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Original Contribution

Chagas disease and gynecologic neoplasias☆

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Abstract The inflammation caused by *Trypanosoma cruzi* produces irritation and cell proliferation and may contribute to the development of cancer. The objective was to determine the occurrence of gynecologic neoplasia (GN) and demographic characteristics in patients with Chagas disease (CD). We used protocols of 671 autopsies between 1976 and 2008. The patients were divided into 3 groups: with GN and CD, only with CD, and only with GN. The 2 diseases were observed in 4.5% of patients with a mean age of 47.6 years and who were predominantly white. The megaesophagus and megacolon were more frequent in the group with only CD. The most common benign neoplasm was uterine leiomyoma, and malignant, carcinoma of the cervix. We conclude that the epidemiological profile of patients with CD and GN was similar to the other groups, and the CD was found not to be a risk factor or protective against the development of GN.

Keywords: Chagas disease; Neoplasm; Gynecological; Autopsies; Inflammation

1. Introduction

Chagas disease (CD) is widely distributed in the American continent, and it has been regarded as one of the most infectious and parasitic diseases, having the greatest impact on society. In Brazil, about 6 million people suffer from this disease, and it is estimated that more than 30,000 new cases appear in the country every year [1-3].

Most of the patients that have CD get infected in childhood and develop cell destruction and proliferation due to the inflammation caused by *Trypanosoma cruzi*, which causes the disease in human beings, virtually throughout the entire life span. These continuous cell inflammation and proliferation are thought to facilitate the occurrence of neoplasias in such individuals [4].

Researches into the molecular basis of infectious and parasitic diseases have shown that carcinogenesis implicates the production of free radicals (0^{-2}) and nitric oxide, which can both break and modify the nucleic acids, causing genomic instability and the development of neoplastic processes [5,6]. Moreover, the inflammatory process may lead to damages during the cells' DNA strand repair process, facilitating occurrence of mutation, evasion of the defense mechanisms of the human host, and cell invasion process—metastasis [6].

The correlation between CD and neoplasias has been widely studied and has arisen many controversies [4,7-11]. Previous studies showed an increased frequency of malignant neoplasias in CD carriers [8], particularly esophageal cancer and cervical cancer [4]. However, studies correlating CD to neoplasias are still required to determine whether this correlation is merely accidental.

Because the most common site of neoplasia in women is the gynecologic tract, whereby malignant neoplasias are the main cause of morbimortality [12,13], we aimed to correlate the occurrence of gynecologic neoplasia (GN) in patients

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with CD and to compare the anthropometric and epidemiological profiles.

2. Materials and methods

This study has been approved by Triângulo Mineiro Federal University Research Ethics Committee under protocol number 629.

From 1970 to 2008, 671 autopsies of women were carried out at in General Hospital of Triângulo Mineiro Federal University, in Uberaba, Minas Gerais state, Brazil. Incomplete autopsies of patients younger than 18 years were disregarded. The patients were divided into 3 groups: (G1) patients with GN and CD; (G2) patients with CD; and (G3) patients with GN. Only to ascertain the correlation between CD and the occurrence of GN, a group of 387 patients without any of the diseases were involved.

Information concerning age, color (white or nonwhite), CD serology, body mass index (BMI), and site and type of neoplasia, as well as information about metastasis development and distinctive characteristics of CD, such as megaesophagus and/or megacolon, were registered. The existence of 2 positive serologies in different examinations and/or specific manifestations, such as Chagas cardiopathy (Fig. 1A) and/or megas, was taken into account in order to diagnose CD.

The patients were then categorized in 3 groups based on their BMI: malnourished, normal, and overweight. The elderly women with BMI less than 22 kg/m^2 were regarded as malnourished, and the ones with BMI greater than 27 kg/m^2 were regarded as overweight [14]. Nonelderly women were regarded as malnourished if their BMI was less than 18 kg/m^2; normal, if it was between 18 and 24.99 kg/m^2; and overweight, if it was greater than 25 kg/m^2 [15].

SigmaStat 2.03 software was used for statistical analysis, and the nonparametric Kruskal-Wallis test was used for numerical variables, followed by Dunn test. The χ^2 test was used to compare categorical variables. The correlation between the diseases was established through the calculation of the odds ratio (OR) measure of risk. $P < .05$ was considered to be significant.

3. Results

Among the 671 autopsy protocols analyzed, it was noticed that 4.5% of women had CD and GN. In the group with CD and GN, women 30 to 39 years old predominated (26.7%), whereas women 60 years or older predominated in the other groups. As for skin color, white-skinned patients prevailed in all groups, except for the group without CD with GN, in which 55.1% of the women were regarded as nonwhite (Table 1).

By analyzing the patients' BMI, it was noticed that 29.4% of the patients with CD and GN were found to be malnourished, 47.1% had normal BMI levels, and 23.5% were overweight. Among the women that only had CD, 77.8% were malnourished, 16% of them had normal BMI levels, and 6.2% were overweight. In the group that only had GN, women with normal BMI (53.7%) predominated, whereas 26.8% were malnourished and 19.5% were overweight.

Megaesophagus was observed in 3% of the patients with CD and GN and in 6% of the ones who only had CD. As for

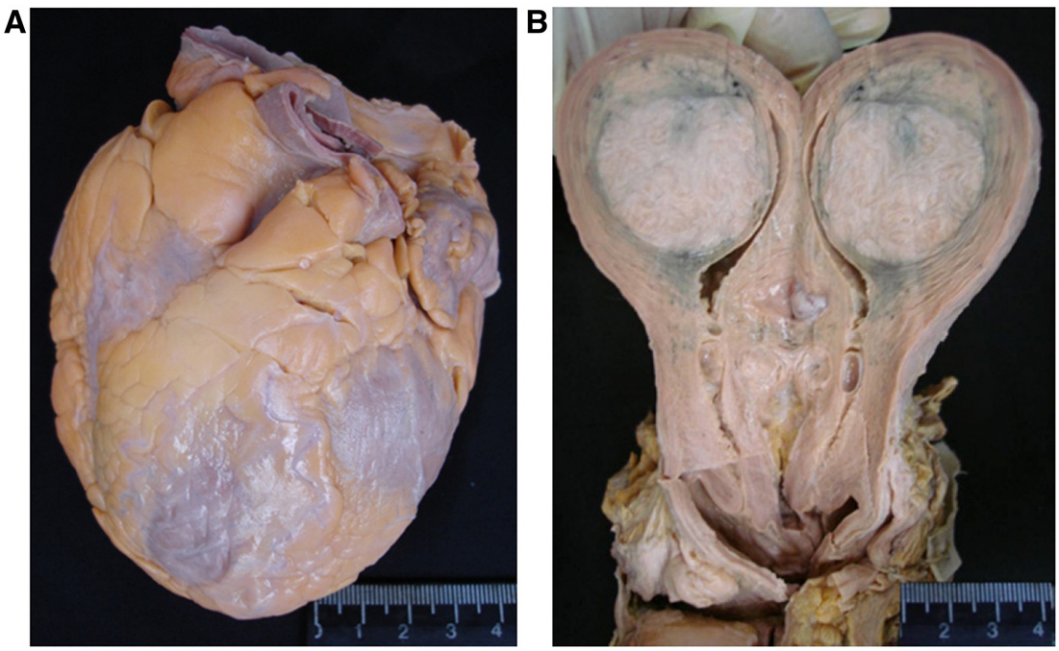

Fig. 1. Macroscopic aspects of organs obtained from patient autopsied in the General Hospital of Triângulo Mineiro Federal University, in Uberaba, Minas Gerais state, Brazil, with CD and GN. (A) Heart with chronic Chagas cardiopathy. (B) Intramural leiomyoma.