

Note to medical doctors.

Summary of Buteyko's Theory on Asthma.

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Important note on medication:

Buteyko therapy is a simple education programme which does not affect conventional asthma management. Patients are actively encouraged to take medication in accordance with current asthma management practices.

Benefits of the treatment manifest initially in a reduction in requirement for bronchodilators and a reduction in symptoms. Reduction in steroids is arranged by the patient's doctor once the symptoms have disappeared.

Buteyko therapy is a logical approach to dealing with **Chronic Hyperventilation Syndrome (CHVS)**. Whereas prolonged chronic stresses of any kind can lead to physiological habituation to over breathing (Ref 13,23), Buteyko therapy simply reverses this process by relaxation of the respiratory muscles accompanied by deliberate volitional reduction in breathing over time.

The medical literature on CHVS reveals that:

- Doctors rarely diagnose the disorder or even look for CHVS as a diagnostic possibility (Ref. 1, 13, 15, 20, 23).
- Treatment for CHVS is not well developed, consisting of counselling and occasionally mild

sedation.

- Prevalence has been found to be between 6 and 11% in outpatient populations (Ref. 4, 13, 15, 24, 25). This excludes patients with organic disease such as asthma.
- The following are a few of the symptoms and observations associated with CHVS: (Ref. 1, 3, 5, 7, 13, 14, 15, 20, 23, 26) Hypophosphatemia, elevated uric acid, elevated sugar levels, loss of CO₂ and base reserve, electrolyte changes, poor oxygenation due to Bohr effect, elevated lipids, elevated calcium ionization, palpitations, cardiac neurosis, angina pain, mitral prolapse, myocardial infarction, tachycardia, Wolfe-Parkinson-White syndrome, arrhythmias, cerebral vascular constriction, stenosis of coronary artery, failure of coronary bypass grafts, right ventricular ectopy, silent ischaemia, elevated blood pressure, ECG: Flat or inverted T-wave, vasoconstriction, hiatus hernia, duodenal spasm, irritable bowel syndrome, spastic colon, Raynaud's disease, Da Costa's Syndrome, renal colic, genito-urinary disturbances, weakness, burnout, post traumatic stress disorders, influenza-like symptoms, sleep disturbances, chest pains, restlessness, syncope, excessive sweating, edema, migraines, aerophagia, failure of transurethral resections, chest tightness, muscle spasm, muscular stiffness and aching, paresthesia, seizures, visual disturbances, panic attacks, phobias, anxiety, EEG abnormalities, auditory disturbances, increased sympathetic tone, dizziness, dyspnea, asthma, shortness of breath.....

Since chronic hyperventilators can get any but not necessarily all of the symptoms, genetic predisposition must influence the way the disorder manifests in an individual.

Buteyko therapy has been brought to the west mainly as a treatment for asthma because of its evident and rapid effectiveness on this disorder. "Anecdotal" evidence supplied by asthmatics trying the method would suggest that the treatment is effective for all asthmatics, an observation which is supported by results published in a paper by Bowler et al.(Ref. 2.) This paper discusses a double blind controlled clinical trial in which the 19 long term asthmatics in the test group reduced their bronchodilator usage by 96% and steroids by 49% in 12 weeks.

What makes the hyperventilation theory for asthma difficult to accept at first, is that asthma is understood to be primarily an inflammatory disease. But as Lum (Ref. 13) points out in relation to CHVS "*Symptoms may show up anywhere, in any organ, in any system; for we are dealing with a **profound biochemical disturbance**, which is as real as hypoglycemia and more far reaching in its effects.*" The biochemical basis for this theory is spelt out by Kazarinov (Ref.12) who demonstrates why CO₂ is so crucial to all biosynthetic and regulatory processes. This biochemical disturbance deranges the immune system leading to immunological disorders like the allergic hyper reactivity seen in asthma, autoimmune disorders as seen in arthritis and a failure by the immune system to pick up cancer cells.

Pathophysiology of chronic hyperventilation in asthmatics:

1. Hypocapnia is the rule in Asthma and is particularly severe during an attack in mild/early stage asthma. (Ref. 4,16). As damage to the lungs progresses, a perfusion/ventilation mismatch occurs resulting in an improvement in arterial hypocapnia, but increasing hypoxia. At the same time those portions of the lungs still functioning properly become over ventilated. (Ref.16)

2. Respiratory alkalosis resulting from over-breathing leads to renal pH compensation by the dumping of bicarbonates. The net result is a depletion of the bicarbonate buffer, low pCO₂ and a disruption of the electrolytic balance resulting from lost electrolytes (particularly magnesium) which accompany the dumped bicarb.
3. Habituation to low CO₂ is brought about by prolonged episodes of factors causing hyperventilation such as chronic undischarged stress, wearing excessively warm clothing over a long period as well as many other bad western lifestyle habits. The accommodation process is set when these episodes span the time taken for bicarbonate to be dumped by the kidneys and the time taken for bicarbonate to slowly cross the blood-brain barrier.(Ref.10)
4. Kazarinov (Ref 12) shows how every biosynthetic process in the body is dependent on CO₂ either directly or as a catalyst. Low CO₂, therefore, affects all processes from the tricarboxylic acid (Krebs) cycle to the synthesis of proteins and lipids. This is the basis of Buteyko's claim that over-breathing is the cause of many diseases which is consistent with the large and bizarre number of symptoms seen in CHVS.
5. Low CO₂ in the blood **reduces oxygenation of the tissues through a depressed Bohr effect.** Oxy-hemoglobin dissociation is very strongly dependent on CO₂.

Oxy-hemoglobin dissociation is also affected by low 2,3 diphosphoglycerate (2,3 DPG). Production of 2,3 DPG is also depressed in CHVS because of hypocapnia induced hypophosphatemia. (Ref. 15)

All this results in an accumulation of acids such as lactic, pyruvic and uric acids. The expected high venous oxygen is, indeed, seen in conditions such as chronic fatigue syndrome.

Poor oxygenation produces air hunger, which tends to stimulate over-breathing in the form of excessive sighing and yawning.

6. Low CO₂ produces spasm in the smooth muscle of blood vessels, gut, ducts, glands and bronchioles (Ref. 8). Blood vessel spasm together with the depressed Bohr effect produces hypoxia that can account for headaches, migraines and angina pain. (Ref.: 5, 13, 15, 20, 23, 25)
7. Bronchioles constrict in response to local conditions rather than to CNS innervation. It makes teleological sense that the bronchioles should shunt air in order to even out ventilation. Since alveolar CO₂ is low in asthmatics, (Ref.:16) the over ventilated bronchioles are closer to shutting down and are, therefore, seen as "twitchy".
8. Buteyko therapy is simply an attempt to get the breathing normalised, i.e.: get the individual to physiologically habituate to breathing less. Effectively the same processes which make acute

episodes of hyperventilation become chronic, are simply reversed. Once the respiratory centre is reset to a physiologically more normal level through a restoration of normal bicarbonate level in the CSF, the bronchioles will open up in response to more normal baseline CO2 levels.

9. According to Professor Buteyko, inflammation and allergic hyper-responsiveness is caused primarily by an immune system which has become deranged due to low CO2. This is also why chronic stress can leave an individual more vulnerable to colds, flues and other disorders associated with an unhealthy immune system.

In addition the normal regulation and production of all hormones is affected by low CO2. This includes the normal production of Cortisol which may be impeded by chronically low CO2. Cortisol shortage contributes to the inflammatory hyper-responsiveness of the lungs.

10. Adrenal insufficiency is considered an important consequence of chronic hyperventilation. Cortisol supplementation along the lines recommended by Mck Jefferies (Ref 17) is considered essential in the process of restoring normal biochemical function.
11. The teleological explanation for mucus build up is that its function is to protect the raw and inflamed tissues. It may become thick and sticky due to the airways drying out as a result of mouth breathing.
12. Finally, what we have considered to be the cause of asthma, viz allergens, anxiety, transient stresses etc, are all just triggers for asthma and not the cause.
13. The Buteyko theory makes sense of all the enigmas that have been confounding our classical understanding of asthma, which according to Buteyko, is a single disease with multiple triggers, rather than a complex diseases with multiple causes.
14. Patients on Buteyko therapy typically report improvements in other CHVS symptoms, corresponding to improvements in their asthma.

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