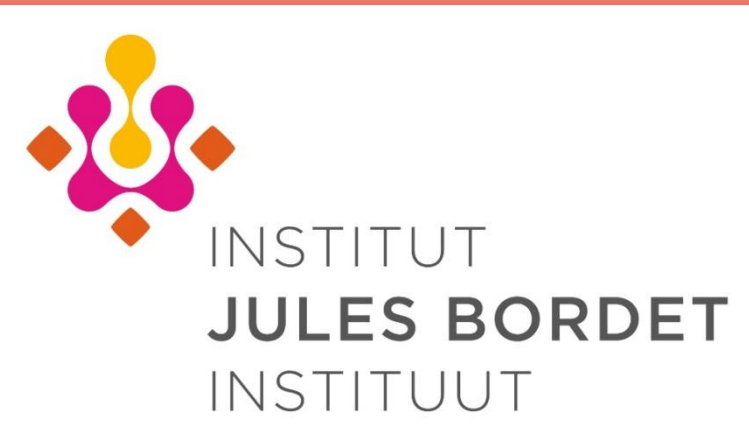




Factors associated with SARS-CoV-2 infection and outcome in patients with solid tumors or hematological malignancies: a single center study

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Background

A novel coronavirus, named Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) was identified in China in December 2019 and caused a pandemic in a few weeks mostly by human-to-human transmission¹.

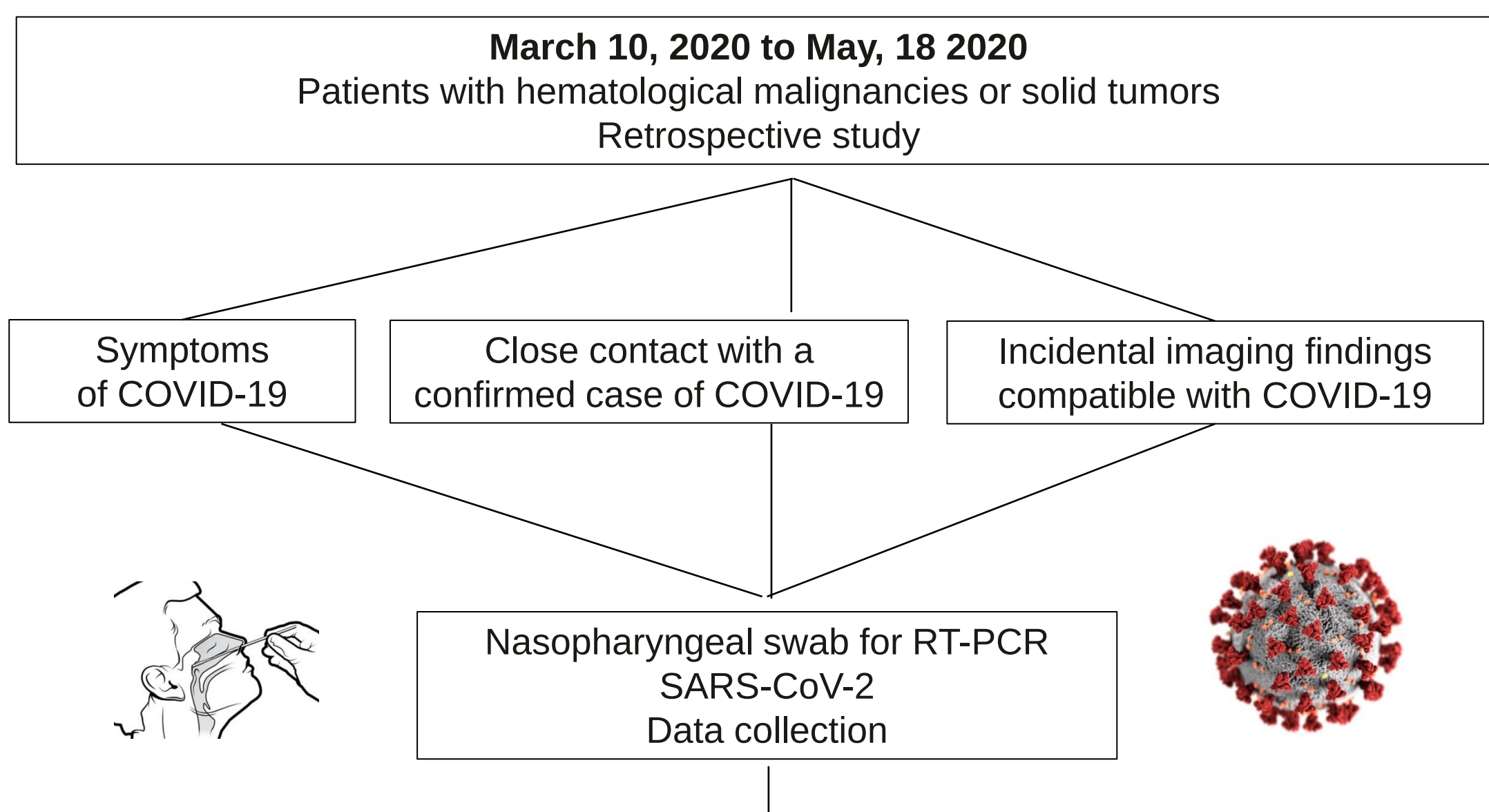
In China, the prevalence of cancer in patients with COVID-19 was higher than the overall cancer incidence and mortality rate in these patients is also increased in comparison with non-cancer patients^{2,3,4}.

Previous reports concerning cancer patients and COVID-19 highlighted the following predisposing factors for severe complications (ICU admission and death):

- Eastern Cooperative Oncology Group Performance Status (ECOG PS) ≥ 2 ⁵
- Progressive malignant disease⁵
- Metastatic cancer patients⁶
- Anti-cancer treatment administered within 14 days⁷
- Hematological malignancies in comparison to solid tumors⁸

Our study aims to compare the factors associated with a SARS-CoV-2 infection and its outcome in patients with solid tumors or hematological malignancies but in a population of a tertiary oncological center in Brussels.

Materials & Methods



Primary endpoint: incidence of COVID-19 among patients with concordant symptoms, close contact with a confirmed case or compatible imaging.

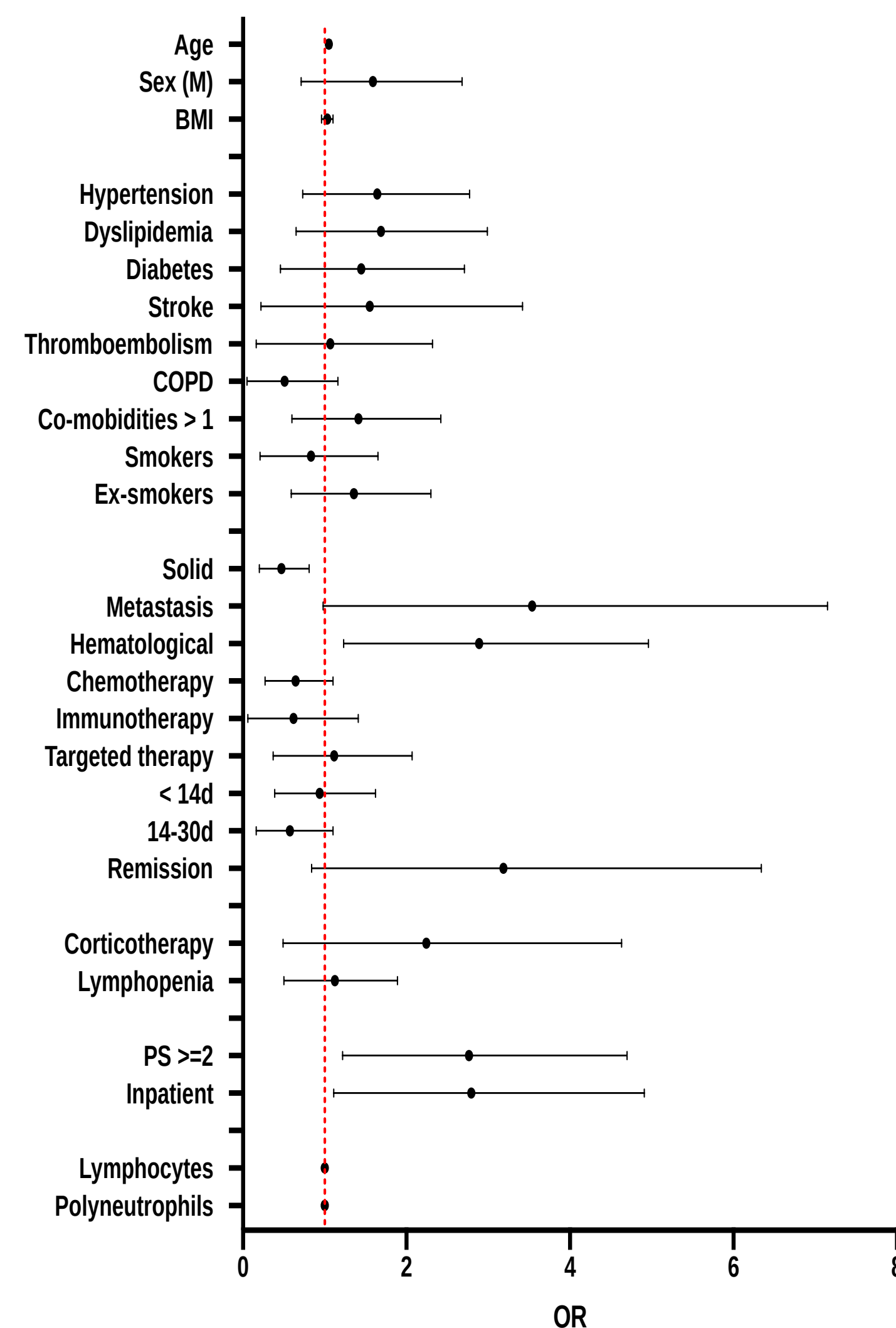
Secondary endpoint: occurrence of a severe outcome (ICU admission or death related to COVID-19)

Statistical analyses for two dependent variables: positive SARS-CoV-2 RT-PCR and the severe outcome. The association between dependent variables and explicative variables was assessed by a Chi-square test with a threshold of significance defined by $p < 0.05$, followed by a univariate analysis calibrated with 95% CI for ORs.

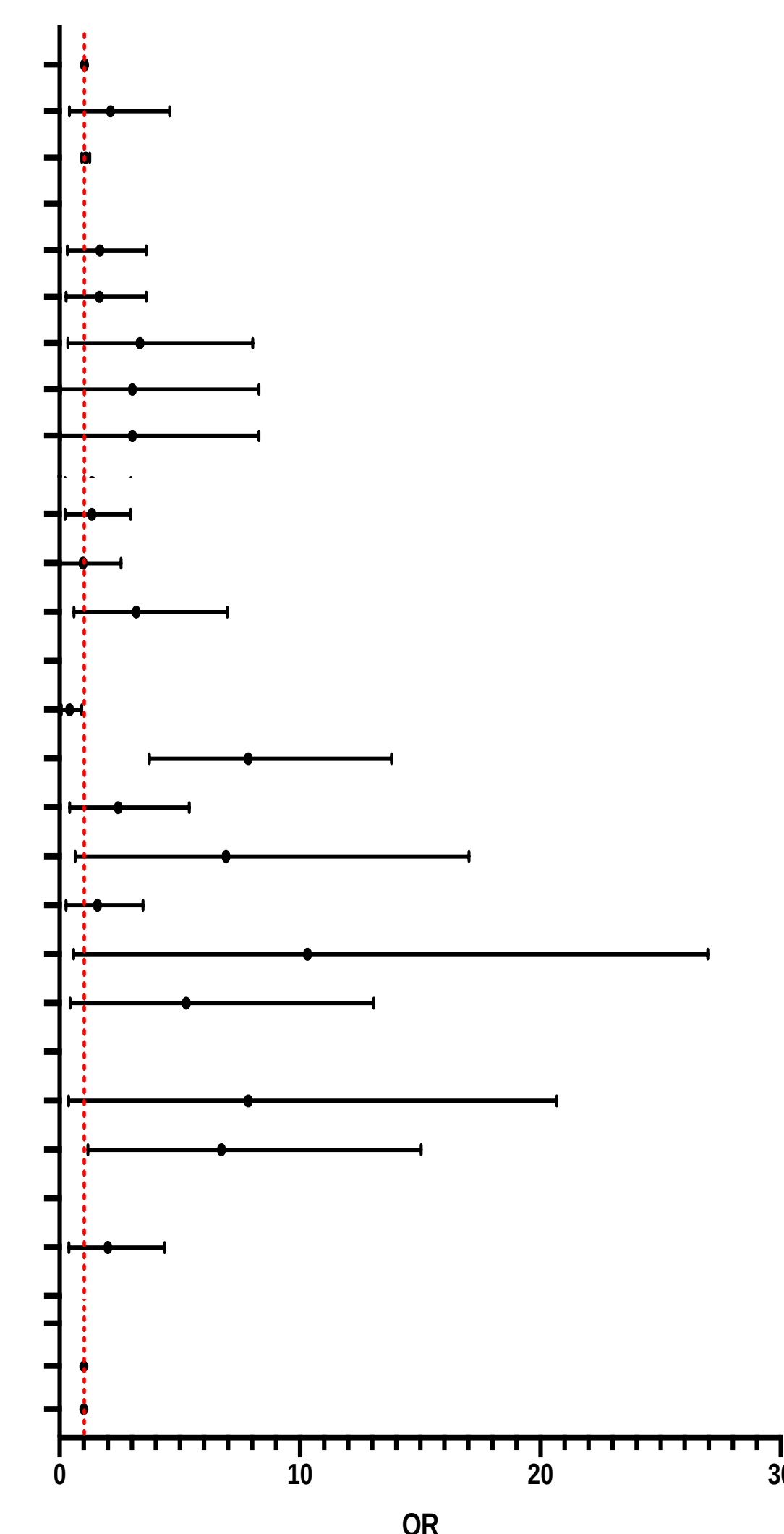
Results

	Ratio of positive PCR SARS-CoV-2	Univariate analysis for positive SARS-CoV-2 RT-PCR	Ratio of severe outcome	Univariate analysis for severe outcome
	N=45/121 (21%)	OR (* $p < 0,05$)	N = 18/45 (36%)	OR (* $p < 0,05$)
Age, median (years)	70	1.05*	72	1,02
Sex, men (n, %)	23 (51%)	1.38	10 (55%)	1,35
BMI, mean kg/m ²	25.7	1.03	26,4	1,06
Solid cancer (n, %)	26 (58%)	0.40*	7 (39%)	0,27*
Metastatic disease (n, %)	20 (77%)	2.48	6 (33%)	2,14
Hematological malignancies (n, %)	19 (42%)	2.48*	11 (61%)	3,73*
Chronic steroid medication (n, %)	5 (11%)	1.61	3 (17%)	2,50
Chronic lymphopenia (n, %)	21 (47%)	0.98	12 (67%)	4,00*
Performance status > 2	15 (33%)	2.38*	2 (11%)	1,26
Inpatient (n, %)	15 (33%)	2.36*	7 (39%)	1,51
Chemotherapy (n, %)	15 (33%)	0.56	7 (39%)	1,51
Immunotherapy (n, %)	2 (4%)	0.39	1 (5%)	1,53
Targeted therapy (n, %)	8 (18%)	0.91	5 (28%)	3,08
Last treatment ≤ 14 days (n, %)	17 (38%)	0.81	7 (39%)	0,98
Last treatment 14-30 days (n, %)	6 (13%)	0.46	4 (22%)	3,38
Remission	7 (15%)	2.38	4 (22%)	2,29
Aplasia (n, %)	3 (7%)	2.30	1 (5%)	0,74

Univariate analysis for positive SARS-CoV-2 RT-PCR



Univariate analysis for severe outcome



Discussion

A few points must be highlighted:

- We found no significant association between comorbidities and our dependent variables. This result contradicts results found in other studies that included non-cancer patients⁹ but mirrors those including cancer patients^{3,8}. This could be explained by the important impact of the cancer itself on the studied variables.
- We found an association between the RT-PCR SARS-CoV-2 results and a PS ≥ 2 in univariate logistic regression but also if the patient was hospitalized at the time of the swab. These two co-variables are closely associated because patients are more hospitalized when their general condition is poor, and long hospitalizations tend to induce a worse PS. These results are similar to those recently published in the CCC19 cohort⁵.
- In contrary to other studies, we have not found any association between recent treatment and COVID-19. These results can be explained by a rapid application of oncology guidelines (ex: ESMO) during COVID-19 pandemic which limited delivery of systemic anti-cancer treatment for stable patients with COVID-19.
- At the beginning of the pandemic, there was limited stock of personal protective equipment and no PCR SARS-CoV-2 swab surveillance on admission day were performed for hospitalized patients. We observed four nosocomial infections (hematology, palliative care, oncology units and surgical ICU).
- We highlighted an association between pre-existing lymphopenia / hematological malignancies and COVID-19 infection but both are confounding factors because hematological patients are prone to have a pre-existing lymphopenia.

Conclusions

We confirm that, in our Brussels tertiary oncological center, among cancer patients, hematological malignancies have a higher occurrence risk of COVID-19 and develop more severe outcomes and that hygiene precaution must be introduced as soon as possible during a pandemic. Other factors for developing a COVID-19 infection are age, PS ≥ 2 and inpatient status.

Limitations

- It is a retrospective, single-center study
- The study took place during the first 3 months of the COVID-19 pandemic, as a consequence, we did not collect or analyze information about the clinical evolution of patients.
- In the beginning of the pandemic, there was a lack of reagent for RT-PCR, so the nasopharyngeal swab was reserved only for patients with high suspicion of COVID-19 and undergoing anti-cancer therapy

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