



COVID-19 impact on an oncologic emergency department visits: observational study

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Received 19 January 2023

Accepted 7 February 2023

Published Online First

22 February 2023

ABSTRACT

Objective This study aimed at evaluating the impact of COVID-19 on emergency department (ED) visits in a tertiary cancer centre and providing information on the features of the unplanned events during the first wave of COVID-19 pandemic.

Methods This retrospective observational study based on data from ED reports was divided into three periods of 2 months each around the first lockdown announcement of 17 March 2020: pre-lockdown, lockdown and post-lockdown.

Results A total of 903 ED visits were included in the analyses. The mean (\pm SD) daily number of ED visits did not change during the lockdown period (14.6 ± 5.5) when compared with the periods before (13.6 ± 4.5) and after lockdown (13.7 ± 4.4) ($p=0.78$). The proportion of ED visits for fever and respiratory disorders increased significantly to 29.5% and 28.5%, respectively ($p<0.01$) during lockdown. Pain, the third most frequent motive, remained stable with 18.2% ($p=0.83$) throughout the three periods. Symptom severity also showed no significant differences in the three periods ($p=0.31$).

Conclusion Our study shows that ED visits during the first wave of the COVID-19 pandemic remained stable for our patients regardless of the symptom's severity. The fear of an in-hospital viral contamination appears weaker than the need for pain management or for the treatment of cancer-related complications. This study highlights the positive impact of cancer ED in the first-line treatment and supportive care of patients with cancer.

INTRODUCTION

The COVID-19 pandemic had a significant impact on the global healthcare system. The paradigm of conventional care was challenged, and the evidence-based practice acquired over the years was debated. Physicians were forced to

WHAT IS ALREADY KNOWN ON THIS TOPIC

⇒ The COVID-19 pandemic had a thorough impact on the global healthcare system. Growing evidence is revealing oncologic therapy and follow-up delays for patients with cancer, but its influence on oncologic emergency department (ED) visits remains uncertain.

WHAT THIS STUDY ADDS

⇒ We showed that ED visits during the first wave of the COVID-19 pandemic remained stable for our patients regardless of the symptom's severity. Patients continued to consult for pain management or for the treatment of cancer-related complications.

HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

⇒ This study highlights the positive impact of cancer ED in the first-line treatment and supportive care of patients with cancer in anticipation of future pandemics.

change their approach and to reevaluate the priorities of the care they provided.¹

Oncology patients require specific care due to their underlying disease and cancer treatments. It has been difficult to define whether these patients were more vulnerable to COVID-19 infections, or if cancer was associated with increased mortality or severe disease. Therefore, medical oncology staffs had to make difficult decisions between administering urgent cancer therapies or delaying treatments to prevent potential in-hospital viral exposures.² In a multicentric study, Lee *et al*³ analysed a group of patients with an active or previous malignancy, and a severe pulmonary infection from COVID-19. They concluded that cancer type and oncologic therapy were not associated with increased COVID-19-related



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To cite: Ram A, Pagès A, Cubilier E, *et al*. *BMJ Supportive & Palliative Care* 2024;**14**:e1354–e1360.

mortality. However, patients with multiple comorbidities and progressive oncologic disease or physical decline may be at higher risk of death. Another study in China concluded that the case fatality rate for oncologic patients was approximately double that of their general population (5.6% vs 2.3%).⁴ A Belgian study conducted during the first wave revealed a significant association between older age in patients with cancer and SARS-CoV-2 infections⁵ and the American Society of Clinical Oncology recommended mindful care for elderly patients with cancer due to their proneness to severe and deadly outcomes.⁶

Parallely, some studies focused on delayed treatments and diagnoses due to the COVID-19 pandemic and the fear of viral exposure. A multicentric study of 41 cancer centres between April and May 2020 showed reductions of 75% of cancer screenings, 46% of follow-up consultations, 36% and 37% of hospitalisations and chemotherapies and 49% of surgeries due to the COVID-19 pandemic.⁷ Delayed treatments due to the pandemic in 40% of patients with palliative thoracic cancer were observed,⁸ as well as treatment disruptions in patients with breast cancer.⁹ In recent studies, these treatment delays due to the COVID-19 pandemic appear to worsen the prognosis of patients with cancer, and modelling studies seem to project a significant negative impact on their morbidity and mortality.¹⁰

To this day, there are few data available on the impact of COVID-19 on unplanned events (UEs) and emergency department (ED) visits, which often occur under normal circumstances in the patient's oncological history. Previous viral infections showed that ED visits depend on the characteristics of the infectious agent involved, its power of contagion and its mortality rates.^{11 12}

This study aims to evaluate the first lockdown's impact on patients with cancer during the COVID-19 pandemic concerning ED visits in a tertiary cancer care hospital. Our objective is to study the oncological patient's behaviour when UEs or symptoms occur during their treatment course. Is the fear of an in-hospital viral contamination greater than the need for pain management or treatment of cancer-related complications ?

METHODS

Study design and participants

This retrospective, observational study was conducted in the Gustave Roussy cancer centre (France). All patients who consulted the ED during the first wave of COVID-19 (from 27 March to 12 July 2020) were included. Gustave Roussy's ED takes care of patients treated at Gustave Roussy for cancer only. Patients consulting for nursing care and paediatric patients (<18 years) were excluded. Each consultation was considered as an independent event. A patient may have had several ED visits during the same period. The study period was divided into three periods of 8

weeks each, centred around the announcement of the first lockdown in the Paris area on 17 March 2020. We analysed 300 patients who visited the ED for each period of 2 months, by including the first 150 patients of the period, and the next 150 patients following a 3 weeks delay in each period to be as representative of each period as possible.

- ▶ Pre-lockdown period from 27 January to 16 March 2020 (n=299).
- ▶ Lockdown period from 17 March to 11 May 2020 (n=302).
- ▶ Post-lockdown period from 12 May to 12 July 2020 (n=302).

This study was reported according to the Strengthening the Reporting of Observational Studies in Epidemiology guidelines.¹³ Medical records were reviewed to collect demographic and clinical data using a standardised-specific form. The demographic data extracted comprised age, gender, cancer location, metastatic status of cancer and cancer status before current episode (complete response (CR), partial response (PR), stable disease (SD), progressive disease (PD)). The clinical data of ED visits comprised postoperative visit status, SARS-CoV-2 PCR test result on the nasopharyngeal swab, main symptoms, degree of symptom severity, causality (tumour-related, treatment-related, independent of tumour or treatment), patient's medical evolution including hospitalisation length and mortality. Postoperative visits were defined as visits within 30 days of a surgical procedure. The main symptoms for an ED visit were chosen in a predefined list with a maximum of two items for every UEs: fever, digestive disorder, respiratory disorder, neurological disorder, cardio-circulatory disorder, altered general condition, pain, palliative care, abnormal biological workup and others. The degree of severity of the UE was established according to the FRENCH triage score, as recommended by the French Society of Emergency Medicine. This score ranks priorities from 5 to 1 (from least urgent to most urgent) according to prognosis and complexity/severity of the medical condition.¹⁴

Statistical analysis

Regarding the descriptive analysis, we presented the qualitative variables as numbers and percentages, and the quantitative variables with means and SD. In addition, we used the χ^2 test to compare categorical variables and the Kruskal-Wallis test to compare continuous variables between the three periods. A difference was considered statistically significant for a p value less than 0.05 ($p < 0.05$). Statistical analyses were performed using SAS V.9.4 software (SAS Institute).

RESULTS

Number of ED visits

A total of 2309 ED visits were observed during the three periods, 760 before lockdown, 820 during the lockdown and 729 after lockdown. Three hundred ED

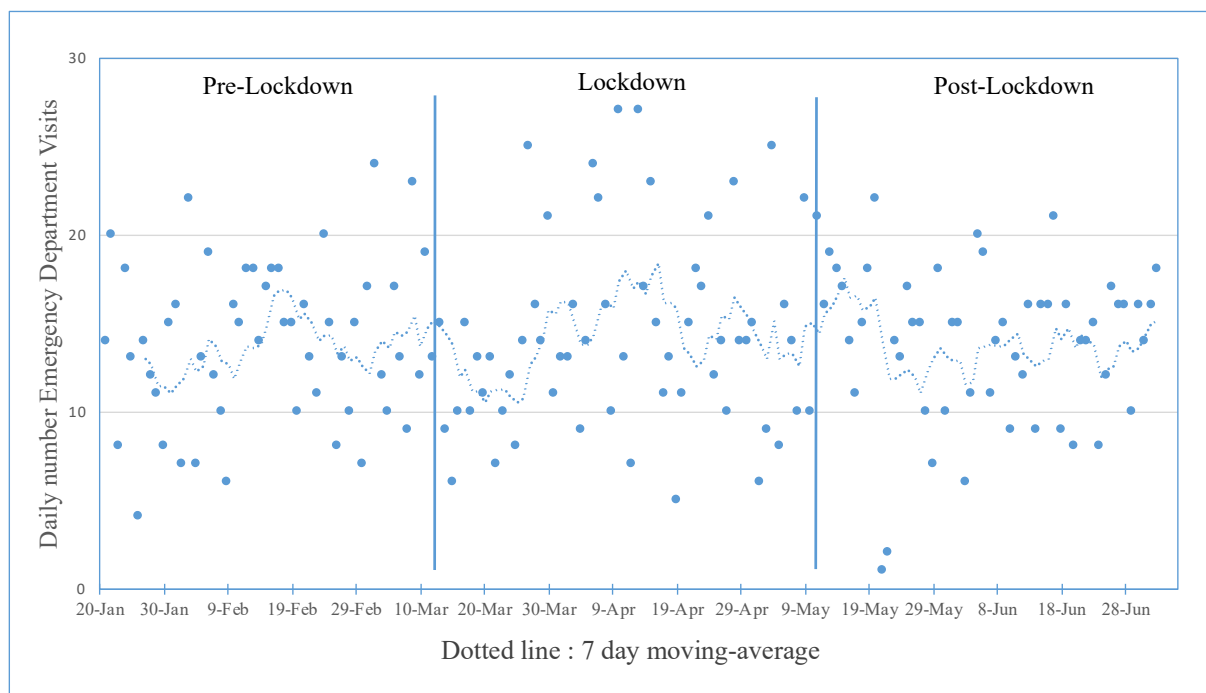


Figure 1 The pre-lockdown period from 27 January to 16 March, lockdown period from 17 March to 11 May, post-lockdown period from 12 May to 12 July.

of each period were analysed. A total of 903 ED visits were included in the analyses. The mean (\pm SD) daily number of ED visits was not significantly different during the lockdown period (14 ± 5.5) when compared with periods before (13 ± 4.5) and after lockdown (13 ± 4.4) ($p=0.78$) (figure 1).

Characteristics of the patients

The characteristics of the patients who consulted the ED are shown in table 1. Our population consisted of 368 men (40.8%) and 535 women (59.2%). The mean age of patients was 61.4 years (± 14.6). The age distribution increased significantly for the post-lockdown period with a median of 63.6 (14.5) years ($p=0.0048$). The sex ratio was not significantly different between the three periods ($p=0.7574$). The most frequent cancers were breast cancers with 187 patients (20.7%), digestive cancers with 116 patients (13.8%) and lung cancers with 105 patients (11.6%). Five hundred and twenty-six patients had metastatic cancer (58.3%). There was no significant difference in the cancer location ($p=0.27$) and in the metastatic cancer status ($p=0.09$) between the three periods. Of the total population, 13.8% had CR, 6.4% had PR, 6.3% had SD, 52.5% had PD and 20.9% were at the beginning of management. The difference of cancer evolution was significant between the three periods ($p=0.034$) with a significant increase in CR patients during the lockdown period (18.2%) when compared

with pre-lockdown (11.0%) and post-lockdown periods (12.3%) (table 1).

Characteristics of the ED visits

The characteristics of ED visits are shown in table 2. There was a significant difference in postoperative ED visits number between the three periods with respectively 31 (10.4%), 15 (5.0%) and 16 (5.3%) ($p=0.014$) in pre-lockdown, lockdown and post-lockdown periods. On all ED visits, the main symptom was fever for 20.6% and respiratory disorders for 18.7%. This proportion of ED visit reason increased significantly during the lockdown period to 29.5% for fever and 28.5% for respiratory disorders ($p<0.01$). Pain was the third most frequent motive with 18.2% of ED visits, and no significant difference was observed during the studied periods for this UE (table 2).

The ED visits' FRENCH triage scores showed 6.2% of scores 1 and 2 (management within 1 hour), 81.6% of score 3 (management within 24 hours) and 12.2% with scores 4 and 5. There was no significant difference in the degree of severity during the three periods ($p=0.31$) (table 2). Among the ED visits, 45.8% were for a cancer-related reason, 32.6% for a treatment-related reason and 21.3% for a non-cancer or non-treatment-related reason (21.3%). The proportion of ED visits for a non-cancer and non-treatment-related reason increased significantly during the lockdown period to 31.5% ($p<0.001$) (table 2).

Table 1 Characteristics of the patients who consulted ED in a tertiary oncologic hospital in France during the three studied periods. P value for the comparison between pre-lockdown, lockdown and post-lockdown period using χ^2 test for categorical variables and Kruskal-Wallis test for continuous variables. n=number of patients

Characteristics of patients	Pre-lockdown, n=299	Lockdown, n=302	Post- lockdown, n=302	P value
Sex, n (%)				
Men	127 (42.5)	121 (40.1)	120 (39.7)	0.7574
Women	172 (57.5)	181 (50.9)	182 (60.3)	
Age (years)				
Median (IQR)	62 (51–71)	62 (50–71)	65 (55–75)	0.0048*
Cancer location, n (%)				
Breast	60 (20.1)	65 (21.5)	62 (20.5)	0.2713
Digestive tract	41 (13.7)	37 (12.3)	38 (12.6)	
Gynaecologic tract	34 (11.4)	38 (12.6)	38 (12.6)	
Lung	32 (10.6)	32 (10.6)	32 (10.6)	
Haematologic	36 (12.0)	34 (11.3)	17 (5.6)	
Head and neck	26 (8.7)	28 (9.3)	24 (7.9)	
Urologic tract	21 (7.0)	15 (5.0)	35 (11.6)	
Soft tissue	12 (4.0)	20 (6.6)	22 (7.3)	
Skin	12 (4.0)	14 (4.6)	14 (4.6)	
Neuroendocrine	5 (1.7)	9 (3.0)	4 (1.3)	
Pancreas	5 (1.7)	4 (1.3)	4 (1.3)	
Brain	4 (1.3)	4 (1.3)	8 (2.6)	
Thyroid	2 (0.7)	2 (0.7)	4 (1.3)	
Metastatic cancer, n (%)				
Yes	172 (57.5)	164 (54.3)	190 (62.9)	0.0954
Cancer evolution, n (%)				
Complete remission	33 (11.0)	55 (18.2)	37 (12.3)	0.024*
Partial response	15 (5.0)	17 (5.6)	26 (8.6)	
Stable disease	25 (8.4)	14 (4.6)	18 (6.0)	
Progressive disease	165 (55.2)	145 (48.0)	164 (54.3)	
New diagnoses	61 (20.4)	71 (23.5)	5 (18.9)	

*Statistically significant.
ED, emergency department.

Medical evolution

Consecutive to the ED visit, 336 (37.2%) patients returned home and 567 (62.8%) patients were hospitalised with an average in-hospital stay of 8.7 days (SD:8.1). This statistical tendency remained stable throughout the three periods ($p=0.9958$).

Characteristics of the SARS-CoV-2 infection (COVID-19)

In our sample, 45 (5%) patients were tested positive for COVID-19, 305 (33.8%) were tested negative and 552 (61.2%) were not tested for COVID-19. During pre-lockdown, 100% of patients were not tested, while 66.8% of patients were tested during lockdown and 51.8% in post-lockdown. Positive tests were found in 44 patients (14.6%) during lockdown and in 1 (0.3%) patient during post-lockdown.

In the group of 45 COVID-19 positive patients, 40 (89%) patients visited the ED for non-cancer or non-treatment-related reasons, 20 (44%) patients for fever and 25 (55.6%) patients for respiratory disorders. Six (13%) patients died within 30 days of admission.

DISCUSSION

Although our study shows that the first wave of the COVID-19 pandemic did not affect the visits' trend in the Gustave Roussy oncology ED, we do observe delayed or adapted treatments in 30%–41% of the patients with cancer, in concordance with another study conducted in this centre.¹⁵

Moreover, we found interesting variability in patient traits or ED visits characteristics throughout the three periods.

During the lockdown, there was an increased proportion of ED visits for reasons unrelated to cancer or its treatment, especially for COVID-19-related motives such as respiratory disorders, fever and flu-like symptoms.

Post-surgical ED visits decreased during and after the lockdown since many surgical interventions were postponed. Several countries recommended delaying non-urgent surgeries and chemotherapies in slowly progressive cancers to limit contaminations.¹⁶ Given the possible deleterious implications of delayed

Table 2 Characteristics of the ED visits in a tertiary oncologic hospital in France during the three studied periods. P value for the comparison between pre-lockdown, lockdown and post-lockdown period using χ^2 test for categorical variables and Kruskal-Wallis test for continuous variables, n=number of ED visits

Characteristics of ED visits	Pre-lockdown, n=299	Lockdown, n=302	Post-lockdown, n=302	P value
Symptom of ED visit, n (%)				
Fever	52 (17.4)	89 (29.5)	45 (14.9)	<0.0001*
Respiratory disorder	41 (13.7)	86 (28.5)	42 (13.9)	<0.0001*
Pain	51 (17.1)	56 (18.5)	57 (18.9)	0.83
Digestive disorder	50 (16.7)	34 (11.3)	47 (15.6)	0.13
Altered general condition	28 (9.4)	17 (5.6)	29 (9.6)	0.13
Neurological disorder	16 (5.4)	18 (6.0)	25 (8.3)	0.31
Cardio-circulatory disorder	17 (5.7)	8 (2.6)	8 (2.6)	0.07
Palliative care	2 (0.7)	2 (0.7)	6 (2.0)	0.20
FRENCH triage score, n (%)				
Score 1 and 2	16 (5.4)	21 (7.0)	19 (6.3)	0.31
Score 3	247 (82.6)	236 (78.1)	254 (84.1)	
Score 4 and 5	36 (12.0)	45 (14.9)	29 (9.6)	
Type of reason, n (%)				
Cancer-related	138 (46.2)	127 (42.1)	149 (49.3)	<0.01*
Treatment-related	113 (37.8)	77 (25.5)	104 (34.4)	
Non-cancer or treatment-related	48 (16.1)	95 (31.5)	49 (16.2)	

*Statistically significant.

ED, emergency department.

therapies targeting cancer in patients, this decision may be questionable. A Canadian study highlighted the impact on morbidity and mortality of delaying cancer treatment.¹⁷ In 2020, a meta-analysis showed increased mortality rates in seven different cancers after a 4-week delay in cancer treatment.¹⁸ Another study focusing on surgical treatments for rectal cancer found that a 30-day delay had a negative impact on survival outcomes.¹⁹

Scarce data are available in the literature about the consequences of delaying treatments for ED visits, especially for patients with cancer. What we know is that caring for symptoms swiftly for patients with cancer is crucial. For palliative patients, early management of symptoms not only improves the quality of life but also has an impact on survival.²⁰

A North Italian study in a general hospital showed an overall reduction in ED visits of 66.2% during the first wave of the pandemic compared with the same period of the previous year. This result was associated with a significant increase in overall mortality (43.2%) and cause-specific mortality for cancer (76.7%).²¹ Another Italian study showed similar results with a 66.4% reduction of ED visits during the first lockdown compared with the previous year.²²

Parallely, our study shows that ED visits for patients with cancer with low severity scores or pain management motives remained stable during lockdown, and even increased for patients in complete remission. Another tertiary cancer institute in Brazil also reported no significant reduction in ED visits during the first wave of COVID-19. When compared with a general

primary care hospital, they reported a 66.4% reduction in all ED visits, and this difference was increased in low severity score patients.²³

Result variability between cancer centres and general hospitals raises an ethical discussion about critical care for patients with cancer in this pandemic. Due to limited resources, access to intensive care unit (ICU) in overwhelmed general hospitals was limited, which narrowed treatment options for patients with cancer requiring ICU therapies. This may have led these patients to favour consulting their oncology centre over a general hospital, which in turn maintained stable ED visits in cancer centres compared with general hospitals.

In this sense, a message has been sent to all the patients followed in our cancer centre through different communication channels, such as emails and text messages. Patients were encouraged to consult if they experienced COVID-19 related symptoms, pain or other symptoms, despite the pandemic. All patients were informed that the centre was able to treat them, even with a COVID-19 infection. An ethics committee was established to assist care practitioners in delicate clinical decisions.²⁴ This particular focus on patient communication and caregiver support may also have backed the ED visits in our centre.

Furthermore, the fear of COVID-19 in patients combined with sudden and forced isolation was a difficult challenge during the pandemic. A study focused on the psychological impact of COVID-19 on patients with cancer and caregivers showed an increased level of depression, anxiety, stress and poorer sleep quality

with loneliness as a significant predictor factor.²⁵ When an UE occurred during lockdown, patients with cancer may thus have dreaded complications related to cancer and have been tempted to visit the ED.

The outcome of our COVID-19 population is similar to the Saudi Arabia experience, where they studied patients with cancer admitted for oncologic emergencies during the pandemic. In patients with cancer who tested positive for COVID-19, they found mortality rates of 16% compared with 13% in our study with mortality not only due to COVID-19 but also to disease progression.²⁶ We also found that 50% of our COVID-19 positive patients with cancer who died were admitted for cancer-related reasons. These results are comparable with the 30-day all-cause mortality of 13% reported in the Cancer consortium CCC-19, which is the largest cohort study for patients with cancer diagnosed with COVID-19.²⁷

Another study of our Cancer Centre, analysing the first 178 COVID-19 patients showed a hospitalisation rate of 70.2% and a mortality of 17.4%.¹³

Our study is limited in some points. First, we do not have information on potential ED visits of our patients with cancer in ED of other general hospitals, although data on ED visits in general hospitals seem to have dropped during the first wave of this pandemic.^{21 22} Lack of previous studies on the topic can make it difficult to extrapolate from existing data.

CONCLUSION

Our study shows that ED visits during the COVID-19 pandemic remained stable in our oncologic sample, regardless of the symptom severity. Fear of complications related to cancer or the need to palliate symptoms appears to be greater than the fear of exposure to the virus. This tendency could be beneficial to patients treated for cancer in oncological hospitals since delayed treatment hinders their prognosis and quality of life. This study highlights the positive impact of a tertiary cancer ED in the first-line treatment and supportive care of patients with cancer. Further studies are needed to determine the long-term consequences of the COVID-19 pandemic on oncologic patients, and to elaborate future pandemic management strategies involving ED in cancer centres.

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Contributors AR conceptualised and designed the study, collected the data, drafted the initial manuscript and reviewed and revised the manuscript. AP carried out the statistical analyses and reviewed and revised the manuscript. EC participated in the study conceptualisation, reviewed and revised the manuscript. ND, FV reviewed and revised the manuscript. SA, MM conceptualised and designed the study and reviewed and revised the manuscript. All authors approved the final manuscript as submitted and agree to be accountable for all aspects of the work. MM accepts responsibility for the finished work and the conduct of the study, had access to the data, and controlled the decision to publish. MM is responsible for the overall content as the guarantor.

Funding The authors have not declared a specific grant for this research from any funding agency in the public, commercial or not-for-profit sectors.

Competing interests None declared.

Patient consent for publication Not applicable.

Ethics approval Not applicable.

Provenance and peer review Not commissioned; internally peer reviewed.

Data availability statement Data are available upon request.

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REFERENCES

- Schrag D, Hershman DL, Basch E. Oncology practice during the COVID-19 pandemic. *JAMA* 2020;323:2005–6.
- Disis ML. Oncology and COVID-19. *JAMA* 2020;324:1141–2.
- Lee LY, Cazier J-B, Angelis V, *et al.* COVID-19 mortality in patients with cancer on chemotherapy or other anticancer treatments: a prospective cohort study. *Lancet* 2020;395:1919–26.
- Liang W, Guan W, Chen R, *et al.* Cancer patients in SARS-cov-2 infection: a nationwide analysis in china. *Lancet Oncol* 2020;21:335–7.
- Goudsmit A, Cubilier E, Meert A-P, *et al.* Factors associated with SARS-cov-2 infection and outcome in patients with solid tumors or hematological malignancies: a single-center study. *Support Care Cancer* 2021;29:6271–8.
- Segelov E, Underhill C, Prenen H, *et al.* Practical considerations for treating patients with cancer in the COVID-19 pandemic. *JCO Oncol Pract* 2020;16:467–82.
- Ranganathan P, Sengar M, Chinnaswamy G, *et al.* Impact of COVID-19 on cancer care in india: a cohort study. *Lancet Oncol* 2021;22:970–6.
- Elkrief A, Kazandjian S, Bouganim N, *et al.* Changes in lung cancer treatment resulting from the COVID-19 pandemic: a prospective observational study. *JAMA Oncol* 2020;6:1805–6.
- Papautsky EL, Hamlish T. Patient-Reported treatment delays in breast cancer care during the COVID-19 pandemic. *Breast Cancer Res Treat* 2020;184:249–54.
- Maringe C, Spicer J, Morris M, *et al.* The impact of the COVID-19 pandemic on cancer deaths due to delays in diagnosis in england, UK: a national, population-based, modelling study. *Lancet Oncol* 2020;21:1023–34.
- Chu D, Chen R-C, Ku C-Y, *et al.* The impact of SARS on hospital performance. *BMC Health Serv Res* 2008;8:228.
- Heiber M, Lou WY. Effect of the SARS outbreak on visits to a community hospital emergency department. *CJEM* 2006;8:323–8.
- Taboulet P, Vincent-Cassy C, Squara PA, *et al.* Validity of the revised FRENCH (FRENCH emergency nurses classification in hospitals), the emergency departments triage scale developed by the FRENCH society of emergency medicine. *Ann Fr Med Urgence* 2019;9:10–6.
- von Elm E, Altman DG, Egger M, *et al.* Strengthening the reporting of observational studies in epidemiology (STROBE) statement: guidelines for reporting observational studies. *BMJ* 2007;335:806–8.
- Albiges L, Foulon S, Bayle A, *et al.* Determinants of the outcomes of patients with cancer infected with SARS-cov-2: results from the Gustave Roussy cohort. *Nat Cancer* 2020;1:965–75.
- Al-Shamsi HO, Alhazzani W, Alhurairi A, *et al.* A practical approach to the management of cancer patients during the novel coronavirus disease 2019 (COVID-19) pandemic: an

- international Collaborative group. *Oncologist* 2020;25:e936–45.
- 17 Walker MJ, Wang J, Mazuryk J, *et al.* Delivery of cancer care in Ontario, Canada, during the first year of the COVID-19 pandemic. *JAMA Netw Open* 2022;5:e228855.
- 18 Hanna TP, King WD, Thibodeau S, *et al.* Mortality due to cancer treatment delay: systematic review and meta-analysis. *BMJ* 2020;371:m4087.
- 19 Fligor SC, Wang S, Allar BG, *et al.* Gastrointestinal malignancies and the COVID-19 pandemic: evidence-based triage to surgery. *J Gastrointest Surg* 2020;24:2357–73.
- 20 Temel JS, Greer JA, Muzikansky A, *et al.* Early palliative care for patients with metastatic non-small-cell lung cancer. *N Engl J Med* 2010;363:733–42.
- 21 Santi L, Golinelli D, Tampieri A, *et al.* Non-COVID-19 patients in times of pandemic: emergency department visits, hospitalizations and cause-specific mortality in northern Italy. *PLoS One* 2021;16:e0248995.
- 22 Morello F, Bima P, Ferreri E, *et al.* After the first wave and beyond lockdown: long-lasting changes in emergency department visit number, characteristics, diagnoses, and hospital admissions. *Intern Emerg Med* 2021;16:1683–90.
- 23 Costa GJ, Júnior H de AF, Malta FC, *et al.* The impact of the COVID-19 pandemic on tertiary care cancer center: analyzing administrative data. *Semin Oncol* 2022;49:182–8.
- 24 Blot F, Dumont SN, Vigouret-Viant L, *et al.* Ethical issues related to the COVID-19 pandemic in patients with cancer: experience and organisations in a French comprehensive cancer centre. *BMJ Support Palliat Care* 2022;12:413–20.
- 25 Steel JL, Amin A, Peyser T, *et al.* The benefits and consequences of the COVID-19 pandemic for patients diagnosed with cancer and their family caregivers. *Psychooncology* 2022;31:1003–12.
- 26 Elemam O, Tashkandi E, Abdelkhalek S, *et al.* Emergency oncology admissions during COVID-19 pandemic: a major institution experience from Saudi Arabia. *Exp Oncol* 2021;43:31–5.
- 27 Warner JL, Rubinstein S, Grivas P, *et al.* Clinical impact of COVID-19 on patients with cancer: data from the COVID-19 and cancer consortium (ccc19). *JCO* 2020;38(18_suppl):LBA110.