Complementary Therapies in Medicine xxx (xxxx) xxx–xxx

Contents lists available at ScienceDirect

Complementary Therapies in Medicine

journal homepage: www.elsevier.com/locate/ctim

Investigations on the constitutional types under consideration of anthropometric data, autonomic regulation and immunological parameters

Gabriela Rentsch, Carmen Steinborn, Amy Marisa Klemd, Gunver Sophia Kienle, Carsten Gründemann, Roman Huber*

Centre for Complementary Medicine, Institute for Infection Prevention and Hospital Epidemiology, Faculty of Medicine, University of Freiburg, Freiburg, Germany

ARTICLE INFO

Keywords:
Anthroposophic medicine
Constitution
Immune function
Kretschmer

ABSTRACT

Objectives: Over time different systems were developed for the characterization of individuals according to their physical and psycho-vegetative traits which until today play a role in complementary medicine. This pilot study aimed at investigating if the concepts of polar constitutional types of anthroposophic medicine and according to Kretschmer can be further clarified using empirical method.

Methods: 96 participants, preselected by two polar body mass index (BMI) ranges (17–19.5 kg/m^2 and 27–31 kg/m^2), were categorized using both classification systems. Anthropometrical measurements were carried out and differences in the autonomic regulation were assessed using a questionnaire. From 12 participants showing a pronounced polar constitutional type, production of reactive oxygen species, proliferation, autophagy, and glucose uptake by lymphocytes, monocytes and granulocytes were measured *in vitro*.

Results: Correlations between the BMI and the strength of constitutional classification were found for both classification systems. Additionally, a strong correlation between the two systems themselves could be seen. Analysis of the overall questionnaire score of autonomic regulation did not yield significant correlations. However, using a modified 11 item score, reliability (Cronbach $\alpha = 0.656$) and a differentiation of polar constitutional types was demonstrated ($p < 0.001$). Regarding the immune function slightly varying levels of reactive oxygen species, autophagy in granulocytes and differences in the strength of inhibition of lymphocyte proliferation by dexamethasone and cyclosporine A were detected. However, most of these *in vitro* results did not reach significance.

Conclusion: This study represents a first empirical approach toward the classification of anthroposophic constitutional types.

1. Introduction

The question whether or not people can be classified into different types according to their physical and psycho-vegetative traits and whether this is related to disposition for chronic diseases and response to interventions has long been asked. The totality of physical and psychological traits of an individual which remain stable over long periods of a lifetime is defined as constitution.[1,2] Over time different systems have been developed to categorize distinct constitutional types and between the different classifications many overlappings can be found. Nowadays academic medicine has largely forsaken the concept of constitutional types, but they still play a role in complementary medicine [3], and traditional medicinal systems [4,5] for diagnosing and therapeutic decision making.

Hippocrates first formulated his theory of the humors around 400 B.C. He described how people's constitution and state of health depend on the mixture of different basic qualities like cold-hot/humid-dry [6] showing that constitution played an important role in the understanding of pathogenesis as well as therapy and healing from the beginning of medicine on. Nowadays there are still a number of treatments in complementary medicine, such as cupping, leech therapy and sweating cure, which root in this theory.[7] During the second century, Galenos of Pergammon broadened Hippokrates' theory of the humoral pathology by combining it with the teachings of the temperaments. In this concept, an imbalance of one of the four humors of the human body: blood (sanguine), yellow bile (chole), black bile (melaina chole),

Abbreviations: AC, anthroposophic constitution; AM, anthroposophic medicine; AR, autonomic regulation; ARQ, questionnaire on autonomic regulation; BMI, body mass index; CFSE, carboxyfluorescein diacetate succinimidyl ester; CPT, camptothecin; CsA, cyclosporine A; KC, constitution according to Kretschmer; m.t.e., moderate to explicit; MLS, metabolic limb system; NSS, nerve-sense system; PBMC, peripheral blood mononuclear cells; PBS, phosphate-buffered saline; ROS, reactive oxygen species; RS, rhythmical system

* Corresponding author at: Breisacher Str. 115B, 79106, Freiburg, Germany.
E-mail address: roman.huber@uniklinik-freiburg.de (R. Huber).

https://doi.org/10.1016/j.ctim.2018.04.011
Received 1 December 2017; Received in revised form 18 April 2018; Accepted 26 April 2018

and phlegm (phlegma) was considered to result in one of the four character types: sanguine, choleric, phlegmatic, and melancholic.[6] This classification can still be found in the current language. In modern times classification of constitutional types underwent a change toward empirical descriptions.[7] Initially constitutional types and the corresponding characters were considered an emphasis of one of the four organ systems: nervous system, motion system, system of thoracic organs, or digestive system. However, beside precise measurements of body proportions, the perceived expression of a person became a focus.[8] Instead of rigid categorization, different systems of constitution were developed which assess physiological and psychological traits of an individual on scales with two polar end points.

The best known categorization of constitutional types was established by the German psychiatrist Ernst Kretschmer in 1921. Linking the impression of physique with detailed measurements of various body parts, he described pyknic, athletic, and leptosome types and postulated that the constitutional type is mostly inherited, however diet and physical load also have an influence.[8] Kretschmer derived these constitutional types starting from observations made in his clinical practice and found correlations between the leptosome type and the development of schizophrenia, the pyknic type and manic-depressive disorders, as well as the athletic type and epilepsy. Later he broadened his observations to the description of healthy individuals.

Also in the 1920s, Rudolf Steiner developed the concept of the threefoldedness of the human organism as a basis of anthroposophic medicine (AM). According to this concept there are three interlinked systems: the nerve-sense system (NSS), the metabolic-limb system (MLS) and the rhythmical system (RS), the NSS and MLS representing polar opposites.[9] Disease development is linked to an imbalance of these three systems.[9] Steiner himself noted that even within healthy individuals one of these systems is always predominant,[10] leading to a concept of constitution based on the tripartite classification.[11] which is of importance for the decision on individual therapies meant to equilibrate imbalances.[9,12,13] However, characterization of constitutional types is mostly done based on different pathologies and empirical studies of healthy individuals and a thus derived detailed description of these constitutional types are still missing. Based on the tripartite classification and being in accordance with other authors.[9,11–13] but avoiding a nomenclature associated with pathologies, we postulate two polar constitutional types: the NSS-accentuated type and the MLS-accentuated type. The predominance of the nerve-sense system characterizes the NSS-accentuated type as rather thoughtful or nervous, with a high sympathetic tone. It is further characteristic that this type is less likely to gain weight, likes to get up early and is a rather active person. The MLS-accentuated type on the other hand is calmer, prefers to avoid sportive activities and tends to gain weight more easily. Individuals of this type feel most comfortable in the evening.

Besides classification of healthy individuals, another question of this study was, whether there could be evidence for differences in the metabolism and function of immune cells between the polar constitutional types, since the human immune system can also be described as polarly structured.[14,15] This concept has so far not been empirically investigated. On the one hand there is the specific immune system with lymphocytes containing specific receptors, with the ability to release specific cytokines and to produce an immunologic memory, reminding us of the NSS. On the other hand there is the unspecific, innate immune system which plays an important role in the lysis of pathogens by neutrophil granulocytes and others, relating to the MLS. Different regulatory immune cells, especially monocytes, macrophages and dendritic cells are important mediators between the two systems, mirroring the RS. For this reason we chose lymphocytes, granulocytes and monocytes for the immunological investigations. Catabolic functions have been attributed to the NSS, anabolic functions to the MLS.[14,15] Therefore, we chose catabolic as well as anabolic parameters.

This pilot study aimed at investigating whether the concept of polar constitutional types according to AM is sustainable when applying empirical methods to further characterize it and if so, whether there could be evidence for differences in the metabolism and function of immune cells between these polar types.

2. Materials and methods

2.1. Study design, inclusion/exclusion criteria

The study was carried out as a monocentric, explorative-descriptive cross-sectional investigation (pilot study) without intervention on healthy test persons. The objective was to generate hypotheses and to estimate the range of possible differences of various parameters between different constitutional types which would help to plan future studies.

Inclusion criteria were age between 18–60 years and body mass index (BMI) between 17–19.5 kg/m^2 or 27–31 kg/m^2. Criteria for exclusion were pregnancy and breast feeding, severe acute or chronic diseases (excluding well-adjusted euthyroid deficiencies) and lack of German language skills. Volunteers were recruited via the intranet of Freiburg University Hospital, a Facebook group for medical students, notices on the university campus, and screened with a telephone interview.

2.2. Measurement of anthropometric parameters and assessment of constitutional types

According to Kretschmer measurement of body weight and size, hip size and abdominal girth, head circumference as well as width, length and height of the head was carried out.

The constitutional type according to Kretschmer (KC) was further assessed by evaluating the visual impression of physical characteristics listed in Table 1 using a scoring system from 1 to 9. Strongly leptosome types were assigned one and strongly pyknic types 9 points.

The anthroposophic constitutional type (AC) was also evaluated by assigning one (NSS-accentuated) to nine (MLS-accentuated) points based on the overall impression of a participant. Criteria were current state nervousness (velocity of speaking, body language, temperature and humidity of the hands during handshake), sleep quality (disturbed, undisturbed), course of body weight since puberty, temperature regulation according to subjects' experience and appetite in relation to body weight. Both constitutional types were always estimated by the same person (KC: trained medical student; AC: experienced anthroposophic medical doctor) independently of each other.

2.3. Questionnaire on autonomic regulation

The questionnaire on autonomic regulation (ARQ) was developed to differentiate autonomic regulation (AR) of patients from normal AR in healthy individuals. The questionnaire contains 18 questions with 3 response options each, characterizing the subscales orthostatic-circulatory (7 items, corresponding to the rhythmical system), resting vs. activity (8 items, corresponding to the nerve-sense system) and digestion (3 items, corresponding to the metabolic-limb system).

2.4. Modified scale of the questionnaire on autonomic regulation

Since our test subjects were all healthy individuals, we suspected from the planning phase of our study that the original ARQ might not be sensitive enough to differentiate between constitutional types. Therefore, we decided to use the collected data (by carrying out the analysis of reliability) to start developing a new scale for assessing polar differences in AR in healthy individuals. According to the clinical experience of RH as anthroposophic medical doctor, two new items were added and 5 of the original items were inverted in scoring in order to allow for the differentiation of polar constitutional types (Table 2 , highlighted in grey),