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The COVID-19 & Cancer Consortium (CCC19) and Opportunities for Radiation Oncology

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Abstract:	

The COVID-19 & Cancer Consortium (CCC19) and Opportunities for Radiation Oncology

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4 To date, there are more than 38,000,000 confirmed cases of COVID-19 worldwide, with over 1,000,000
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6 deaths [1]. In the United States, there are over 7,800,000 confirmed cases, with over 215,000 deaths [1].
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8 This disease is highly infectious, especially since asymptomatic and symptomatic individuals can transmit
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10 the virus [2, 3]. During the pandemic, extensive public health measures have been taken to limit
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12 exposure of both staff and patients to the SARS-COV-2 virus, including physical distancing and
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14 quarantine. Due to these public health measures, there is concern that access to radiation treatment
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16 may be limited, or treatment plans may be interrupted or changed due to SARS-COV-2 infection. Despite
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18 the lack of data, multiple clinical practice guidelines have been released recommending changes in dose
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20 fractionation schedules for patients undergoing radiation therapy during the pandemic [4]. The short-
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22 and long-term clinical impact of these changes on patient outcomes is unknown.
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29 The COVID-19 & Cancer Consortium (CCC19) is an international collection of 120 institutions from the
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31 United States, European Union, Argentina, Canada, Mexico and the United Kingdom. The purpose of the
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33 CCC19 is to collect detailed information on patients with cancer diagnosed with COVID-19 at scale across
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35 the globe. In the CCC19 cohort study, the 30-day all-cause mortality was 13% among 928 patients in the
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37 United States with active cancer or previous history of cancer and confirmed COVID-19 [5]. Independent
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39 factors associated with increased 30-day mortality were increased age, male sex, smoking history,
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41 number of comorbidities, ECOG performance status of 2 or higher, active cancer, and receipt of
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43 azithromycin plus hydroxychloroquine, and residence in the US-Northeast. Of note, active anticancer
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45 therapy was not associated with increased 30-day mortality [5].
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51 In the UK Coronavirus Cancer Monitoring Project (UKCCMP) study consisting of 800 patients with cancer
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53 and symptomatic COVID-19, the risk of death was significantly associated with advanced age, male sex,
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55 and comorbidities. After adjusting for age, gender and comorbidities, chemotherapy in the past 4 weeks
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57 had no significant effect on mortality from COVID-19 [6]. Several other studies have similarly shown no
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59 statistically significant relationship between the use of chemotherapy and adverse outcomes [7, 8].
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4 Specific to radiation therapy, in 59 patients with breast cancer with positive viral RNA testing or typical
5 radiology signs for COVID-19 who were actively treated for early or metastatic disease during the last
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7 four months at the Institut Curie Parisian, no association was found between prior RT fields or RT
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9 sequelae and the extent of COVID-19 lung lesions. The four patients who died had significant non-cancer
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11 co-morbidities and in univariate analysis, hypertension and age > 70 years were two factors associated
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13 with a higher risk of ICU admission and/or death [8].
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19 In Wuhan, China, the largest radiation therapy dataset reported to-date provided insight into the
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21 radiation treatment courses of 209 patients [9] with a 10-fold decrease in clinical caseload due to the
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23 lock-down. Beyond these reports, there have been no large studies addressing the impact of COVID-19
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25 related delays to start radiation therapy, changes in radiation treatment dose and fractionations or
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27 unexpected interruptions or delays in completing treatment, which could have long-lasting effects on
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29 overall cancer outcomes.
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34 The CCC19 have an exceptionally detailed system of data collection on cancer related variables on
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36 almost 5000 patients (Figure 1). Currently, the consortium lacks important details of radiation treatment
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38 and timing. We hope to increase the collection and availability of radiation specific variables to allow a
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40 more granular analysis of radiation decision making and the impact of radiation treatment during the
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42 COVID-19 era. We hope to call attention to the members of the American Society for Radiation
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44 Oncology (ASTRO) to join the CCC19 and help accrue additional patients with radiation specific details.
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47 The CCC19 will help better understand the use of radiation treatment during the COVID-19 pandemic,
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49 the impact on cancer and Covid-19 outcomes in general, and help prepare our field for any future
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51 pandemic.
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Figure Legend

Figure 1. Patient level demographic, Covid-19 course, and cancer related data available in the COVID-19 & Cancer Consortium (CCC19) database, along with proposed radiation specific data variables.

Demographic Information

- Age, gender, race/ethnicity
- ECOG
- Smoking status
- Medical and smoking status
- Medications

COVID-19 Initial Course of Illness

- Presenting symptoms
- Presenting labs
- Diagnostic testing
- Initial severity of illness
- Co-infections
- Complications
- Treatments including trials
- Clinical status

Radiation Details

- Radiation Modality
- Radiation technique
- Number of fractions and total dose planned and delivered
- Radiation Start and Completion Date
- PTV volume, anatomic site
- Organ at risk (OAR) doses (lungs, heart doses, etc.)
- Use of concurrent therapy (type)

Other Cancer & Treatment details

- Cancer type, stage, status
- Endocrine therapy
- Chemotherapy
- Targeted therapy
- Immunotherapy
- Surgery (type and location)
- Hematopoietic stem cell transplant
- Treatment timing, treatment related adverse events

COVID-19 Related Treatment Modifications

- Was locoregional therapy delayed (surgery, radiation or both)?
- Was there a treatment break during radiation therapy?
- Was the radiation plan modified upfront or during radiation (hypofractionation used)?
- Was the patient diagnosed using CBCT/on board imaging?