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Letter to the Editor

Severity and 1-year cumulative incidence of COVID-19 among inpatients with haematologic malignancies

Sir,

Coronavirus disease 2019 (COVID-19) presents complex healthcare challenges in assisting patients with chronic diseases and cancer [1,2]. Haematologic malignancies (HMs) are highly associated with severe COVID-19 due to the immune effects of HMs and treatments [3–5]. The mortality rate of COVID-19 has been estimated at approximately 1–2% in the general population and 21–62% for HM patients [1,3–6]. Despite universal health care and a celebrated infectious diseases programme, Brazil has seen recurring COVID-19 outbreaks and an alarmingly high case-fatality rate, posing a threat to at-risk populations [6–8].

The occurrence of COVID-19 in HM inpatients jeopardizes the possibility of cancer cure or control [2–5]. To assess the incidence and severity of COVID-19 among HM inpatients, we performed a retrospective analysis of patients admitted to Hospital Municipal São José (HMSJ), Joinville, Brazil between April 2020 and March 2021 (the first 1-year period after the first case of COVID-19 in Joinville). HMSJ is the reference hospital for both COVID-19 and HM patients in the region. HM inpatients at HMSJ in the 1-year period before COVID-19 (April 2019–March 2020) were also assessed retrospectively. Inclusion criteria were HM diagnosis and hospital admission to the haematology ward. Exclusion criteria were age <18 years or HM patients seeking medical attention who already had symptoms of COVID-19. Diagnosis of COVID-19 was confirmed by severe acute respiratory syndrome coronavírus-2 (SARS-CoV-2) reverse transcription polymerase chain reaction (RT-PCR). Confirmed COVID-19 cases with <3 days, 3–7 days and >7 days between hospital admission and symptom onset were considered unlikely, possible and very likely cases of nosocomial transmission, respectively. Chi-squared test was used to test relationships between categorical variables.

One hundred and seventeen consecutive HM inpatients admitted between April 2020 and March 2021 were included in this study. These patients accounted for 2616 hospital-days, with a median hospital stay of 19 days. Fifty-four SARS-CoV-2 RT-PCR tests were performed in 44 HM inpatients, with 36 positive tests (67%) and 29 confirmed cases of COVID-19 (66%). Over the reported 1-year period, the cumulative incidence of COVID-19 for HM inpatients was 25%, with one COVID-19 positive test every 73 patient-hospital-days. The main features of HM inpatients with and without COVID-19 are shown in Table I. Among HM inpatients with COVID-19, the median interval between symptom onset and COVID-19 diagnosis was 3 days [interquartile range (IQR) 1–5 days]. Nosocomial transmission was considered unlikely in five cases (17%), possible in five cases (17%), and very likely in 19 cases (66%).

A diagnosis of severe COVID-19 was established in 22 patients (76%), with 16 (55%) intensive care unit admissions and 19 deaths (66%). Thrombotic events were reported in six patients (pulmonary embolism, N=3; internal jugular vein thrombosis, N=1; renal vein thrombosis, N=1; ischaemic stroke, N=1). All severe cases of COVID-19 (N=22) received steroids after diagnosis, with 17 (77%) receiving dexamethasone. Thrombocytopenia prevented thromboprophylaxis in 11 severe cases (50%). Nineteen HM inpatients with COVID-19 died (66%), at a median of 10 days after COVID-19 diagnosis (IQR 6–17 days). At HMSJ, 3627 SARS-CoV-2 RT-PCR assays were performed over the same 1-year period, with 1739 confirmed cases and 447 in-hospital deaths (26%).

In the 1-year period before COVID-19 in Joinville, 152 consecutive inpatients with HM were admitted. These patients accounted for 3655 hospital-days, with a median stay of 16 days (IQR 6–29 days). The median age was 60 years (IQR 49–70 years), and 55% were male (N=84). The in-hospital mortality rate for HM inpatients in the year preceding COVID-19 was 23% [N=35; vs 66% for HM inpatients with COVID-19 (P<0.001); vs 32% for HM inpatients without COVID-19 (P=0.17)].

Therapy-related decisions in HMs have always been challenging. Given that many patients with HMs are elderly and have comorbid conditions, COVID-19 represents a major threat [1–5]. In this study, a considerable number of patients developed COVID-19 during their hospital stay, chiefly with nosocomial transmission and with higher mortality rates in comparison with HM patients without COVID-19 for both reported 1-year periods. Cautious selection of patients to receive intensive chemotherapy, restrictions to reduce viral exposure, and frequent SARS-CoV-2 testing [2,3,8] are in order. Among in-hospital deaths of HM patients with COVID-19, 16 patients (84%) had a recent HM diagnosis or disease in remission, highlighting lost opportunities for disease-free survival in this setting.

This study has several limitations, from its single-centre retrospective nature, to the lack of routine SARS-CoV-2 testing on patient admissions, single-bed high-efficiency particulate air-filtered rooms, or low inpatient numbers per nursing professional. At the same time, it provides a snapshot of a difficult regional scenario, to be taken together with

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Table I
Main features of haematologic malignancy (HM) inpatients admitted between April 2020 and March 2021 with and without confirmed coronavírus disease 2019 (COVID-19) during their hospital stay

	HM inpatients without confirmed COVID-19	HM inpatients with confirmed COVID-19	*P*-value
Number of patients	88	29	—
Male gender (%)	45 (51%)	17 (59%)	0.53
Median age (years; IQR)	59 (49—69)	58 (43—66)	0.48
Age ≥60 years (%)	41 (47%)	12 (41%)	0.67
Median ECOG-PS at hospital admission (IQR)	1 (1—2)	1 (1—2)	0.73
Haematologic malignancies (HM)			
Acute leukaemia	20 (23%)	10 (34%)	0.23
CLL (%)	4 (5%)	4 (14%)	0.10
CML and other CMN (%)	5 (6%)	2 (7%)	1.00
Lymphoma (%)	30 (34%)	8 (28%)	0.65
Multiple myeloma (%)	16 (18%)	3 (10%)	0.40
Other (%)	13 (15%)	2 (7%)	0.35
Disease status at hospital admission			
In remission (%)	15 (17%)	5 (17%)	1.00
Relapsed or refractory disease (%)	23 (26%)	8 (28%)	1.00
Stable disease (%)	4 (5%)	2 (7%)	0.64
Not evaluable (recent diagnosis) (%)	31 (35%)	11 (38%)	0.24
Not evaluable (other) (%)	15 (17%)	3 (10%)	0.55
Median hospital stay (IQR)	18 (9—28)	22 (15—32)	0.50
Chemotherapy administration as inpatient (%)	59 (67%)	20 (69%)	1.00
Febrile neutropaenia (%)	33 (28%)	10 (35%)	0.83
Combined broad-spectrum antibacterial treatment (%)	20 (23%)	22 (76%)	<0.001[a]
Therapeutic use of antifungal agents (%)	6 (7%)	6 (21%)	0.07
In-hospital mortality (%)	28 (32%)	19 (66%)	0.002[a]

CLL, chronic lymphocytic leukaemia; CML, chronic myeloid leukaemia; CMN, chronic myeloproliferative neoplasm; ECOG-PS, Easten Cooperative Oncology Group Performance Scale; IQR, interquartile range; MM, multiple myeloma.
[a] Significant ($P<0.05$).

international publications of COVID-19 among HM patients [2—5]. Local improvements in patient surveillance and protective isolation have been proposed in the continuation of this study, and prospective data collection is underway. In spite of vaccination strategies, it is uncertain whether hospital care for HMs will carry on without inpatient COVID-19 transmission. Large collaborative studies reporting on COVID-19 outcomes of HM inpatients and indirect effects of the pandemic on HM management are needed to guide decisions in this patient population.

Author contributions
MPL and JPRB wrote the paper and performed statistical analyses. NW, JPRB, GDN and HVCJ proposed the study and collected the data. ISB, ACD, FST, GRG and FLS revised the data and the paper. All authors approved the final version.

Conflict of interest statement
None declared.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jhin.2022.04.011.

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