced external counterpulsation and future directions: step beyond medical management for patients with angina and heart failure 8

2. Stroke

- 2.1 Predictors of good functional outcome in counterpulsation-treated recent ischaemic stroke patients 10
- 2.2 External counterpulsation enhances neuroplasticity to promote stroke recovery 12
- 2.3 External Counterpulsation Increases Beat-to-Beat Heart Rate Variability in Patients with Ischemic Stroke 14

3. Type 2 diabetes

- 3.1 Effects of external counter-pulsation on endothelial function assessed by peripheral artery tonometry, levels of glycaemia and metabolic markers in individuals with type 2 diabetes mellitus 16

4. Exercise Recovery

- 4.1 Effects of External Counterpulsation on Postexercise Recovery in Elite Rugby League Players 18
- 4.2 Effect of External Counterpulsation on Exercise Recovery in Team Sport Athletes 20

5. Erectile dysfunction

- 5.1 Effect of enhanced external counterpulsation on medically refractory angina patients with erectile dysfunction 22
- 5.2 Enhanced external counterpulsation in rehabilitation of erectile dysfunction: a narrative literature review 24

6. Ocular ischemic disease

- 6.1 Clinical study in patients with ocular ischemic diseases treated with enhanced external counterpulsation combined with drugs 26
- 6.2 Effect of enhanced extracorporeal counterpulsation in patients with non-arteritic anterior ischaemic optic neuropathy 28

7. Sudden hearing loss

- 7.1 Pneumatic external counterpulsation (PECP): a new treatment option in therapy refractory inner ear disorders? 30

8. Neurodegenerative diseases

- 8.1 External Counterpulsation Therapy for Patients with Mild Cognitive Impairment 32
- 8.2 Study of the external counterpulsation (ECP) therapy for senile dementia of the Alzheimer's type (SDAT) 33

9. Revision Article

- 9.1 Expert consensus on the clinical application of enhanced external counterpulsation in elderly people (2019) 34



Enhanced External Counterpulsation in the Treatment of Chronic Refractory Angina: A Long-term Follow-up Outcome from the International Enhanced External Counterpulsation Patient Registry

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Abstract

Background

The management of patients who suffer from medically refractory angina and are unsuitable for conventional revascularization therapy is often unsatisfactory. Enhanced external counterpulsation (EECP) is a noninvasive treatment that is safe and effective immediately after a course of treatment. However, the duration of benefit is less certain.

Hypothesis

To evaluate the 3-year outcome of EECP treatment.

Methods

One thousand four hundred and twenty seven patients from 36 centers registered in the International EECP Patient Registry (IEPR)—Phase 1 was prospectively followed for a median of 37 months. Two hundred and twenty patients (15.4%) died, while 1,061 patients (74.4%) completed their follow-up.

Results

The mean age was 66 ± 11 years and 72% were men. Seventy-six percent had multivessel coronary disease for 11 ± 8 years. Eighty-eight percent had a prior percutaneous or surgical revascularization and 82% were unsuitable for further coronary intervention. Immediately post-EECP, the proportion of patients with severe angina (Canadian Cardiovascular Angina Classification [CCS] III/IV) were reduced from 89% to 25%, $p < 0.001$. The CCS class was improved by at least 1 class in 78% of the patients and by at least 2 classes in 38%. This was sustained in 74% of the patients during follow-up.

Thirty-six percent of the patients had CCS II or less angina, which was better than pre-EECP state without a major adverse cardiovascular event during follow-up. More severe baseline angina and a history of heart failure or diabetes were independent predictors of unfavorable outcome.

Conclusion

An EECP improves angina and quality of life immediately after a course of treatment. For most of the patients, these beneficial effects are sustained for 3 years.

摘要

背景

對於患有心絞痛但不適合藥物和血管重建治療的病人，療效往往不能令人滿意。體外反搏治療 (EECP) 是一種非侵入性的治療方法，療程後立即見效且安全。然而，療效時間卻不太確定。

假設

評價 EECP 治療的 3 年效果。

方法

1,427 名病人分別來自 36 個國際 EECP 患者登記處 (IEPR) - 第一階段進行了前瞻性的跟進，維持時期 (中位數) 為 37 個月。220 名病人 (15.4%) 死亡，1,061 名病人 (74.4%) 完成整個研究。

結果

平均年齡為 66 ± 11 歲，72% 為男性。76% 的病人患有多血管冠狀動脈疾病達 11 ± 8 年。88% 的病人之前接受過經皮或外科血管重建手術，82% 的病人不適合做進一步的冠狀動脈介入治療。進行 EECP 治療後，嚴重心絞痛 (加拿大心血管心絞痛分類 [CCS] III/IV) 病人的比例從 89% 減少到 25%， $P < 0.001$ 。78% 的病病人的 CCS 等級至少提高了一個等級，38% 的病人至少提高了兩個等級。74% 的病人在病情維持等穩定。

36% 患有 CCS II 或低級心絞痛的病人，比進行 EECP 治療前的狀態好，在研究期間沒有發生重大不良心血管事件。嚴重心絞痛、心衰竭或糖尿病史都是不利結果的獨立預測因素。

Keywords: external counterpulsation, angina pectoris, refractory pain, coronary artery disease, ischemic heart disease

關鍵詞： 體外反搏，心絞痛，頑固性疼痛，冠狀動脈疾病，缺血性心臟病

Enhanced External Counterpulsation: An Innovative Physical Therapy for Refractory Angina

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Abstract

The prevalence of refractory angina in the United States is 600,000 to 1.8 million. Improved pharmacological, invasive, and surgical therapies for cardiovascular diseases during the last few decades have led to an increase in life expectancy of such individuals. Despite treatment with multiple medications and invasive procedures, these patients remain symptomatic and functionally limited. Enhanced external counterpulsation (EECP) is a safe, noninvasive, well-tolerated, and clinically effective outpatient physical therapy for many patients with refractory angina. Numerous trials demonstrate positive clinical responses among at least 80% of patients undergoing EECP, including reductions in angina and nitrate use, increases in exercise tolerance, and enhanced quality of life. Several mechanisms, including the promotion of collateral blood flow, improvement in endothelial function, reduction in inflammation, and the production of peripheral training effects similar to exercise, are thought to be responsible for the clinical benefits of this therapy. Despite the marked success rates EECP achieves with appropriately selected patients who have end-stage coronary artery disease, the treatment remains largely unknown, particularly among physiatrists. This review will summarize the current evidence for the use of EECP and spark a better understanding of the potential role of this treatment in cardiac rehabilitation.

摘要

在美國，難治性心絞痛的發病率為 60 萬至 180 萬。在過去的幾十年裡，心血管疾病的藥物、侵入性和手術療法不斷改進，令患者預期壽命亦隨之增長。然而，儘管有多種藥物和侵入性手術的治療，病人發病前仍然沒有症狀，治療的功效亦受限制。體外反搏治療 (EECP) 是一種安全、無創、耐受性高的物理療法，適用於難治的心絞痛患者。眾多研究列出，至少 80% 的接受 EECP 的患者有積極的臨床反應，包括減少心絞痛和硝酸鹽的使用，增加運動耐受性，以及提高生活質量。一些機制，包括促進側支血流，改善內皮功能，減少炎症，以及產生類似運動的外周訓練效果，這些都是體外反搏治療的臨床益處。儘管 EECP 對晚期冠狀動脈疾病患者有取得明顯的成功率，但療法仍未普及，特別是在物理學家中。本文章總結了目前患者使用 EECP 後的結果，並清晰列出治療在心臟康復中所潛在的作用。

Enhanced external counterpulsation: A unique treatment for the “No-Option” refractory angina patient

Jose Caceres, MD, Patricia Atal, MD, Rohit Arora, MD, and Derek Yee, Editor

Abstract

What is known and objectives

Coronary artery disease (CAD) is the leading cause of death in the United States. For patients on whom guideline-driven measures have been tried, enhanced external counterpulsation (EECP) is the only truly noninvasive and safe intervention for which a reduction of angina symptoms and nitrate use, increased exercise tolerance, and improvement in myocardial ischaemia have been shown. The objective of this study was to demonstrate, by way of literature review, the efficacy of EECP as a treatment modality for the relief of refractory angina and improvement in quality of life in CAD patients.

Methods

This article reviewed the safety and efficacy of EECP in patients with refractory angina, by conducting a sweeping search and analysis of existing published literature.

Results and discussion

Critical review of a multitude of studies revealed that EECP consistently reduces angina pectoris, extends time to exercise-induced ischaemia, decreases dependency on nitroglycerine for frequent chest pain, increases maximum workload, and improves the quality of life in patients with symptomatic stable angina. The literature reviewed also indicated that EECP is well-tolerated by the vast majority of patients, with relatively few adverse events reported.

Conclusion

The present study suggests that EECP is a safe and likely best available method of treatment for patients presenting with symptomatic CAD not amenable to further revascularization.

摘要

已知的情況和目標

冠狀動脈疾病 (CAD) 是引起美國人死亡的主要原因。對於已經嘗試過不同治療措施的患者，體外反搏治療 (EECP) 是唯一真正無創和安全的治療方案，它可以減少心絞痛症狀和硝酸鹽的使用，增加運動耐力，並改善心肌缺血狀況。本研究的目的是通過文獻回顧，證明 EECP 作為一種治療方式對緩解難治性心絞痛和改善 CAD 患者的生活質量的有效性。

方法

本文通過對現有發表的文獻進行全面的搜索和分析，對 EECP 在難治性心絞痛患者中的安全性和有效性進行了研究。

結果和討論

大量研究證實，EECP 能持續減少心絞痛，延長運動誘發缺血的時間，減少對硝化甘油的依賴，增加提升身體機能，並改善有症狀的穩定心絞痛患者的生活質量。文獻亦表明，絕大多數患者對 EECP 的耐受性良好，而不良事件的報導相對較少。

結論

本研究列出了 EECP 是一種安全、可能是最佳的治療方法，適用於有症狀的 CAD 患者，但不適合進一步進行血管重建。

Keywords: EECP; angina pectoris; coronary artery disease

關鍵詞： EECP；心絞痛；冠狀動脈疾病

Enhanced external counterpulsation and future directions: step beyond medical management for patients with angina and heart failure

Aarush Manchanda , Ozlem Sora

Abstract

Between 25,000 and 75,000 new cases of angina refractory to maximal medical therapy and standard coronary revascularization procedures are diagnosed each year. In addition, heart failure also places an enormous burden on the U.S. health care system, with an estimated economic impact ranging from \$20 billion to more than \$50 billion per year. The technique of counterpulsation, studied for almost one-half century now, is considered a safe, highly beneficial, low-cost, noninvasive treatment for these angina patients, and now for heart failure patients as well. Recent evidence suggests that enhanced external counterpulsation (EECP) therapy may improve symptoms and decrease long-term morbidity via more than 1 mechanism, including improvement in endothelial function, promotion of collateralization, enhancement of ventricular function, improvement in oxygen consumption (VO₂), regression of atherosclerosis, and peripheral training effects similar to exercise. Numerous clinical trials in the last 2 decades have shown EECP therapy to be safe and effective for patients with refractory angina with a clinical response rate averaging 70% to 80%, which is sustained up to 5 years. It is not only safe in patients with coexisting heart failure, but also is shown to improve quality of life and exercise capacity and to improve left ventricular function long-term. Interestingly, EECP therapy has been studied for various potential uses other than heart disease, such as restless leg syndrome, sudden deafness, hepatorenal syndrome, erectile dysfunction, and so on. This review summarizes the current evidence for its use in stable angina and heart failure and its future directions.



摘要

每年有 25,000 到 75,000 個需要藥物治療和進行冠狀動脈血運重建的心絞痛被診斷出來。此外，心力衰竭也給美國衛生保健系統帶來了巨大的負擔，估計每年的經濟影響從 200 億美元到 500 億美元以上不等。研究了近半個世紀的反搏技術，被認為是對這些心絞痛患者，以及現在對心衰患者的一種安全、高效、低成本的無創治療。最近有證據表明，體外反搏（EECP）療法可以通過一種以上的機制來改善症狀和降低長期發病率，包括改善內皮功能、促進側支血液循環、增強心室功能、改善耗氧量（VO₂）、抑制動脈粥樣硬化，以及類似於運動的外周訓練效果。過去 20 年的大量臨床試驗表明，EECP 療法對難治性心絞痛患者是安全和有效的，其臨床反應率平均為 70% 至 80%，療效可持續 5 年。它不僅對合併有心力衰竭的患者是安全的，而且還被證明可以改善生活質量和運動能力，並能長期改善左心室功能。有趣的是，EECP 療法已被研究用於心臟疾病以外的各種潛在用途，如不寧腿綜合症、突發性耳聾、肝腎綜合症、勃起功能障礙等。本文總結了穩定型心絞痛和心力衰竭中應用的現有證據及其未來發展方向。

Predictors of good functional outcome in counterpulsation-treated recent ischaemic stroke patients

Wenhua Lin, Jinghao Han, Xiangyan Chen, Li Xiong, Ho Wan Leung, Thomas W Leung, Yannie Soo, Lawrence Ka Sing Wong

Abstract

Objectives

External counterpulsation (ECP) is a non-invasive method being investigated for ischaemic stroke. We aimed to explore predictors of good functional outcome for ECP-treated ischaemic stroke patients who completed a minimum of 10 sessions.

Methods

We analysed our ECP registry of ischaemic stroke patients with cerebral large artery stenosis who underwent ECP therapy at the Prince of Wales Hospital from 2004 to 2010. We included 155 patients who completed at least 10 sessions of ECP and had 3-month follow-up data as well as 52 medical controls. Functional outcomes were dichotomised into good outcome (modified Rankin Scale (mRS) 0–2) and bad outcome (mRS 3–6). We compared the differences in two groups in terms of demographics, medical history and parameters of ECP treatment.

Results

At 3 months after stroke, 70.5% of patients who finished the whole course of ECP had a good outcome (only 46.5% in the unfinished group and 38.5% in the medical group). Among all 207 recruited cases, 119 (57.5%) patients had a good outcome at 3 months after stroke.

Compared with the bad outcome group, patients in the good outcome group were younger and had a lower baseline National Institutes of Health Stroke Scale (NIHSS) and longer ECP therapy duration. Multivariate logistic regression showed that ECP duration (OR 1.032), baseline NIHSS (OR 0.734) and age (OR 0.961) were independent predictors for a favourable outcome.

Conclusions

Duration of ECP therapy is first found to be an important predictor for good outcome of ECP treated ischaemic stroke patients, in addition to the well-known prognostic factors such as age and NIHSS.

摘要

目的

體外反搏 (ECP) 是一種正在研究的治療缺血性中風的非侵入性方法。我們正探索進行 ECP 治療的缺血性中風患者，在完成至少 10 次治療後以良好功能結局作為預測因素。

方法

我們分析了 2004 年至 2010 年在威爾士親王醫院接受 ECP 治療的腦大動脈狹窄缺血性中風患者的情況。我們納入了 155 名完成至少 10 次 ECP 治療並持續 3 個月的患者，以及 52 名醫學對照組。功能結果顯示 2 分為良好結果 (改良的 Rankin 量表 (mRS) 0-2) 和不良結果 (mRS 3-6)。我們比較了兩組在人口統計學、病史和 ECP 治療參數方面的差異。

結果

中風後 3 個月並完成整個 ECP 療程的患者中，有 70.5% 有良好結果 (未完成組只有 46.5%，醫療組有 38.5%)。在所有 207 個招募的病例中，119 名 (57.5%) 患者中風後 3 個月有良好結果。

與壞結果組相比，好結果組的患者更年輕，美國國家衛生院腦中風評估表

(NIHSS) 的基線較低，ECP 治療療效較長。多變量邏輯回歸中顯示，ECP 持續時間 (OR 1.032)、基線 NIHSS (OR 0.734) 和年齡 (OR 0.961) 是有利結局的獨立預測因素。

結論

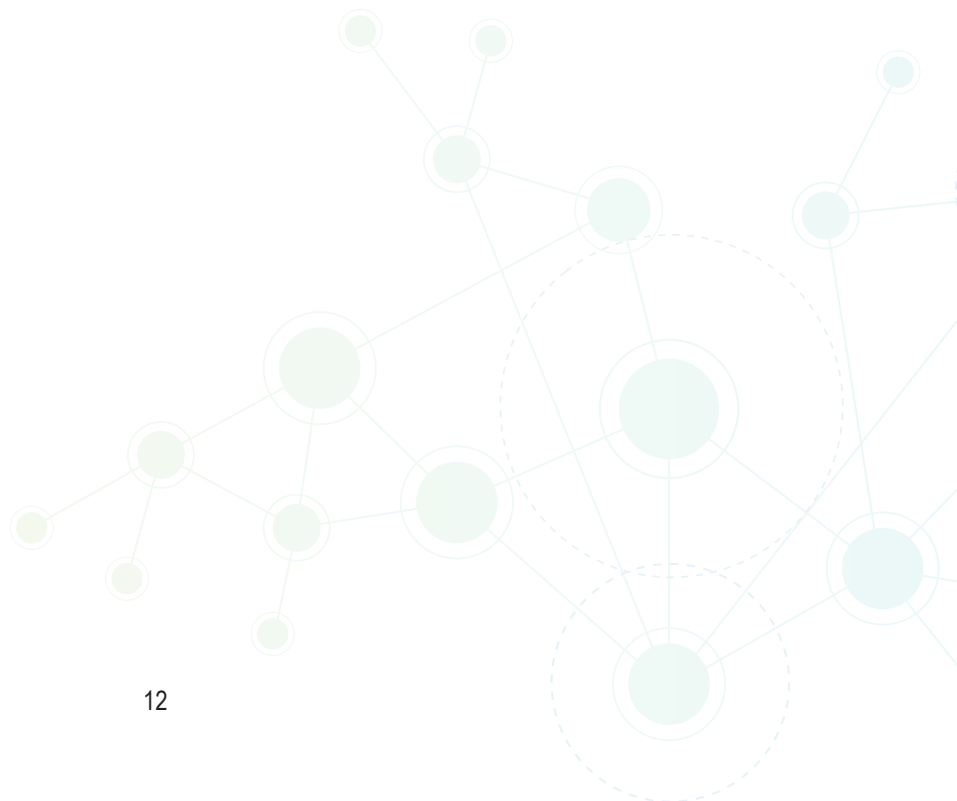
首次發現 ECP 的治療時間是治療缺血性中風患者的重要預測因素，此外還有眾所周知的預後因素如年齡和 NIHSS。

External counterpulsation enhances neuroplasticity to promote stroke recovery

Liu JY, Xiong L, Stinear CM, et al. Jan

Abstract

Improving tissue perfusion in peri-infarct cortex could enhance neuroplasticity and improve functional recovery after stroke. Treatments that enhance corticomotor function may benefit motor recovery. However, the effects of cerebral blood flow augmentation on corticomotor excitability have not been explored in humans. External counterpulsation (ECP) is a non-invasive method to improve perfusion of vital organs. It operates by applying ECG-triggered pressure to the lower extremities during diastole by means of air-filled cuffs. The diastolic augmentation of blood flow and the reduction of systolic afterload increases blood flow to the heart, brain and kidneys. In patients who had ischaemic stroke, ECP enhances cerebral blood flow velocities and can be associated with improvement in the neurological outcome. ECP may improve cerebral perfusion and collateral blood supply in ischaemic stroke by augmenting blood pressure and cerebral blood flow velocity. The effects of ECP on corticomotor excitability are unknown. We aimed to explore the effects of ECP on corticomotor excitability and upper limb motor recovery. We hypothesised that enhancing cerebral blood flow with ECP will facilitate ipsilesional corticomotor excitability and improve upper limb performance at the subacute stage of recovery after ischaemic stroke.



摘要

改善梗死周圍皮層的組織灌注可以增強神經可塑性，以及改善中風後的功能恢復。增強皮質運動功能的治療方法則有利於運動恢復。然而，腦血流增加對皮質運動興奮性的影響仍未在人類身上進行探討。體外反搏治療（ECP）是一種改善重要器官灌注的非侵入性方法。它通過在舒張期用充滿空氣的袖帶，依據心電圖向下肢施加壓力來操作。舒張期血流的增加和收縮期後，減少了心臟負荷，並增加心臟、大腦和腎臟的血流。在缺血性中風的病人中，ECP能提高腦部血流速度，並可改善神經系統。ECP可通過提高血壓和腦部血流速度來改善缺血性中風的腦灌注和側支血液供應。

ECP對皮質運動興奮性的影響尚不清楚。我們的目的是探索ECP對皮質運動興奮性和上肢運動恢復的影響。我們假設用ECP提高腦部血流量並促進同側皮質運動興奮性，從而改善缺血性中風後亞急性恢復階段的上肢表現。

External Counterpulsation Increases Beat-to-Beat Heart Rate Variability in Patients with Ischemic Stroke

Li Xiong , Ge Tian , Li Wang , Wenhua Lin , Xiangyan Chen , Thomas Wai Hong Leung , Yannie Oi Yan Soo , Lawrence Ka Sing Wong

Abstract

Background and purpose

External counterpulsation (ECP) is a noninvasive method used to augment cerebral perfusion in ischemic stroke. However, the response of beat-to-beat heart rate variability (HRV) in patients with ischemic stroke during ECP remains unknown.

Methods

Forty-eight patients with unilateral ischemic stroke at the subacute stage and 14 healthy controls were recruited. Beat-to-beat heart rate before, during, and after ECP was monitored. The frequency components of HRV were calculated using power spectral analysis. Very low frequency (VLF; <.04 Hz), low frequency (LF; .04-.15 Hz), high frequency (HF; .15-.40 Hz), total power spectral density (TP; <.40 Hz), and LF/HF ratio were calculated.

Results

In stroke patients, although there were no statistical differences in all of the HRV components, the HRV at VLF showed a trend of increase during ECP compared with baseline in the left-sided stroke patients ($P = .083$). After ECP, the HRV at LF and TP remained higher than baseline in the right-sided stroke patients (LF, 209.4 versus 117.9, $P = .050$; TP, 1275.6 versus 390.2, $P = .017$, respectively). Besides, the HRV at TP also increased after ECP compared with baseline in the left-sided stroke patients (563.0 versus 298.3, $P = .029$).

Conclusions

Irrespective of the side of the ischemia, patients showed an increased beat-to-beat HRV after ECP. Additionally, sympathetic and parasympathetic cardiac modulations were increased after ECP in patients after right-sided subacute stroke.

摘要

背景和目的

體外反搏 (ECP) 是一種無創的治療方法，用於增加缺血性腦中風的腦灌注。然而，缺血性腦中風患者在 ECP 期間的心率變異性 (HRV) 的反應仍不清楚。

方法

研究招募了 48 名亞急性期的單側缺血性中風患者和 14 名健康對照組。監測 ECP 之前、期間和之後的逐次心率。心率變異的頻率成分用功率譜分析來計算。計算了極低頻 (VLF; $<.04$ Hz)、低頻 (LF; $.04$ -. 15 Hz)、高頻 (HF; $.15$ -. 40 Hz)、總功率譜密度 (TP; $<.40$ Hz) 和 LF/HF 比率。

結果

在腦中風患者中，雖然所有的心率變異成分沒有統計學差異，但與基線相比，左側腦中風患者在 ECP 期間 VLF 的心率變異有增加的趨勢 ($P = .083$)。在 ECP 後，右側腦中風患者 (低頻) 和 TP 的心率變異仍高於基線 (低頻， 209.4 對 117.9 ， $P = .050$ ；TP， 1275.6 對 390.2 ， $P = .017$ ，分別)。此外，與基線相比，左側腦中風患者在 TP 的心率變異在 ECP 後也有所增加 (563.0 對 298.3 ， $P = .029$)。

結論

不管是哪一側位置的缺血，患者在 ECP 後都表現出了逐搏的心率變異。此外，右側亞急性中風患者在 ECP 後交感神經和副交感神經的心臟調節都有所增加。

Keywords: External counterpulsation; heart rate variability; infarct location; ischemic stroke

關鍵詞： 體外反搏；心率變異性；梗死位置；缺血性中風

Effects of external counter-pulsation on endothelial function assessed by peripheral artery tonometry, levels of glycaemia and metabolic markers in individuals with type 2 diabetes mellitus

Caroline Wei Shan Hoong , Maudrene Luor Shyuan Tan , Shih Ling Kao, Eric Yin Hao Khoo

Abstract

Background and Aims

External counter-pulsation (ECP) generates sheer stress thereby improving endothelial function and anginal symptoms in coronary artery disease. Endothelial dysfunction is also involved in the pathogenesis of T2DM. The aim of this pilot study was to investigate the use of ECP at different doses in improving endothelial function and glycaemic markers in T2DM.

Methods

This prospective study involved 46 subjects with T2DM randomly assigned to receive 35 sessions of ECP at different regimens (0.5 h versus 1 h) and duration (7 versus 12 weeks). Endothelial function was evaluated by reactive hyperaemia index (RHI) via peripheral arterial tonometry at the start, midpoint and end of study. Other secondary outcomes included fasting glucose, HOMA-IR, HbA1c, blood pressure, lipid profile, weight and vibration sense.

Results

There was no change in RHI across all 3 regimens of ECP individually or collectively at the end of the study ($\Delta\text{RHI} +0.01\%$, $p = 0.458$). Glycaemic markers also remained unchanged at endpoint. Subgroup analysis showed an improvement in RHI ($\Delta\text{RHI} +20.6\%$, $p = 0.0178$) in subjects with more severe endothelial dysfunction at baseline.

Conclusion

ECP did not show a beneficial effect on endothelial function or glycemic control in this South-East Asian population with T2DM at any of the three regimens. This may partly be explained by less severe endothelial dysfunction and less insulin resistance in our population at baseline.

摘要

背景和目的

體外反搏 (ECP) 可產生絕對壓力，從而改善冠狀動脈疾病的內皮功能和心絞痛症狀。當中內皮功能紊亂參與了 T2DM 的發病機制。本試驗研究的目的是調查在不同程度次數進行 ECP，在改善 T2DM 的內皮功能和血糖指標方面的應用。

方法

這項前瞻性研究涉及了 46 名 T2DM 患者，他們被隨機分配接受 35 次不同方案 (0.5 小時與 1 小時) 和持續時間 (7 週與 12 週) 的 ECP 治療。在研究開始、中期和結束時，通過外周動脈測壓法對內皮功能進行評估，即反應性低血脂指數 (RHI)。其他次要結果包括空腹血糖、HOMA-IR、HbA1c、血壓、血脂狀況、體重和振動感。

結果

研究結束時，3 種 ECP 方案的 RHI 單獨或集體都沒有變化 ($\Delta RHI +0.01\%$ ， $p = 0.458$)。血糖指標最終也保持不變。子組分析顯示，基線內皮功能障礙更嚴重的患者的 RHI 是有所改善 ($\Delta RHI +20.6\%$ ， $p = 0.0178$)。

結論

在東南亞的 T2DM 研究人群中，ECP 在三種方案中的任何一種都沒有顯示出對內皮功能或血糖控制的有利影響。這可能部分是由於東南亞的研究人群的內皮功能障礙較不嚴重和較少胰島素抵抗。

Keywords: Endothelial dysfunction; External counterpulsation; Peripheral arterial tonometry; Reactive hyperaemia; Type 2 diabetes

關鍵詞：內皮功能障礙；體外反搏；外周動脈測壓；反應性高血脂；2 型糖尿病

Effects of External Counterpulsation on Postexercise Recovery in Elite Rugby League Players

Llion A. Roberts, Johnpaul Caia, Lachlan P. James, Tannath J. Scott, and Vincent G. Kelly

Abstract

Purpose

External counterpulsation (ECP) has previously been used to treat cardiac patients via compression of the lower extremities during diastole to increase venous return and coronary perfusion. However, the effects of ECP on exercise performance and markers of recovery in elite athletes are largely unknown.

Methods

On 2 separate occasions, 48 h apart, 7 elite National Rugby League players performed an identical 60-min field-based conditioning session followed by a 30-min period of either regular ECP treatment or placebo. Power measures during repeated cycle bouts and countermovement jump height and contraction time derivatives were measured at rest and 5 h postexercise. Saliva samples and venous blood samples were taken at rest, postexercise, and 5 h postexercise to assess stress, inflammation, and muscle damage.

Results

After ECP treatment, cycling peak power output ($P = .028$; 11%) and accumulated peak power ($P = .027$; 14%) increased compared with the placebo condition. Postexercise plasma interleukin 1 receptor antagonist only increased after ECP ($P = .024$; 84%), and concentrations of plasma interleukin 1 receptor antagonist tended to be higher ($P = .093$; 76%) 5 h postexercise. Furthermore, testosterone-to-cortisol ratio was increased above baseline and placebo 5 h postexercise ($P = .017$ – $.029$; 24–77%). The ratio of postexercise salivary α -amylase to immunoglobulin A decreased after treatment ($P = .013$; 50%) compared with the placebo control.

Conclusions

Exercise performance and hormonal indicators of stress were improved and inflammation markers were reduced following acute ECP.

摘要

目的

體外反搏 (ECP) 一直被用來治療心臟病患者，通過在舒張期壓迫下肢來增加靜脈回流和冠狀動脈灌注。然而，ECP 對精英運動員的運動表現和恢復表現在很大程度上是未知的。

研究方法

在兩個不同的場合 (相隔 48 小時)，7 名國家橄欖球聯盟的精英球員各進行了 60 分鐘的場地調節訓練，然後進行了 30 分鐘的常規 ECP 治療或安慰劑治療。在休息時和運動後 5 小時，測量了重複循環訓練中的力量測量、反運動跳躍高度和收縮時間導數。在休息時、運動後和運動後 5 小時採集唾液樣本和靜脈血樣本，以評估壓力、炎症和肌肉損傷。

結果

在 ECP 治療後，與安慰劑治療條件相比，騎行峰值功率輸出 ($P=0.028$; 11%) 和累積峰值功率 ($P=0.027$; 14%) 有所增加。運動後血漿白細胞介素 1 受體拮抗劑只在 ECP 治療後增加 ($P = .024$; 84%)，運動後 5 小時血漿白細胞介素 1 受體拮抗劑的濃度趨於更高 ($P = .093$; 76%)。此外，睾酮 - 皮質醇比率在運動後 5 小時高於基線和安慰劑 ($P=0.017-0.029$; 24-77%)。與安慰劑對照組相比，運動後唾液中 α - 澱粉酶與免疫球蛋白 A 的比率在治療後下降 ($P=0.013$; 50%)。

結論

急性 ECP 治療後，運動表現和壓力的激素指標得到改善，炎症標誌物減少。

Keywords: sport, pneumatic compression, ECP, adaptation

關鍵詞： 運動；氣動壓縮；ECP；適應

Effect of External Counterpulsation on Exercise Recovery in Team Sport Athletes

Ruben Collins, Denise McGrath, Katy Horner, Silvia Eusebi, Massimiliano Ditroilo

Abstract

External counterpulsation (ECP), an electrocardiogram-led sequential compression of lower limbs, has been recently proposed for sports recovery, but research is scant. This study examined the effects of an ECP session upon neuromuscular function (vertical jump and torque/velocity characteristics), biochemical responses (creatine kinase, cortisol, testosterone, alpha-amylase and immunoglobulin-A), and muscle soreness (visual analogue scale) following high-intensity exercise. Twenty- one male team sport athletes (age: 21.6 ± 3.4 yrs; height: 182.7 ± 7.3 cm; body mass: 82.7 ± 9.3 kg) recovered from the fatiguing exercise using either ECP or rest. Data collection was conducted at three separate time points: upon arrival (Pre), post-recovery (Post), and 24 h post-recovery (24h Post). Significant main effects for time were observed for increased torque/velocity slope and for decreased isometric extension peak torque ($p < 0.001$). Significant main effects for time were observed for increased creatine kinase, testosterone, alphaamylase, and muscle soreness (all $p < 0.001$). Significant interaction effects were observed at post-testing following ECP: Cortisol release and the related decline in testosterone/cortisol ratio were attenuated, and immunoglobulin-A was increased following ECP in comparison to the control (all $p < 0.05$). Following high-intensity exercise, ECP has potentially beneficial effects upon biomarkers of recovery, without affecting the neuromuscular function.

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摘要

體外反搏 (ECP) 是根據心電圖引導而控制下肢連續按壓，最近發現可用於運動後恢復，但目前研究仍不多。本研究探討 ECP 治療對神經肌肉功能 (垂直跳躍和扭矩 / 速度特徵)、生化反應 (肌酸激酶、皮質醇、睪丸激素、 α - 澱粉酶和免疫球蛋白 -A) 以及高強度運動後肌肉酸痛 (視覺模擬量表) 的影響。21 名男性團隊運動運動員 (年齡： 21.6 ± 3.4 歲；身高： 182.7 ± 7.3 厘米；體重： 82.7 ± 9.3 公斤) 使用 ECP 治療或休息從疲勞運動中恢復過來。數據收集在三個獨立的時間點進行：運動時，恢復後，和恢復後 24 小時。觀察到時間點對扭矩 / 速度斜率的增加、等長伸展峰值扭矩的減少有明顯的主效應 ($P < 0.001$)。同時亦觀察到治療對肌酸激酶、睪丸激素、 α - 澱粉酶和肌肉酸痛的增加有明顯的反應 (所有 $P < 0.001$)。在 ECP 之後的測試治療間，有明顯的交互作用：皮質醇的釋放和相關的睪酮 / 皮質醇比率的下落被減弱，與對照組相比，ECP 治療後，免疫球蛋白 -A 增加了 (所有 $P < 0.05$)。在高強度運動後，ECP 對恢復方面有潛在有益的影響，而不影響神經肌肉的功能。

Keywords: fatigue, biomarkers, muscle soreness, peak power, torque/velocity relationship, countermovement jump

關鍵詞： 疲勞、生物標誌物、肌肉酸痛、峰值功率、扭矩 / 速度關係，反向運動跳躍

Effect of enhanced external counterpulsation on medically refractory angina patients with erectile dysfunction

W E Lawson , J C K Hui, E D Kennard, O Soran, P A McCullough, S F Kelsey, IEPR Investigators

Abstract

Patients with refractory angina often suffer from erectile dysfunction. Enhanced external counterpulsation (EECP) decreases symptoms of angina, and increases nitric oxide release. This study evaluated the effect of EECP on sexual function in men with severe angina. The International Index of Erectile Function (IIEF) was used to assess erectile function of severe angina patients enrolled in the International EECP Patient Registry. Their symptom status, medication use, adverse clinical events and quality of life were also recorded before and after completing a course of EECP. A cohort of 120 men (mean age 65.0 $\pm$ 9.7) was enrolled. The men had severe coronary disease with 69% having a prior myocardial infarction, 90% prior coronary artery bypass graft or percutaneous coronary intervention, 49% with three vessel coronary artery disease, 86% were not candidates for further revascularisation, 71% hypertensive, 83% dyslipidaemia, 42% diabetes mellitus, 75% smoking and 68% using nitrates. Functional status was low with a mean Duke Activity Status Inventory score of 16.6 $\pm$ 14.8. After 35 h of EECP anginal status improved in 89%, and functional status in 63%. A comparison of the IIEF scores pre- and post-EECP therapy demonstrated a significant improvement in erectile function from 10.0 $\pm$ 1.0 to 11.8 $\pm$ 1.0 ($p=0.003$), intercourse satisfaction (4.2 $\pm$ 0.5 to 5.0 $\pm$ 0.5, $p=0.009$) and overall satisfaction (4.7 $\pm$ 0.3 to 5.3 $\pm$ 0.3, $p=0.001$). However, there were no significant changes in orgasmic function (4.2 $\pm$ 0.4 to 4.6 $\pm$ 0.4, $p=0.19$) or sexual desire (5.3 $\pm$ 0.2 to 5.5 $\pm$ 0.2). The findings suggest that EECP therapy is associated with improvement in erectile function in men with refractory angina.

摘要

難治性心絞痛患者經常亦會患有勃起功能障礙。增強型體外反搏 (EECP) 可減少心絞痛的症狀，並增加一氧化氮的釋放。這項研究評估了 EECP 對嚴重心絞痛男性患者性功能的影響。國際勃起功能指數 (IIEF) 用於評估 EECP 對嚴重心絞痛患者的勃起功能。患者的症狀狀態、藥物使用、不良臨床事件和生活質量在完成 EECP 療程前後也被記錄下來。一個由 120 名男性 (平均年齡 65.0 ± 9.7) 組成的隊列被登記在冊。這些男性有嚴重的冠狀動脈疾病，其中 69% 曾經有過心肌梗塞，90% 曾經做過冠狀動脈旁路移植手術或經皮冠狀動脈介入治療，49% 患有三支血管冠狀動脈疾病，86% 不適合進一步進行血管重建，71% 患有高血壓，83% 患有血脂異常，42% 患有糖尿病，75% 吸煙，68% 使用硝酸鹽。他們的功能狀態低下，杜克大學活動狀態量表的平均分是 16.6 ± 14.8 。經過 35 小時的 EECP 治療，89% 的患者血管狀況得到改善，63% 的患者功能狀況得到改善。EECP 治療前後的 IIEF 評分比較列明，勃起功能從 10.0 ± 1.0 到 11.8 ± 1.0 ($P=0.003$)，性交滿意度 (4.2 ± 0.5 到 5.0 ± 0.5 ， $P=0.009$) 和總體滿意度 (4.7 ± 0.3 到 5.3 ± 0.3 ， $P=0.001$) 有明顯改善。然而，性高潮功能 (4.2 ± 0.4 至 4.6 ± 0.4 ， $p=0.19$) 或性慾 (5.3 ± 0.2 至 5.5 ± 0.2) 沒有明顯變化。研究結果表明，EECP 治療與難治性心絞痛男性患者的勃起功能改善是有幫助的。

Enhanced external counterpulsation in rehabilitation of erectile dysfunction: a narrative literature review

Seyed Ahmad Raeissadat , Atefeh Javadi , Farzad Allameh

Abstract

Background

Enhanced external counterpulsation (EECP) is a noninvasive treatment option widely applied in patients with erectile dysfunction (ED). The aim of this study is to review the efficacy of EECP in patients suffering from ED.

Methods

PubMed, MEDLINE, Google Scholar, Tripdatabase, Scopus, and Cochrane library databases were searched for articles with the following search terms: enhanced external counterpulsation and erectile dysfunction. No restrictions with respect to study setting, date of publication, and language were imposed.

Results

From an initial set of 208 records, 4 studies were selected after a final review. A total of 177 patients with a mean age of 59.98 years were included in these studies, with 20-35 hours per week of EECP treatment. Three studies used the International Index of Erectile Function questionnaire and one applied a four-item questionnaire and a peak systolic flow measurement. All of these parameters were significantly improved after the EECP treatment.

Conclusion

To the best of our knowledge, this is the first study reviewing the clinical effectiveness of EECP in patients with ED. According to the articles reviewed in this study, an improvement in erectile function after EECP treatment courses has been observed in patients with and without coronary artery disease without any significant adverse effects.

摘要

背景

增強型體外反搏術 (EECP) 是一種非侵入性的治療方案，廣泛適用於勃起功能障礙 (ED) 患者。本研究的目的是回顧 EECP 對 ED 患者的療效。

方法

在 PubMed、MEDLINE、Google Scholar、Tripdatabase、Scopus 和 Cochrane 圖書館的數據庫中搜索文章，搜索詞如下：增強型體外反搏治療和勃起功能障礙。對研究環境、出版日期和語言沒有限制。

結果

從最初的 208 條記錄中，經過最終審查，選出了 4 項研究。這些研究共包括 177 名患者，平均年齡為 59.98 歲，每週接受 20-35 小時的 EECP 治療。三項研究使用了國際勃起功能指數問卷，一項研究應用了四項問卷和收縮壓峰值流量測量。所有參數在 EECP 治療後都有明顯改善。

結論

據我們所知，這是第一項回顧 EECP 對 ED 患者臨床有效性的研究。根據本研究回顧的文章，在冠狀動脈疾病和非冠狀動脈疾病患者中，觀察到在進行 EECP 治療後，患者的勃起功能得以改善，沒有任何明顯的不良反應。

Keywords: fcoronary artery disease; enhanced external counter pulsation; erectile dysfunction; impotence; ischemic heart disease

關鍵詞： 冠狀動脈疾病；增強型體外反搏；勃起功能障礙；陽痿；缺血性心臟疾病

Clinical study in patients with ocular ischemic diseases treated with enhanced external counterpulsation combined with drugs

Yuxin Yang , Haitao Zhang, Yitao Yan, Yanling Gui

Abstract

The aim of this study was to evaluate the clinical effect in patients with ocular ischemic diseases treated with enhanced external counterpulsation (EECP) combined with drugs. A total of 65 patients with carotid artery stenosis were included in this study. Group A consisted of 31 patients (43 eyes) treated with EECP and medication, and group B consisted of 34 patients (49 eyes) treated with medication alone. The clinical effect was analyzed by comparing the visual acuity, visual fields and optical hemodynamics between the two groups of patients. Ocular ischemic diseases mainly included ischemic optic neuropathy, central (branch) retinal artery occlusion, ophthalmoplegia externa and ocular ischemic syndrome. Significant improvement of visual acuity, visual fields and optical hemodynamics was observed in the patients of group A, and statistically significant differences were found between groups A and B ($\chi^2=4.935$, 7.124 and 5.478, respectively; $P<0.05$). In conclusion, ophthalmologists should observe for ocular ischemic diseases. The symptoms of the disease and the vision of the patient could be effectively improved by EECP, which has no evident complications.

摘要

本研究的目的是評估用增強型體外反搏術（EECP）結合藥物以用作治療眼部缺血性疾病患者的臨床效果。本研究共包括 65 名頸動脈狹窄的患者。A 組包括 31 名患者（43 隻眼睛），採用 EECP 和藥物治療，B 組包括 34 名患者（49 隻眼睛），單獨採用藥物治療。通過比較兩組患者的視力、視野和光學血流動力學，分析其臨床效果。眼部缺血性疾病主要包括缺血性視神經病變、視網膜中央（分支）動脈閉塞、眼外傷和眼部缺血綜合症。A 組患者的視力、視野和光學血流動力學均有明顯改善，而 A 組和 B 組之間有統計學差異（ $\chi^2=4.935, 7.124$ 和 5.478 ； $P<0.05$ ）。總而言之，眼科醫生應多觀察眼部缺血性疾病。通過 EECP 可以有效地改善患者的疾病、症狀和視力，過程中沒有出現任何明顯的併發症。

Effect of enhanced extracorporeal counterpulsation in patients with non-arteritic anterior ischaemic optic neuropathy

Wenhui Zhu, Ruiduan Liao, Yongchong Chen, Li Liu, Yan Zhang

Abstract

Purpose

The purpose is to study the effect of Enhanced Extracorporeal Counterpulsation (EECP) in patients with non-arteritic anterior ischaemic optic neuropathy (NAION).

Methods

EECP is a noninvasive, mechanical, and circulatory support therapy. Sixteen patients with unilateral NAION were treated with EECP (twelve 1-h daily treatment sessions for each patient). Color Doppler imaging (CDI) was applied to measure the mean flow velocity (MFV), peak-systolic velocity (PSV), end-diastolic velocity (EDV) of the ophthalmic artery (OA) and central retinal artery (CRA). Intraocular pressure (IOP) was measured by Goldmann applanation tonometry. Measurements were collected before and immediately after the first and the last sessions of EECP in both eyes, and they were compared with the baseline measurement before EECP. The measurements were also compared between the NAION eyes and the normal fellow eyes. Visual acuity (VA) and visual field (VF) were assessed before EECP and after the last EECP.

Results

EECP progressively increased blood flow velocities of the OA and CRA and progressively decreased IOP in both eyes ($P < 0.05$). After the first session of EECP, there was a $16 \pm 5.3\%$ increase in EDV and a $13.9 \pm 9.5\%$ increase in MFV of the OA, and a $17.1 \pm 2.5\%$ increase in PSV, a $21.2 \pm 9.3\%$ increase, in EDV and a $16.5 \pm 3.3\%$ increase in MFV of the CRA in NAION eyes. After the last EECP treatment, there was a $16.8 \pm 6.7\%$ increase in EDV and a $14.0 \pm 5.1\%$ increase in MFV of the OA, and a $17.7 \pm 12.3\%$ increase in PSV, a $23.1 \pm 6.3\%$ increase in DSV, and a $21.1 \pm 8.4\%$ increase in MFV of the CRA in NAION eyes ($P < 0.05$). The change of the PSV, EDV, and MFV in the CRA were more significant in NAION eyes than that of their fellow eyes ($P < 0.05$). VA was improved and VF mean deviation was decreased in NAION eyes after the last EECP treatment ($P = 0.003$ and 0.049 , respectively), and VA improvement was correlated positively with the blood flow parameter.

Conclusions

EECP could be a clinically effective and safe treatment for NAION.

摘要

目的

研究增強型體外反搏術 (EECP) 對非動脈性前部缺血性視神經病變 (NAION) 患者的影響。

方法

EECP 是一種無創、機械、循環式支持療法。16 名單側 NAION 患者接受了 EECP 治療 (每位患者每天進行 1 小時的治療，共 12 天)。應用彩色多普勒成像 (CDI) 測量眼動脈 (OA) 和視網膜中央動脈 (CRA) 的平均流速 (MFV)、收縮期峰值流速 (PSV)、舒張末期流速 (EDV)。眼壓 (IOP) 是用壓平式眼壓計 (Goldmann applanation tonometry) 測量的。兩隻眼睛在第一次和最後一次 EECP 治療之前和之後都收集了測量數據，並與 EECP 之前的基線測量進行了比較。此外，還比較了 NAION 眼和正常同胞眼的測量結果。在進行 EECP 前和最後一次 EECP 後評估了視力 (VA) 和視野 (VF)。

結果

EECP 逐漸增加了 OA 和 CRA 的血流速度，並逐漸降低了兩眼的眼壓 ($P < 0.05$)。在第一次 EECP 治療後，NAION 眼的 OA 的 EDV 增加了 $16 \pm 5.3\%$ ，MFV 增加了 $13.9 \pm 9.5\%$ ，PSV 增加了 $17.1 \pm 2.5\%$ ，EDV 增加了 $21.2 \pm 9.3\%$ ，CRA 的 MFV 增加了 $16.5 \pm 3.3\%$ 。最後一次 EECP 治療後，NAION 眼的 EDV 增加了 $16.8 \pm 6.7\%$ ，OA 的 MFV 增加了 $14.0 \pm 5.1\%$ ，PSV 增加了 $17.7 \pm 12.3\%$ ，DSV 增加了 $23.1 \pm 6.3\%$ ，CRA 的 MFV 增加了 $21.1 \pm 8.4\%$ ($P < 0.05$)。NAION 眼的 PSV、EDV 和 MFV 的變化很明顯 ($P < 0.05$)。最後一次 EECP 治療後，NAION 眼的 VA 得到改善，VF 平均偏差下降 ($P = 0.003$ 和 0.049)，VA 的改善與血流參數有正面影響。

結論

EECP 可能是一種臨床上有效且安全的 NAION 治療方法。

Pneumatic external counterpulsation (PECP): a new treatment option in therapy refractory inner ear disorders?

Wenhui Zhu, Ruiduan Liao, Yongchong Chen, Li Liu, Yan Zhang

Abstract

Background

The established therapeutic principle for sudden deafness and tinnitus is based on the stimulation of the inner ear perfusion by infusion therapy using vaso-active or hemodilutive agents. Concerning a mechanically induced increase of the inner ear's blood supply, the new technique of Pneumatic External Counterpulsation (PECP) was performed. This technique had already been used successfully in patients suffering from coronary heart disease. Due to an ECG-guided pneumatic compression of the lower extremities during diastole an increase of arterial perfusion of the extracranial supplying brain vessels can be obtained by PECP-treatment.

Patients and methods

PECP was used in 33 patients (22 males, 11 females) between 19 and 76 years of age suffering from persisting acute hearing disorders and/or tinnitus after adequate infusion therapy. 3 patients revealed mild complications during PECP-treatment (e.g. thoracic pain) which seemed to be related to the therapeutic regime and disappeared completely after cessation of PECP. 30 patients underwent PECP-treatment on 5 following days for 1 hour. This standardized hourly treatment regime was extended to 10 days in 12 patients. Therapeutic effects were determined by color-coded duplexsonography and pure tone audiometry eventually masking the audiogram.

Results

During treatment an increase of 19% flow volume in the internal carotid arteries and of 11% in the vertebral arteries was evaluated using color-coded duplexsonography. In 47% of cases (n = 14) decrease of tinnitus intensity and/or tinnitus appearance with an average of 16 dB was perceived after the end of the treatment series. Hearing threshold increased in 28% of cases (n = 7) with an average threshold shift of 19 dB after PECP-treatment. All patients were examined by pure tone audiometry during the follow-up after 4, 8 and 12 weeks as well as after 6 and 12 months. In all cases the audiometric benefit lasted throughout the follow-up 1 year, after treatment.

Conclusions

The determination of a positive correlation between vascular flow increase in the extracranial brain-supplying vessels during PECP-treatment and the encouraging therapeutic results obtained by audiometry seem to make this new and promising therapeutic option effective, practicable and easy to handle. These preliminary results of the PECP technique should be validated in further studies featuring larger numbers of patients suffering from therapy-resistant inner ear disorders.

摘要

背景介紹

突發性耳聾和耳鳴的既定治療原理是通過使用血管活性或血液稀釋劑的輸液療法來刺激內耳灌注。關於機械性地增加內耳的血液供應，我們採用了氣動外反搏（PECP）的新技術。這種技術已經成功地應用於冠心病患者。由於在心電圖指導下，在舒張期對下肢進行氣動按壓，通過 PECP 治療可以促使供應腦血管的動脈灌注增加。

患者及方法

PECP 用於 33 名年齡在 19 至 76 歲之間的患者（22 名男性，11 名女性），他們患有持續的急性聽力障礙和 / 或耳鳴，全部已經過輸液治療。3 名患者在 PECP 治療期間出現了輕微的併發症（如胸痛），這似乎與治療方法有關，在停止 PECP 治療後完全消失。30 名患者在接下來的 5 天裡接受了 1 小時的 PECP 治療。這種標準化的每小時治療方法在 12 名患者中被延長至 10 天。治療效果以彩色編碼雙相圖和純音測聽法確定，而非聽力圖。

結果

在治療過程中，使用彩色編碼雙相圖評估，頸內動脈的流量增加了 19%，椎動脈的流量增加了 11%。47% 的病例（ $n = 14$ ）在治療結束後感覺到耳鳴強度和 / 或耳鳴外觀平均下降了 16dB。28% 的病例（ $n = 7$ ）在 PECP 治療後，聽力提高，平均聽力移動 19 分貝。在 4、8 和 12 週以及 6 和 12 個月後的隨訪中，所有病人都接受了純音測聽的檢查。在所有的病例中，聽覺效果在治療後一年仍然一直持續。

結論

在 PECP 治療過程中，顱外腦供血血管流量增加與聽力測量中所獲得的治療結果之間，存在著正相關的關係，似乎使這種新的和有前途的治療方案變得有效、可行和易於操作。這些 PECP 技術的初步結果應該在進一步的研究中得到驗證，因為有更多的患有耐藥性內耳疾病的病人。

External Counterpulsation Therapy for Patients with Mild Cognitive Impairment?

Wenhui Zhu, Ruiduan Liao, Yongchong Chen, Li Liu, Yan Zhang

Abstract

The development of vascular dementia and Alzheimer's Disease (AD) share an association with hemodynamic risk factors. Physical exercise improves cardiac output, which in turn increases Cerebral Blood Flow (CBF) and may improve cognitive function. Unfortunately, patients with signs of dementia are not always able to exercise, due to cognitive or physical decline. The Enhanced External Counterpulsation (EECP) therapy system is a non-invasive device used for patients with chronic angina and mild heart failure. This study evaluated the CBF changes in patients (n=4) with Mild Cognitive Impairment (MCI) after 35 one hour sessions of EECP therapy over 7 weeks. EECP therapy improves CBF in certain brain regions and there is evidence that these effects may persist for 6 months post-treatment. Cognitive function appears to be correlated with CBF rate in the hippocampus and precuneus. Although this study is small, its results are promising and support the need for a larger randomized controlled trial.

摘要

血管性癡呆和阿爾茨海默病 (AD) 的發展與血液動力學風險因素有共同之處。通過物理鍛煉可以提高心輸出量，從而增加腦血流量 (CBF)，並可改善認知功能。不幸的是，由於認知能力或身體機能的下降，有些癡呆症跡象的病人並不能夠鍛煉。增強型體外反搏 (EECP) 治療系統是一種非侵入性設備，用於慢性心絞痛和輕度心力衰竭患者。這項研究評估了輕度認知障礙 (MCI) 患者 (n=4) 在 7 週內接受 35 次一小時的 EECP 治療後的 CBF 變化。EECP 療法可改善某些腦區的 CBF，而且有證據表明，療效可在治療後持續 6 個月。認知功能似乎與海馬和楔前的 CBF 速率相關。雖然這項研究規模不大，但其結果是有希望的，並支持需要進行更大規模的隨機對照試驗。

Keywords: External Counterpulsation; Mild cognitive impairment; Dementia; Alzheimer's disease; Cerebral blood flow

關鍵詞： 體外反搏；輕度認知障礙；癡呆症；阿爾茨海默病；腦血流

Study of the external counterpulsation (ECP) therapy for senile dementia of the Alzheimer's type (SDAT)

Wenhui Zhu, Ruiduan Liao, Yongchong Chen, Li Liu, Yan Zhang, W P Li, Z B Yao, W J Yang, Y C Chen, W H Peng, P Hu

Abstract

Ten patients with SDAT received the ECP therapy. The examination of Hasegawa's Dementia Scale (HDS), single photon emission computed tomography (SPECT) brain imaging, and some biochemical parameters in blood and CSF were selected to evaluate the effect of ECP for SDAT. After ECP treatment, the average HDS score of the patients increased, the value of P was close to 0.05; and the cortical cerebellar ratios of SPECT brain scan, the superoxide dismutase (SOD) activity and the concentrations of somatostatin-like immunoreactivity (SLI), dynorphin AL-13 (Dyn AL-13) in blood and/or CSF were significantly elevated. The results indicated that ECP could not only improve cerebral blood flow, but also make a notable impact on biological active substances in blood and CSF. It is suggested that ECP is beneficial to SDAT patients. need for a larger randomized controlled trial.

摘要

10 名 SDAT 患者接受了 ECP 治療。選擇以長谷川式失智症量表 (HDS)、單光子發射計算機斷層掃描 (SPECT) 腦成像以及血液和腦脊液中的一些生化指標的檢查來評價 ECP 對 SDAT 的效果。ECP 治療後，患者的 HDS 平均分上升，P 值接近 0.05；SPECT 腦掃描的皮質小腦比值、超氧化物歧化酶 (SOD) 活性和血液和 (或) CSF 中的類體蛋白免疫反應性 (SLI)、代諾啡 AL-13 (Dyn AL-13) 的濃度均明顯升高。結果表明，ECP 不僅可以改善腦血流，而且對血液和 CSF 中的生物活性物質也有明顯的影響。ECP 對 SDAT 患者是有幫助的。

Expert consensus on the clinical application of enhanced external counterpulsation in elderly people (2019)

Abstract

Enhanced external counterpulsation (EECP) is a non-invasive assisted circulation technique and a rich pool of evidence has accumulated for its clinical application in the prevention and management of multiple comorbidities in the elderly population, including angina, heart failure, ischemic cerebrovascular diseases, neurodegenerative diseases, sleep disorder, diabetes and its complications, ischemic eye diseases, sudden hearing loss and erectile dysfunction, as well as various psychological and psychiatric conditions. When applying EECP to elderly patients, emphasis should be placed on issues such as safety assessment, risk management and protocol individualization, as well as the monitoring of efficacy during and after treatment.

摘要

增強型體外反搏術 (EECP) 是一種非侵入性的輔助循環技術，臨床上的應用已經積累了豐富的證明，特別是預防和治療老年人群的多種併發症，包括心絞痛、心力衰竭、缺血性腦血管疾病、神經退行性疾病、睡眠障礙、糖尿病及其併發症、缺血性眼病、突發性聽力損失和勃起功能障礙，以及各種心理和精神疾病。老年患者在應用 EECP 時，應強調並應重視安全評估、風險管理和方案的個性化等問題。以及治療期間和治療後的療效監測。



