

Description of testicular germ cell tumors, according to biopsies from the department of pathology, Mexico Hospital, Costa Rica from January 2003 to march 2011

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Abstract

Background: 95% of testicular tumors are germ cell tumors (TGCT). These neoplasms have increased in number and have become more common in young people. The TGCTs are divided into two groups: seminomatous and non-seminomatous. The objective is to describe the TGCT based on pathological biopsy results at the Mexico hospital from 1st January 2003 to 31st march 2011.

Methods: A descriptive study of the department of Pathology database, from which the cases of TGCTs were selected. Within the analysis, absolute and relative frequencies, confidence intervals, measures of dispersion and central tendency were calculated. Chi-square $p < 0.05$ was used for the trend.

Results: 148 patients with germ cell tumors were selected. There was an increasing tendency in tumors with $p < 0.003$. Out of the total number of cases, 60.2% (89), CI 95% (52.2-68.1), occurred in males younger than thirty years old. Non-seminomatous TGCTs occurred in 59.5% (88) of the cases, CI 95% (51.5-67.3). The average age of those with non-seminoma was 26.4 years; DE 8.1, and of those with seminoma was 31 years; DE 7.5, with a difference of $p < 0.001$.

Conclusions: There is a significant tendency towards the increase of TGCT, which is more frequent in patients under 30. The non-seminomatous TGCTs are the most frequent. The average age for non-seminomatous TGCTs is significantly lower than for the seminomatous. Limitations: incidences and prevalence were not calculated. Recommendations: to focus detection campaigns on the population at risk, and extend the study to other hospitals.

Key words: Germ cells, seminoma, biopsy, Costa Rica, testicular tumors

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Abbreviations: SD, standard
deviation; TGCT, testicular germ
cell tumor.

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The testicular germ cell neoplasms are between 1% and 3% of human tumors. In the past 40 years, the incidence has doubled and it became more common in young men 20 to 40 years old, with an average age of 32 years, with an impact on the most productive stage of an individual's life.¹⁻⁷

95% of the tumors arise from germ cells. These tumors are divided into two groups: *seminomatous* and *nonseminomatous* (more aggressive tumors).²⁻⁸ The seminomatous are characterized by the presence of seminoma only, whereas, the nonseminomatous present

embryonic carcinoma, yolk sac tumor, choriocarcinoma and/or immature or mature teratoma. Furthermore, TGCT are characterized by combinations of two or more types of different tumors mentioned above.³

The risk factors that are considered in the development of these tumors are: cryptorchidism, congenital malformations (hypospadias), intersexual syndromes, Caucasians, family history, etc. There are also acquired risk factors: prenatal risk factors (high estrogen levels), child nutrition, western lifestyles (little exercise, caloric diets), occupation (welders, painters, carpenters),¹⁻⁵ etc. It is well known that the higher incidence occurs in northern European countries such as Denmark, Germany, Norway, Hungary, Switzerland.

Most authors report that 35.7% of the TGCTs are seminomatous⁵ and they are diagnosed between 30 to 50 years old, with a mean age of 35.8, SD 8.6,⁵⁻⁶ while non seminomatous tumors present in 64.2% of cases,⁵ and these are most common in adolescence and early forties, with an average age of 29.1 years, and a SD of 8.9.⁶⁻⁵

This study was conducted in Mexico Hospital, a referral center that has specialties and subspecialties, located in the province of San José Costa Rica, canton of La Uruca.

The aim of the study was to characterize the TGCT based on the results of the biopsies done at the department in the Mexico Hospital during the period January 1, 2003 to March 31, 2011.

Methodology

It was a descriptive study conducted at the Mexico Hospital. The data were obtained from the database of the Pathology Department. The variables studied were number of biopsy, patient's age at the time of the procedure, classification of the type of tumor: seminomatous and nonseminomatous (mixed embryonic carcinoma, yolk sac, immature teratoma, choriocarcinoma and mature teratoma).

The inclusion criteria were all results of testicular biopsies to which the procedure was performed in the study period (from January 1, 2003 to March 31, 2011). Results of no neoplastic and neoplastic biopsies from the same patient were excluded. All cases of germ cell tumors were selected for the study.

For the descriptive analysis of qualitative variables absolute and relative frequencies were calculated with their respective confidence intervals at 95%, for the quantitative variables dispersion measures of central tendency and standard deviations (SD) are calculated, we evaluate the statistical significance of the annual trend using a chi-square test, using $p < 0.05$ as significant.

For statistical analysis, we used Epi info 3.3.2 and Microsoft Excel. The results of the TGCT are presented using tables and figures, which show the distribution according to tumor type, group, age, and according to the predominance of mixed tumor.

The study protocol complied with the requirements of the Institutional Review Board of the hospital where the study was performed.

Results

In the study period, there were 1455 testicular biopsy results revised of which 148 cases of TGCT were selected, with an average of 18.1 cases per year, with a DE of 4.1, with a minimum of 14 cases per year and a maximum of 22 cases per year. The annual trend of TGCT was measured using a Chi square trend, and there was a significant rise of $p < 0.003$ (Figure 1).

The average age for the TGCT was 28.3 years, with a SD of 8.2 and a range for the age of 14-56 years. It was determined that 60.25% (89 cases, 95% CI 52.2-68.1) had 29 years or less, and 39.8% (59 cases, 95% CI 31.9-47.7) had 30 years or more, and the most affected group was that of 20 to 24 years where there was the highest percentage of cases (Table 1).

According to the classification of TGCT, we found that 40.5% (60 cases) 95% (32.6-48.4) were seminomatous type, and 59.5% (88 cases, 95% CI 51.5-67.3) were non seminomatous type: the mixed tumor was the most frequent, it presented in a 50.6% (75 cases) (Table 2).

The average age for nonseminomatous type was 26.4 years, SD 8.1, with an age range of 14 to 56 years, and for seminomatous type it was 31 years, SD 7.5, range 18 to 54 years. The calculated difference in these averages for age is significant at $p < 0.001$.

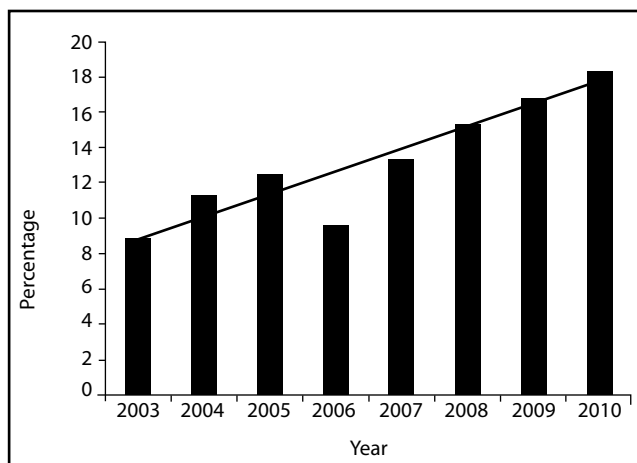


Figure 1. Trend of the TCG per year, based on the biopsy reports at the Pathology Department, Mexico Hospital, January 2003 to March 2011.

Table 1. Distribution of the TTCG according to age group based on the biopsy reports at the Pathology Department, Mexico Hospital, January 2003 to March 2011.

Age Group	N°	%	CI 95%	
			IL	SL
19 years or less	20	13,5	8,5	20,1
20-24 years	39	26,4	19,5	34,2
25-29 years	30	20,3	14,1	27,7
30-34 years	32	21,6	15,3	29,1
35-40 years	16	10,8	6,3	17,1
41 years or more	11	7,4	3,8	12,9
Total		148		100

CI= confidence interval, LI = inferior limit, LS= superior limit.

Table 2. Distribution of the TTCG according to type of tumor based on the biopsy reports at the Pathology Department, Mexico Hospital, January 2003 to March 2011.

Type	N°	%
Non Seminomatous		
Mixed	75	50,6
Embryonic Ca	7	4,7
Teratoma	2	1,4
Immature Teratoma	2	1,4
Mature Teratoma	2	1,4
Seminomatous		
Seminoma	60	40,5
Total	148	100

When comparing both tumors by age group, we found that the highest percentage of non-seminoma tumors occurred in the group of 20 to 24 years, in a 35.2% (95% CI 25.2-45.2), while for the seminomatous tumors, it appeared in the group aged 30 to 34 years with 26.7% (16 cases, 95% CI 15.4-37.8) (Figure 2).

In 71.5% (63 cases, 95% CI 62.1-81.1) of nonseminomatous tumors there was an age under 30 years, while in the case of seminomatous tumors, it was 43.3% (25 cases, 95% CI 7.30- 55.8).

Furthermore, it was found that 84.9% (64 cases) of mixed tumors diagnosed were embryonic carcinoma, predominant in 45.2% (34 cases) (Figure 3).

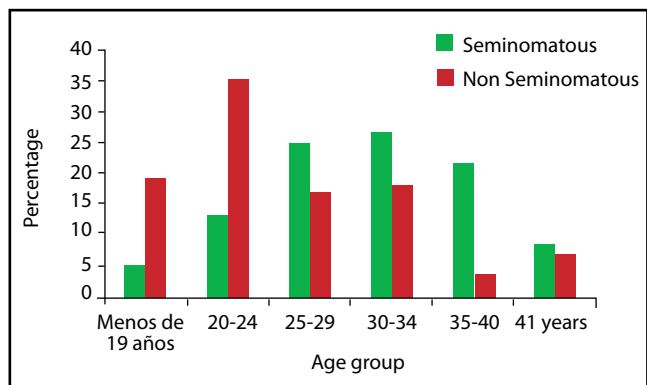


Figure 2. Distribution of the TCG according to group and type of tumor based on the biopsy reports at the Pathology Department, Mexico Hospital, January 2003 to March 2011.

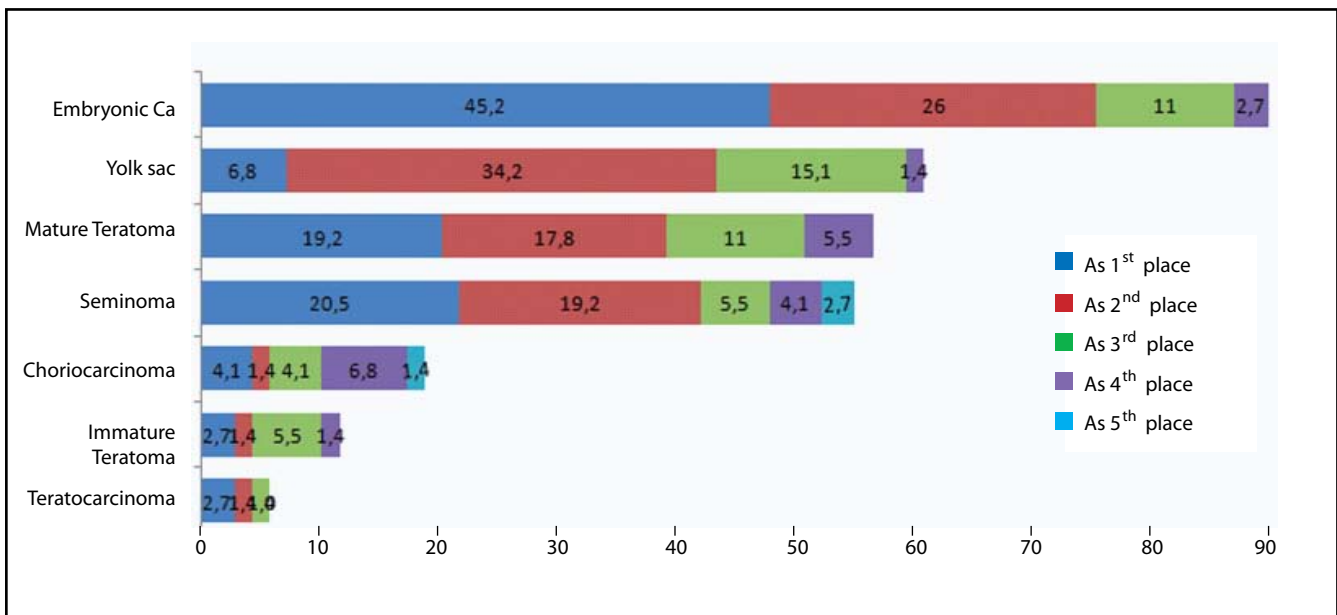


Figure 3. Distribution of the TCG according to predominance in the mixed tumors based on the biopsy reports at the Pathology Department, Mexico Hospital, January 2003 to March 2011.

Discussion

There is a significant trend towards an increase in the detection of TGCT compared with other countries. The average age of TGCT was lower than that reported in the literature, and it occurs most often in children under 30 years, statistically significant.^{1,3,4}

According to the classification of TGCT type, nonseminomatous tumors are significantly more frequently in comparison with the literature data.¹

There are significant differences in the average age of both tumors, and patients with nonseminomatous TGCTs were younger (30 years or younger), including the group of 20 to 24, which is the most affected. When comparing the average age of seminomatous TGCTs with data from the world literature, it is significantly lower. In patients with nonseminomatous TGCTs, the average age is also lower, but it does not reach significant differences.

From the nonseminomatous TGCTs, the mixed tumor is the most common; and embryonic carcinoma is the dominant tumor manifestation, similar to the literature data.

A limitation of this study is that because of the type of study it is not possible to establish causal relationships. The study is not population based, which prevents the calculation of the incidence and prevalence of disease.

It is recommended to direct detection campaigns for youth and young adults, to do association studies, to expand it to other national hospitals in order to understand the behavior and also to analyze the trend in Costa Rica.

Conflict of interest: There is no conflict of interest because this study was performed as part of the daily work that helps us daily in the decision-making at our hospital.

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