Changes of Urine pH after the Compression of the Fourth Ventricle

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The purpose of this research is to determine whether the use of a particular osteopathic technique, the compression of the fourth ventricle (C-IV), induces a significant change in acid–base homeostasis. A total of 205 adult healthy subjects volunteered in this study. In order to verify the efficiency of the technique C-IV the urine pH was measured. The obtained results show a significant alkalization of urine.

INTRODUCTION

Osteopathy is a term coined by Andrew Taylor Still (1828-1917) which describes a complementary and alternative medicine based on the principle that the well-being of a person depends on proper interaction of bones, muscles, ligaments and connective tissue, functioning smoothly together. Osteopathy represents a holistic approach to health care and believes that treatments of musculoskeletal system, which primarily consist of moving, stretching and massaging a person’s muscles and joints, help the body to restore itself¹,². Osteopathy could represent a non-invasive technique to enhance and support the traditional medicine in various pathological conditions.

The compression of the fourth ventricle (C-IV) is a cranial osteopathic technique that aims to balance the cranial rhythmic impulse (CRI) through the stimulation of the Parasympathetic Nervous System (PNS)³,⁴. C-IV was mentioned for the first time by William G. Sutherland³, who learned osteopathy from Andrew Taylor Still in 1898. Sutherland based his model on the proposed physiology as defined in Emanuel Swedenborg’s eighteenth century anatomical studies⁵.

Several medical indications have been suggested for this technique. Harold Magoun⁷ suggested that C-IV “favours resolution of all membranous and ligamentous strains, lowers blood pressure, quiets nervous tension and facilitates any type of manipulative work”. Alain Gehin⁸ proposed that C-IV could be useful “to bring about a general relaxation of the patient”. Thorsten Liem⁹ advised that the C-IV can be used as a technique for reducing blood high pressure¹⁰-¹³. Jean-Pierre Amigues¹⁴ stated that the lowering the tonus of Sympathetic Nervous System has positive influences on stress as well as fear and insomnia. Christian Gfeller¹⁵ has provided experimental evidence for a significant movement of the fluids and, therefore, a better fluid exchange within the brain and between brain and blood.

The present research stems from the latter observation and has the aim of verifying whether the fluid exchange between brain and blood is capable of influencing body homeostasis and, in particular, the acid–base homeostasis.

In order to test this hypothesis it was decided to carry out assessments of the physiological pH in the urine before and after treatment C-IV¹, 16-18. In fact, it is well known that kidney has several powerful mechanisms to control pH through the excretion of excess acid or base.
MATERIAL AND METHODS

The research was carried out on a group of 205 healthy adult subjects, 102 males and 103 females.

All subjects were aged 31-55 years. The following exclusion criteria were applied: 1) Severe renal, cardiovascular, liver, respiratory, endocrine, or metabolic disorders, or food allergies; 2) Bone disease or abnormal bone metabolism; 3) Anomalous plasmatic calcium and/or magnesium levels; 4) Treatment capable of influencing body composition (ie steroidal hormone, thyroid hormone, female sex hormone, body fat-reducing drugs, antiepileptic drugs, osteoporosis drugs, vitamins D or K); 5) Ingestion of calcium, magnesium or indigestible oligosaccharides on a daily basis; 6) Pregnancy or lactation; or 9) Any medical condition making a subject unsuitable for the trial, as judged by a doctor.

All subjects received complete information about the osteopathic treatment that they would receive and signed the informed consent.

The subjects had to be fasting for eight hours and not having drunk alcohol in the previous 24 hours.

The subjects were randomly divided into three groups:

a) **Treated Group C -IV** composed of 77 subjects (38 males and 39 females), submitted to the of compression of the fourth ventricle;

b) **Control Group** consists of 78 subjects (39 males and 39 females), not treated.

c) **Sham Group** composed of 50 subjects (25 males and 25 females), which were informed that they will be submitted to an osteopathic technique that, in fact, was not practiced.

All subjects were underwent a two urine samples, one at rest and one after 25 minutes from the start.

The protocol can be represented in 4 phases:

- **Phase 1**: All subjects, both the treated group than in the control group were, lying on the couch, take the supine position for 10 minutes;

- **Phase 2**: all subjects were asked to urinate. The urine was collected in a sterile container, marked with a number, in order to maintain anonymity. Then the containers were taken to an adjoining room, where a specialist performed the measurements.

- **Phase 3**: The treated group (C -IV) was subjected to 15 minutes C -IV, the control group remained supine for the same time of administration of the technique; Group Sham was the approach at a time five fingers and the operator was limited to listening to the cranial rhythm. (this does not lead to any physiological change) to 15 minutes.

- **Phase 4**: Finally, subjects of both groups had to lie on their back for 10 minutes and then they were asked to empty the bladder; the maximum time allowed to collect the urine sample was 5 minutes.

The compression of the fourth ventricle was carried out by placing the subject in supine position, with the osteopath placed near its head (Fig. 1). The technique requires that subject lifts head and the osteopath’s thenar eminences are placed on the supraocciput and the thumbs point down the spinal column with the spinous processes between them. The osteopath initially follows the occiput during flexion and extension to tune into the mechanism. Once tuned, the osteopath encourages the occiput towards extension then it will accompany the occiput during the period of extension and the goal is to maintain extension and resist flexion 19.

Urinary pH was measured by using commercial pH test strips (Simple Health, Wellingborough, United Kingdom).

Data was collected and averaged, and then compared by using one-way repeated measures ANOVA (Friedman test) followed by the Dunn’s Multiple Comparison Test. Signifi-
The results obtained with the present research permit us to hypothesize that by acting directly with a cranial technique, such as compression of the fourth ventricle, it is able to induce alkalinization (increasing the pH) of urine.

In response to acidosis, tubular cells increase the reabsorption of bicarbonate from the tubular fluid, distal duct cells secrete more H+ and generate more bicarbonate, and in parallel there is an increased formation of the NH3 buffer. In responses to alkalosis, the nephron excretes more bicarbonate by decreasing H+ secretion from the duct cells, and lowering glutamine metabolism and ammonium excretion. Woods and Woods first described the “cranial rhythmic impulse”, an oscillation distinct from the respiratory and cardiovascular cycles, and normally occurring at a rate of 6–12 cycles/min. It has been suggested that this oscillation could be dependent on movement of cerebrospinal fluid (CSF) from brain to spinal cord. Therefore, “cranial rhythmic impulse” may facilitate movement of H+ from blood to CSF then pushing the kidney to reduce the secretion of hydrogen ions, and thus alkalinizing the urine.

From a therapeutic point of view, it is well known that the mainstay for medical management of uric acid stones is alkalinization of the urine. Increasing the urine pH to around 6.5 provides optimal conditions for dissolution of uric acid stones whereas increasing the urine pH to a value higher than 7.0 increases the risk of calcium phosphate stone formation. This leads us to speculate that this simple and non-invasive technique could be useful in promoting the dissolution of uric acid stones and therefore, used as a complementary technique of official medicine.

REFERENCES


