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CLINICAL CASE REPORT

Effects of Acupuncture at the *Yintang* and the *Chengjiang* Acupoints on Cardiac Arrhythmias and Neurocardiogenic Syncope in Emergency First Aid

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Abstract
This study evaluated the effectiveness of *YinTang* and *ChengJiang* acupoints on patients with cardiac arrhythmia and neurocardiogenic syncope in emergency first aid. A 45 year old woman underwent acupuncture. She had a previous history of a valvuloplasty for rheumatic disease and two acute myocardial infarctions, followed by four catheterizations and an angioplasty. Needling of the *YinTang* acupoint and stimulation of the *ChengJiang* acupoint through acupressure were performed for 20 minutes soon after syncope and during tachycardia, hypertension, tachypnea, and precordial pain, without any effect on peripheral oxygen saturation (SpO_2) or the glycemic index. Data were analyzed comparatively by using the following parameters at rest, during syncope, and at 1 minute and 10 minutes after an emergency acupuncture procedure: blood pressure; heart rate; SpO_2; and respiratory rate. We found that acupuncture at *YinTang* and *ChenJiang* acupoints induced cardiovascular responses, increased the limits of the body's homeostasis, and normalized the patient's condition in the case of syncope. Acupuncture using a combination of *ChengJiang* and *YinTang* acupoints had an immediate effect on the autonomic nervous system and on maintaining homeostasis and energy balance in the body. Although this technique was effective, the patient was still referred to the Emergency Room.

1. Introduction

Heart diseases are clinically important due to their high prevalence, mortality, and morbidity. Epidemiological studies report overall mortality rates of 30% on average, with half the deaths occurring in the first 2 hours of the event and 14% of the deaths occurring before the patient receives any medical care [1,2]. The prognosis of these patients depends on the rapidity in providing medical assistance and on the effectiveness of efforts to establish coronary artery reperfusion as soon as possible [3]. In Southeast Asia, Chinese physicians have long been using acupuncture to treat heart diseases. The World Health Organization (WHO) has published an official report listing 31 symptoms, conditions, and diseases, such as cardiac pain, arrhythmias, and hypertension. In controlled trials, those symptoms, conditions, and diseases have been treated effectively by using acupuncture [4,5].

The curious meridians Yin Wei could be involved, and the precordial pain irradiates to the left arm, with a feeling of oppression of the chest and imminent death; however, all cardiology exams are normal. As Yin Wei connects all Yin meridians, the symptoms associated with some clinical particularities may appear because of an impaired meridian [6]. A pattern of disharmony is the condition, as well as the basis for the treatment, which will only be successful when the pattern is properly differentiated; in fact, the best criterion to verify a diagnosis is the effectiveness of the treatment. The basic patterns of disharmony of the body constitute a set of signs and symptoms that determine an illness and can be analyzed in traditional Chinese medicine from various points of view, e.g., loss of balance of Yin and Yang in relation to the five movements and according to the internal systems. In different periods of the development of Chinese medicine, several methods were applied to identify the patterns that could be used in different situations: "These methods have their own specificities and play a different role in diagnosis; however, they are linked and complement each other" [7].

One of the main purposes of acupuncture is to keep the energetic balance of the body. Acupuncture can modulate the autonomic tonus and, consequently, correct the abnormalities in blood pressure (BP) caused by changes in heart rate (HR), cardiac contractility and arteriolar vasomotor tone [8]. One of the mechanisms by which acupuncture inhibits centrally-mediated arrhythmias is by increasing the endorphin and dynorphin levels in the periaqueductal grey matter. This reduces the levels of norepinephrine and dopamine by decreasing the sympathetic stimulation of the heart.

The points *YinTang* and *ChengJiang* provide homeostasis, which consequently influences the cardiovascular system, and modern studies have widely evaluated the therapeutic effects of acupuncture on the cardiovascular system. The efficacy of acupuncture in treating cardiovascular disorders and their symptoms, such as arrhythmia, palpitation, dyspnea, dizziness, syncope, hypotension, hypertension, and angina, is gradually being recognized [9—13]. Based on these ideas, the main goal of this research was to evaluate the effectiveness of acupuncture at the *YinTang* and the *ChengJiang* acupoints on cardiac patients with cardiac arrhythmia and neurocardiogenic syncope in cases of emergency first aid.

2. Case Report

A 45-year-old woman with a previous history of a valvuloplasty for rheumatic disease and two acute myocardial infarctions (AMIs), followed by four catheterizations and an angioplasty, was the subject of this study. This study was approved by the Research Ethics Committee of the Claretiano University Center, São Paulo, Brazil (number: 67/2011). The participant was informed about the experiment and agreed to participate by providing her free and informed consent according to resolution 466/12 of the Health National Council.

After having walked for 20 minutes, the patient had a cardiac arrhythmia and neurocardiogenic syncope

mediated by tachyarrhythmia with increased HR, respiratory rate (RR), and BP, followed by precordial pain without any repercussion on the peripheral oxygen saturation (SpO_2) and any alteration of the glycemic index. The patient remained quiet in the supine position, and the mobile Intensive Care Unit (ICU) was called immediately. The acupuncture procedure was performed while waiting for the ICU. To improve the patient's energy flow and produce homeostasis in the body, we applied a needle (0.25 mm $\times$ 0.15 mm) to the *YinTang* acupoint (Fig. 1) at 90°, and we used acupressure to stimulate the *ChengJiang* acupoint (Fig. 2).

The harmonization of an acupuncture point was performed with the needle inserted perpendicular to the energy channel; the needle was left in place for an average time of 20—25 minutes [14—16]. Needles were inserted at the *YinTang* and the *ChengJiang* acupoints, and the patient received nonstop 1 minute stimulation immediately after syncope with symptoms of tachycardia, systemic arterial hypertension, tachypnea, and precordial pain, but without repercussion on the SpO_2 and alteration of the glycemic index. Stimulations by using the needles were then performed every 5 minutes, and the vital signs were monitored by using a pulse oximeter, a sphygmomanometer, a stethoscope, and RR and blood glucose measurements. The needles remained in place for 20 minutes and were then removed, and the stimulation ceased. The patient's condition was stabilized. After 20 minutes and after the acupuncture procedure had been completed, the mobile ICU arrived at the scene. Traditional Chinese medicine (TCM) states that the treatment of the heart must be addressed indirectly and not by the emperor (the heart itself), but rather through the emperors ministers (masters of the heart); in this case, however, the masters of the heart were not used because the purpose was to restore the vital functions through a harmonization of Shen.

3. Discussion

A comparative analysis of the data collected showed that acupuncture performed at the *YinTang* and the *ChengJiang* acupoints as emergency first aid had positive effects, as shown in Table 1. The internal and the external pathogenic factors cause an exhaustion of energy, leading to

Figure 1 *YinTang* point (source: personal collection).

Figure 2 *ChengJiang* point (source: personal collection).

circulatory disorders that show that the energy of the heart may not be sufficient. Less energy of the heart gives rise to circulatory disorders that cause blood stagnation, which may lead to cardiac arrhythmia and neurocardiogenic syncope or even an acute coronary syndrome, and the first signs of heart disease are palpitations (hsin Qi) or abnormal heartbeats [17].

TCM suggests that regulation of the mind (Shen) through an indirect treatment of the heart (Xin), which we applied as emergency first aid, produces an immediate effect on energy harmonization. These findings corroborate those observed by Li et al [18], who started their studies in China and concluded them in North America. The authors identified a neurological basis for the effect of acupuncture on the cardiovascular system, as the stimulation of certain acupuncture points activated the Group III and IV muscle afferents that provide the inputs for a number of regions of the hypothalamus, midbrain stem, and brain stem, which are responsible for maintaining homeostasis in the cardiovascular system [18—20].

A great number of clinical reports have suggested that acupuncture can reduce BP in hypertensive subjects suffering from angina and coronary diseases. Since 1950, some studies have reported that acupuncture can be used to reduce BP in hypertensive patients [21—23]. Radzievsky et al [24] confirmed that acupuncture plays a role in regulating BP, improves the contractile function, and reverses the myocardium hypertrophy in patients with hypertension. Richter et al [12] determined with the use of an electrocardiogram that acupuncture can prevent myocardial ischemia in patients with coronary heart disease. In a series of studies, Ballegaard et al [13] confirmed that acupuncture, in addition to drug treatments, might have specific effects on angina pectoris due to hemodynamic alterations. However, there are no data on the influence of acupuncture on exercise performance and cardiovascular response, not even in healthy individuals [13].

Williams et al [25] found that electrical stimulation rapidly caused a significant and immediate reduction of the diastolic blood pressure. In 1997, a study carried out with 50 patients with hypertension reported that after 30 minutes of acupuncture, the systolic and the diastolic BPs were reduced by between 10 mmHg and 20 mmHg,

Table 1 Comparison of vital signs collected and subdivided into four stages.

Vital signs	Rest	After syncope	At 1 min	At 10 min	Recovery (%)
Heart rate (bpm)	89	142	88	82	57
Respiratory rate (rpm)	18	30	20	20	66
Blood pressure (mmHg)	160 × 100	230 × 110	160 × 100	140 × 100	60
SpO_2 (%)	98	100	98	98	98

SpO_2 = peripheral oxygen saturation.

suggesting that something happened immediately after the procedure [26]. In experimental studies with anesthetized animals, Li and Longhurst [27] demonstrated that the inhibitory effect of acupuncture on reflex responses occurred after 10—20 minutes of electrostimulation, with a residual effect being observed for 60—90 minutes. In a preliminary study held in an ambulatory clinic, some patients with mild to moderate hypertension were monitored 24 hours a day during 8 weeks of treatment with acupuncture and presented decreased HRs [27]. Acupuncture induces cardiovascular responses, and the association of the points *YinTang* and *ChengJiang* increases the limits of the body's homeostasis, normalizes the patient's condition in the case of syncope, and stabilizes the vital functions, such as the BP, HR, RR and SpO_2.

According to Zhou et al [28], the somatic afferent pathway through low-frequency electrical stimulation or mechanical stimulation with acupuncture needles inhibits the sympathoexcitatory cardiovascular reflex responses. Therefore, the neural sensory input is an important reflex mechanism subjacent to acupuncture used in cardiovascular regulation [28]. In a recently published review study, Li et al [29] discussed the correlation between PC6 (Neiguan) acupuncture and cardiac function on the basis of central neural mechanisms and suggested that some experimental studies had demonstrated that the hypothalamic rostral ventrolateral medulla (RVLM), arcuate nucleus (ARC), ventrolateral periaqueductal gray (VLPAG), and medullary raphe were involved in the acupuncture-mediated attenuation of sympathoexcitatory cardiovascular reflex responses, and they appeared to contribute to the long lasting, acupuncture-mediated attenuation of sympathetic premotor outflow and excitatory cardiovascular reflex responses [29]. Thus, the authors concluded that acupuncture modulated the activity in the cardiovascular system, which could be attributed to the attenuation of cardiovascular reflex responses. Such reflex responses are significantly reduced when low current and low frequency are used in electroacupuncture (0.3—0.5 mA, 2 Hz) applied to the acupuncture points PC5 (Jianshi) and PC6 (Neiguan) in rats [30,31].

Smith [8] carried out some studies on the stimulation of the E36 (Zusanli) point and demonstrated a decrease in BP through an inhibition of the sympathetic nervous system and a release of endogenous opioids, which resulted in a decreased cardiac output. Bradycardic patients showed an increase in HR, and patients with tachycardia showed a decrease in HR after the stimulation of PC6 (Neiguan) [8]. Dill et al [32] also showed the effects of acupuncture on cardiac rhythm, cardiac output, blood flows for organs and tissues, and BP.

In a study carried out with 54 patients with symptomatic sinus bradycardia, who were unresponsive to medication and had undergone acupuncture with manual stimulation for 5—15 minutes of the PC6 (Neiguan), PC7 (Daling), and E36 (Zusanli) points for 8—10 days, 37 patients had a 20% increase in HR, 12 patients had a 10% increase in HR, and seven patients showed the same HR. A total of 87% of the patients with bradycardia showed improvements [8]. The points used were observed to increase the HR; however, in our study, the HR was decreased after the stimulation of the same points. This comparison is important considering that if the points are chosen incorrectly and without prior knowledge of the effects, the patient's condition may worsen.

Although a considerable number of previous clinical studies support the effectiveness of acupuncture for the treatment of many cardiac diseases, the mechanisms of these effects are still unknown. A set of acupuncture points overlying the median nerve is often used in the treatment of cardiovascular diseases. Clinical and experimental studies have suggested that acupuncture has therapeutic effects on hypertension, hypotension, arrhythmias, angina pectoris, and myocardial infarction [31,33]. Many studies give emphasis to the PC6 (Neiguan) and the E36 (Zusanli) acupoints with good results and state that the use of acupuncture in a comprehensive way contributes to homeostasis of the body. However, no reports were found in the literature on the use of a combination of the *YinTang* and the *ChengJiang* acupoints in the emergency treatment of cardiac arrhythmia and neurocardiogenic syncope. Further studies are necessary to determine the effectiveness of this procedure.

Acupuncture at a combination of the *ChengJiang* and the *YinTang* acupoints produces an immediate effect on the autonomic nervous system and on maintaining the homeostasis and the energy balance in the body. This fact is relevant because in emergency rooms, time is essential to saving lives, and the applied technique showed an essential hemodynamic stability in this type of situation. However, it is worth mentioning that even though this technique is effective, the patient may still need to be referred to the Emergency Room.

Disclosure statement

The authors declare that they have no conflicts of interest and no financial interests related to the material of this manuscript.

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