Clinical and Nutritional Profile of Individuals with Chagas Disease

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Chagas disease (CD), caused by the protozoan *Trypanossoma cruzi*, affects approximately 18 million individuals in the Americas, 5 million of which live in Brazil. Most chronic sufferers have either the indeterminate form of the disease, without organic compromise, or the cardiac or digestive forms. Despite the importance of this disease, there is no information on the effect of nutrition on CD evolution. We evaluated the clinical-nutritional profile of individuals with CD treated at the Tropical Diseases Nutrition Out-Patient Clinic of the Botucatu School of Medicine, UNESP. A retrospective cohort study was performed between 2002 and 2006, on 66 patients with serum and parasitological diagnosis of CD. Epidemiological, clinical, nutritional, and biochemical data were collected, including gender, age, skin color, smoking, alcoholism, physical activity, weight, stature, body mass index, abdominal circumference, glycemia, and lipid profile. Fifty-three percent were male and 47% female; 96% were white skinned. Mean age was 49.6±6.36 years. The predominant form was indeterminate in 71%; smoking and drinking were recorded in 23% and 17%, respectively. Sedentariness predominated in 83%, and 55% presented increased abdominal circumference. Most, 94%, were overweight or obese. The biochemical exams revealed hyperglycemia in 12% and dyslipidemia in 74%. These findings suggest that the Chagas population presents co-morbidities and risk factors for developing chronic non-transmissible diseases, including cardiovascular diseases, making CD evolution even worse.

Key-Words: Chagas disease, nutrition, dyslipidemia.

Acute or chronic Chagas disease (CD) is the result of infection by the protozoan *Trypanossoma cruzi*, with greater incidence in communities living under poor hygiene and sanitation conditions in the Americas [1]. In Brazil, this is one of the most serious medico-social problems, evident from its high frequency and the large number of deaths, notably as a consequence of cardiac lesions [2].

World Health Organization (WHO) data show that in continental America, between 16 and 18 million people are parasite carriers and that around 90 million are at risk of acquiring it, and there are approximately 21,000 deaths per year. In Brazil, the Health Ministry reports about five million infected individuals [3].

Most individuals with chronic CD have the indeterminate form, without any evident organic compromise. Other forms of the chronic phase are cardiac and digestive, the latter attacking the esophagus and colon [1]. Chagasic cardiomyopathy is associated in an independent manner with ischemia [4]. Other risk factors can be involved in the development of cardiovascular diseases, specifically hypertension, diabetes mellitus, obesity, and dyslipidemia, among others [5-7].

An increase in dyslipidemia has been in seen in the general population in recent years; this is characterized by high LDL and low HDL cholesterol levels [8,9]. Changes in lifestyle, such as sedentariness and diets rich in carbohydrates and fats, with consequent overweight and obesity, could be contributory factors towards this increased prevalence [10]. High triglyceride levels also play an indirect role in this process by causing small dense particles of LDL-cholesterol to form, which can be atherogenic [11].

International Obesity Task Force (IOTF) data published by the WHO indicate that there are approximately 250 million obese adults (7% of the world's population), and at least 500 million overweight, demonstrating that obesity is a worldwide epidemic [12]. Approximately 51 million adults are overweight or obese in Brazil [13].

Prospective studies have suggested that obesity significantly increases the morbidity-mortality of other diseases, such as arterial hypertension, dyslipidemia, coronary ischemia disease, bile duct disease, osteoarticular diseases, type II diabetes mellitus, and some types of cancer [12,14,15]. There are no literature reports about a possible correlation between risk factors involved in the development of cardiovascular diseases and Chagas disease. It would be useful to determine the clinical, nutritional, and personal aspects of individuals infected by *Trypanossoma cruzi*, with the aim of finding ways to minimize risk factors for developing non-transmittable chronic diseases.

We evaluated the clinical-nutritional profile of individuals with chronic forms of Chagas disease seen at the Tropical Disease Nutrition Out-Patient Clinic (TDNC) of the Botucatu School of Medicine, São Paulo State University, Brazil (FMB-UNESP).

Materials and Methods

A retrospective cohort study was performed between 2002 and 2006, on 66 Chagas disease patients, whose diagnosis was confirmed by serum or parasitology tests; they were all over 18 years old, of both genders, and attended TDNC at

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FMB-UNESP. The serum tests to detect anti-*T. cruzi* antibodies were ELISA, Indirect Hemaglutination (IHA), and Indirect Immunofluorescence (IIF), performed in the Technical Clinical Analysis Serum Laboratory, FMB-UNESP. The parasitology tests used to detect trypanosome forms were: blood culture in Liver Infusion Tryptose (LIT) medium, and artificial xenodiagnosis, in the Tropical Disease Research Laboratory, Tropical Diseases and Image Diagnosis Department, FMB-UNESP. Individuals under 18 years or who were pregnant were not included. This study was approved by the Research Ethics Committee of FMB-UNESP.

Epidemiological, clinical, nutritional and biochemical data were collected from medical record sheets from TDNC FMB-UNESP, from 2002 to 2006. Epidemiological and clinical data included gender, skin color, age, smoking, alcohol intake, and physical activity. Smokers were classified as such if they smoked daily, independent of quantity [16], and alcohol drinkers were women who consumed more than one and men more than two units per week [17]. Individuals were considered sedentary when they did not partake in physical activity during leisure time for at least 30 minutes, on most days during the week (≥4), as per American Heart Association recommendations [18]. Anthropometric data were weight, stature, and abdominal circumference. Body mass index was also calculated by dividing weight (kg) by stature (m) squared, in order to make a nutritional diagnosis based on World Health Organization (WHO) proposed values [19]. Abdominal circumference values were considered high when over 102 cm in men and 88 cm in women, as high-risk cut-off points for cardiovascular disease [7]. Laboratory exams were fasting glycemia and lipid profile, including total, LDL, and HDL, cholesterol, and triglycerides. All exams were performed after 12h fasting, with no rigorous physical activity for the previous 24h and no alcohol ingestion for the previous 72h. These analyses were performed in the Clinical Medicine Laboratory of FMB-UNESP. Hyperglycemia was considered when individuals presented fasting plasmatic glycemia values ≥110 mg/dL. Isolated hypercholesterolemia was considered when serum total cholesterol was ≥240 mg/dL or LDL-cholesterol ≥160mg/dL, isolated hypertriglyceridemia when serum triglycerides were ≥200 mg/dL, or mixed dyslipidemia, when both were high.

Results

Among the 66 individuals, 35 (53%) were male and 31 (47%) female; 95.5% were white skinned and 4.5% negro. Mean age was 49.6±6.36 years. Habitual smoking and drinking were reported in 22.7% and 16.7%, respectively; 83.3% were sedentary and 54.5% had abdominal circumferences considered to be high risk for cardiovascular diseases (CDV). Hyperglycemia was found in 12.1% (Table 1).

The predominant form of CD was indeterminate, followed by digestive, cardiac, and mixed, at 71.2, 12.1, 9.1, and 7.6%, respectively (Figure 1). The prevalent nutritional diagnoses were pre-obesity (31.8%), and various grades of obesity (62.1%), with eutrophy found in only 6.1% (Figure 2). In the lipid profile, dyslipidemia was found in 74.2% (Table 1), the most commonly-seen forms being mixed, hypercholesterolemia, and hypertriglyceridemia, in 36.4, 22.7, and 15.1%, respectively (Figure 3).

Discussion

Chagas disease has a heterogeneous presentation, with wide variation in clinical course and prognosis. Treated as a chronic pathology, patients are susceptible to developing co-morbidities, such as cardiovascular diseases, obesity, diabetes mellitus, which can directly or indirectly interfere in disease evolution, accentuating its seriousness.

The Brazilian Health Ministry recognizes that public services must have quality and operate at low cost. To this end, university hospitals must provide differentiated treatment to CD patients to prevent complications and reduce costs [20]. We investigated the clinical/nutritional profile of CD patients treated at TDNC FMB-UNESP to look for parameters that might help reduce complications in such patients.

There were no significant differences between genders; CD affected both men and women, and as found in other studies, CD is prevalent in rural areas, it is associated with low socioeconomic levels, and it can attack both genders [21].

We found that CD predominated in the adult-age group, which agrees with most reports; they indicate that it is a late-manifesting chronic disease [22-24]. White-colored skin, the most numerous group, reflects the origin of those included in this study, who were mainly from the rural interior of São Paulo State, where Italian immigrant colonization predominated.

Most cases that we studied originated from a blood bank, in which indeterminate CD predominated, which reflected the normal distribution of chronic forms of this disease [20,23,24]. The principal co-morbidities and risk factors for developing DVC identified in these individuals were hyperglycemia, obesity, smoking, sedentariness, high abdominal circumference values, and dyslipidemia. Although elevated glycemia has been reported in around 32% of the Chagas population that includes all clinical forms of the chronic phase [25], we observed hyperglycemia in only 12% of the individuals. Other risk factors for chronic diseases are regular drinking and smoking, which were documented in 17% and 23% of our patients respectively. These frequencies are within the range reported for the Brazilian population, for which the frequency of smoking and drinking are between 2.9 and 45.4%, and 20 and 30% of the country's population, respectively [26].

Sedentariness was found in 83%, within the range reported in a recent review article [27]. Physical inactivity can contribute to the development of clinical-nutritional alterations and consequently aggravate CD evolution, as it can provoke cardiovascular alterations. Another factor that can contribute to these alterations is increased abdominal circumference, which was found in 55% of the individuals, which is higher than reported in a study by Marcopito et al [16] for a population

Table 1. Epidemiological, clinical, and anthropometric data for the 66 individuals with Chagas disease seen at TDNC FMB-UNESP

Variable	Individuals	
	N	%
Gender (n=66)		
Feminine	31	47
Masculine	35	53
Colour white	63	95.5
Smoking	15	22.7
Drinking	11	16.7
Sedentariness	55	83.3
CA with high risk of DCV	36	54.5
Hyperglycemia	08	12.1
Dyslipidemia	49	74.2

AC = abdominal circumference
N = number
CVD = cardiovascular disease
TDNC = Tropical Disease Nutrition Out-patient Clinic

Figure 1. Form of Chagas disease in the 66 individuals seen at TDNC FMB-UNESP.

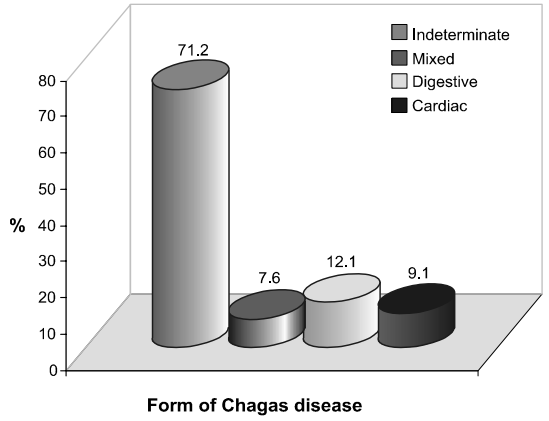


Figure 2. Nutritional profile for the 66 individuals with Chagas disease seen at TDNC FMB-UNESP.

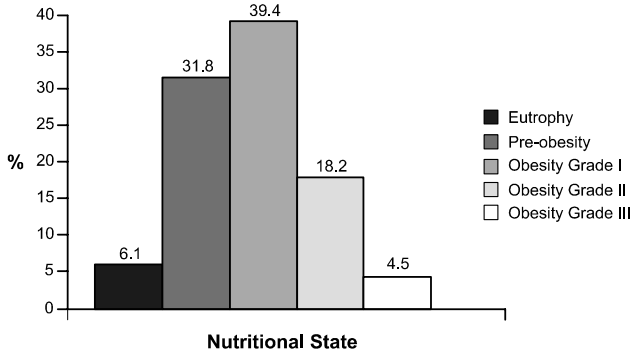
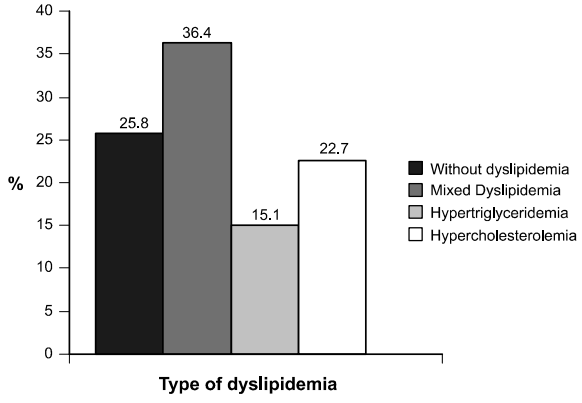


Figure 3. Type of dyslipidemia in the 66 individuals with Chagas disease seen at TDNC FMB-UNESP.



from the São Paulo municipal area, in which the prevalence was 19.7%.

Combined excess weight and obesity in our study population was 94%, higher than in the Brazilian population which is currently around 51%; this is extremely worrying and requires special attention [13]. Another important aspect that was evaluated was dyslipidemia, which was found in 74% of the individuals, with mixed dyslipidemia predominating. Carod-Artal et al. [4] observed cardiac dyslipidemia in 19.15% of CD individuals. We observed lipidic alterations in 67% of individuals with the cardiac form of CD, in 75% of those with the indeterminate form, in 88% of those with the digestive form, and in 60% of those with the mixed form.

There was a high prevalence of co-morbidities and risk factors for developing non-transmittable chronic diseases in

these individuals with CD. We conclude that it is important to make an early evaluation of associated chronic pathologies and inadequate lifestyles, aiming towards specialized orientation and follow-up, with the objective of preventing and treating these alterations, as they can worsen Chagas disease, especially the cardiac form. New studies are needed to improve our understanding of the importance of these metabolic alterations and lifestyle impacts, with the aim of defining methods for treatment of this population.

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