Advanced-stage cancer and time from diagnosis to treatment in cancer patients during the COVID-19 pandemic

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Introduction

The COVID-19 pandemic has impacted cancer care and the diagnosis of new cases. Delays in diagnosis and treatment due to the COVID-19 pandemic may allow cancer progression to more advanced stages, resulting in more complex care and worse outcomes. The impact of the COVID-19 pandemic on cancer patients remains unclear, particularly regarding cancer stage and time from diagnosis to treatment in days.

Therefore, the purpose of the present study was to analyze the impact of COVID-19 pandemic on cancer patients by comparing the number of newly diagnosed cases according to year, cancer stage and time to start treatment (days) in 2020 versus 2018 and 2019.

Methods

A retrospective cohort that included all cancer cases identified from the Hospital Cancer Registry (HCR) at the A.C.Camargo Cancer Center between 2018 and 2020 was studied. In patients with multiple primary cancer, the first tumor diagnosed was considered. All variables were analyzed according to absolute and relative frequencies. Year of diagnosis was compared using chi-squared tests, with the same test applied to compare clinical stage (early versus advanced) according to the most frequent tumor sites. The Median Test was applied to examine time between diagnosis and treatment.

Results

Between 2018 and 2020, a total of 16,268 new cases (including non-melanoma skin cancer) were treated, comprising 6,934 cases in 2018, 5,911 in 2019 and 3,423 in 2020. There was a 51% decrease in newly diagnosed cases between 2018 and 2020 and a 42% decrease between 2019 and 2020 (Figure 1).

The Male: Female ratio decreased between 2018 and 2020, from 0.80 in 2018 to 0.70 in 2020. There was a difference in patient age (< 60 years) over the period, where patients in 2020 were younger (p<0.05) (Table 1).

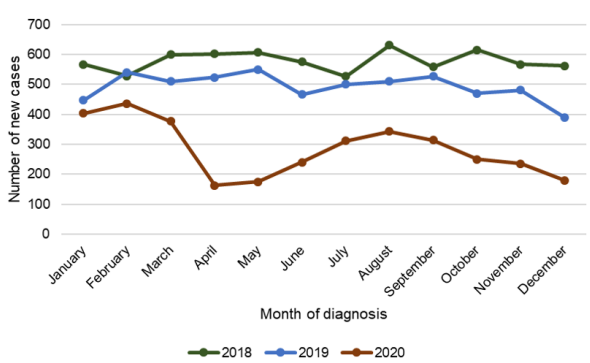

Figure 1. Number of newly diagnosed cancer cases by month of diagnosis for 2018, 2019 and 2020 from Hospital Cancer Registry A.C.Camargo Cancer Center (including non-melanoma skin cancer).

Results

In 2020, new cases of cancer with advanced tumors (cT3-T4) increased by 3.1%, the presence of positive lymph nodes by 3.7% and advanced stage patients by 2.5% compared to 2019 (Table 1).

Table 1. Socioeconomic and clinical variables for cancer cases treated between 2018 and 2020 at A.C.Camargo Cancer Center, including non-melanoma skin cancer

	All cancer cases (including non-melanoma skin cancer)			Chi-square test		
Variables	2018 (n = 6,934)	2019 (n = 5,911)	2020 (n = 3,423)	2018-2019 p*	2018-2020 p*	2019-2020 p*
Sex ratio (M: F)	0.80 (3,089: 3,845)	0.78 (2,595: 3,316)	0.73 (1,443: 1,980)	0.462	0.021	0.101
Age group				0.128	<0.001	0.004
<60 years	3,880 (48.7)	2,961 (50.1)	1,821 (53.2)			
60+ years	3,554 (51.3)	2,950 (49.9)	1,602 (46.8)			
Area of residence				<0.001	0.559	0.037
Metropolitan area of São Paulo	4,997 (72.1)	4,106 (69.5)	2,448 (71.5)			
State of São Paulo interior and other states	1,937 (27.9)	1,805 (30.5)	975 (28.5)			
Health Insurance				<0.001	<0.001	<0.001
Public	1,245 (18.0)	687 (11.6)	278 (8.1)			
Private	5,689 (82.0)	5,224 (88.4)	3,145 (91.9)			
Previous diagnosis of cancer before admission				0.005	0.048	<0.001
No	4,277 (61.7)	3,503 (59.3)	2,180 (63.7)			
Yes	2,657 (38.3)	2,408 (40.7)	1,243 (36.3)			
Clinical T (tumor size)				0.100	0.618	0.065
cT1-T2	3,964 (80.8)	3,481 (82.2)	1,927 (80.3)			
cT3-T4	941 (19.2)	756 (17.8)	472 (19.7)			
Clinical N (lymph node)				0.038	0.314	0.007
cN0	4,690 (82.6)	4,053 (84.1)	2,212 (81.7)			
cN+	968 (17.4)	764 (15.9)	495 (18.3)			
Clinical M (distal metastasis)				0.169	0.356	0.826
cM0	5,790 (92.4)	4,992 (93.1)	2,797 (93.0)			
cM+	475 (7.6)	371 (6.9)	212 (7.0)			
Clinical Stage				0.146	0.482	0.060
Early (CS 0, I and II)	4,968 (79.3)	4,311 (80.4)	2,367 (78.7)			
Advanced (CS III and IV)	1,297 (20.7)	1,052 (19.6)	642 (21.3)			

Time from diagnosis to oncologic treatment was calculated for the three periods, revealing a difference from 2018 to 2020. Time to treatment decreased for eight types of cancers, with medians reduced from 56.0 to 44.0 days for breast cancer (p<0.001), 41.5 to 25.0 days for thyroid (p<0.001), 86 to 56 days for prostate (p<0.001), 48 to 38.5 days for colorectal (p=0.008), 56 to 42 days for lung cancer (p=0.035),48.0 to 30.0 for stomach cancer (p=0.045), and from 50 to 28 days for cancer of the oropharynx (p<0.001) (Table 2).

Table 2. Mean (Standard Deviation) and median time in days from diagnosis to first cancer treatment by year of diagnosis and tumor site at A.C.Camargo Cancer Center for 2018-2020.

	Year of diagnosis						
	2018		2019		2020		
Tumor site	Mean (SD) days	Median days	Mean (SD) days	Median days	Mean (SD) days	Median days	p*
Non-melanoma skin (C44)	35.3 (±64.7)	0.0	41.9 (±65.6)	23.0	30.7 (±46.7)	0.0	0.001
Breast (C50)	66.4 (±48.1)	56.0	64.5 (±46.9)	57.0	50.3 (±31.2)	44.0	<0.001
Thyroid (C73)	51.6 (±74.8)	41.5	47.9 (±61.8)	40.0	36.7 (±49.6)	25.0	<0.001
Prostate (C61)	127.3 (±126.7)	86.0	108.1 (±113.0)	76.5	70.1 (±49.3)	56.0	<0.001
Melanoma skin (C43)	61.2 (±60.0)	49.0	64.1 (±53.4)	52.0	45.9 (±31.8)	39.0	<0.001
Colorectal (C18-20)	56.2 (±58.9)	48.0	51.9 (±59.4)	42.0	42.7 (±42.0)	38.5	0.008
Lung (C34)	69.8 (±74.3)	56.0	59.1 (±57.8)	50.0	59.1 (±55.8)	42.0	0.035
Cervix Uteri (C53)	101.3 (±107.5)	78.5	63.4 (±55.4)	61.0	43.5 (±50.2)	35.0	<0.001
Kidney (C64)	11.5 (±31.0)	0.0	19.9 (±84.6)	0.0	11.2 (±28.6)	0.0	0.467
Stomach (C16)	72.1 (±73.0)	48.0	56.0 (±41.2)	50.0	39.3 (±38.3)	30.0	0.045
Oral Cavity (C02-C06)	70.2 (±74.4)	46.0	70.8 (±80.3)	52.5	39.1 (±30.7)	34.0	0.140
Oropharynx (C01-C10)	63.7 (±39.8)	50.0	60.2 (±40.6)	52.0	29.1 (±18.7)	28.0	<0.001
Larynx (C32)	57.2 (±52.7)	43.0	30.6 (±26.9)	27.5	39.6 (±33.9)	33.0	0.112

*Median Test

Conclusions

The number of newly diagnosed cancer cases in 2020 decreased by 42% due to restrictions imposed by the COVID-19 pandemic. However, there was a significant increase in the number of cases diagnosed with advanced tumor (T3 and T4) and compromised lymph nodes (N+).

There was an increase in both the number of cases of advanced-stage and early-stage cancers. This profile could be transient, since findings are from 2020 and subsequent vaccination against COVID-19 may have changed this pattern. Immunosuppressed cancer patients received a booster dose, possibly leading to a change in clinical characteristics for 2021 cases. Future studies investigating cancer diagnoses are warranted.

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