COMPARISON OF HRV AND EEG BIOFEEDBACK ON THE QUALITY OF LIFE OF ASTHMA PATIENTS

Shireen Hamza
Frederick Wamboldt, MD
Milisyar Aviles, MS
Jessica Graves, MS
Maria Katsamanis, PsyD
Paul Lehrer, PhD
Asthma:
An episodic disease in which inflammation renders airways more reactive and therefore more susceptible to bronchoconstriction and asthma exacerbation.

Goal of Asthma Treatments:
Reduce a patients’ susceptibility to exacerbations of airway sensitivity which may cause severe, even life-threatening illness.

- Anti-inflammatory medications reduce airways’ reactivity
- Bronchodilator medications relieve symptoms once an asthma exacerbation is in process and may stop progressive constriction of airway smooth muscles

Purpose of the Study:
to determine the role of heart rate variability (HRV) biofeedback in asthma management as either
- a controller, anti-inflammatory treatment or
- a complementary/rescue bronchodilator treatment
## THE STUDY

<table>
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<tr>
<th>Phase One (four weeks)</th>
<th>Phase Two (three months)</th>
<th>Phase Three (during the last month of phase two)</th>
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<td>Weekly educational program for asthma self-treatment based on existing guidelines</td>
<td>Eligible patients are randomized into a 3-month trial of either: 1) Heart-Rate Variability Biofeedback (HRV) 2) EEG Biofeedback</td>
<td>Patients in the HRV-BF group are randomized again– Half receive a standard dose of an inhaled steroid (budesonide)</td>
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<td>Assessment of airway reactivity is conducted at <strong>three main</strong> visits. Various tests and evaluations are also administered, including the Asthma Quality of Life Questionnaire</td>
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Prior work showed HRV-BF treatment has a large effect on asthma control compared to this EEG protocol, which does not significantly affect either pulmonary function or medication requirements among people with asthma (Lehrer, 2004).

HRV-BF could potentially affect:
- airway inflammation and autonomic tone

**Control : EEG Biofeedback**
- Oz, Fp2 placement — alternatively increase and decrease alpha (following the international 1020 system)
- Paced breathing at a regular rate (usually 13.5-16.5 breaths/min)
- Music Meditation
  - patients are instructed to achieve a state of “relaxed alertness” at home, while listening to tapes of relaxing music and sounds of nature

**HRV Biofeedback**
- Paced breathing at a patient’s RESONANCE FREQUENCY - (usually about 6 breaths/min)
THE ASTHMA QUALITY OF LIFE QUESTIONNAIRE

The Questionnaire was used with no adaptations.

It consists of thirty two questions divided into four domains:

1) SYMPTOMS
2) ACTIVITY LIMITATION
3) EMOTIONAL FUNCTION
4) ENVIRONMENTAL STIMULI

Patients respond on a 7-point scale, with seven indicating that the patient is not impaired at all.

USE OF AQLQ IN THE STUDY

The questionnaire is administered **three** times throughout the study:

- in the visit **preceding** the ten biofeedback sessions,
- **halfway** through, after five sessions have been completed
- and **after** all ten biofeedback sessions.

![Image of questionnaire question 12](image)
A preliminary analysis of the AQLQ data of 23 patients
(less than one fourth of the study’s total participants)

7 from the HRV Biofeedback Group
12 from the Control (EEG + music) Group
And 4 from the HRV Biofeedback and Budesonide Group

Possible factors contributing to an improved quality of life score:
• Decreased symptoms
• Decreased inflammation of the airways
• Increased pulmonary function

What are the effects of each treatment on the patients’ quality of life?
Is there a significant difference between the AQLQ data of groups so far?
Is that a sign of the effectiveness of one treatment over another?
OVERALL RESULTS

QOL Total Score

HRV
N = 7

EEG
N = 12

HRV & Budesonide
N = 4

VISIT F(2, 40) = 4.8
P < .02
WERE THERE SIGNIFICANT DIFFERENCES BETWEEN THE CONTROL AND HRV GROUPS?

Every group showed improvement between the first and last visit.

There were no differences between groups in the trend of improvement.

There is a suggestion of sustained improvement between the midway and last visit in the HRV groups that does not exist in the EEG group, which shows a faint decrease.
THE TAKE-AWAY

Low numbers of participants – No conclusive results

Improvement – across groups

What do all groups have in common? Every patient:
- receives asthma education
- meets regularly with doctors
- receives relaxation therapy
- is provided with an albuterol rescue inhaler
- has a heightened awareness of asthma control
- practices paced breathing at home

How big a role do these factors also play in the improvement of the patients’ symptoms?

Could this data shed any light on the role of biofeedback in asthma management? What will be found when analyzed with together with the physiological testing data and other questionnaires?