

## COVID-19 amongst cancer patients: An experience from Oman

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### Abstract

**Objective:** To evaluate the extent of coronavirus infection in cancer patients along with their demographics, laboratory findings and outcomes in a tertiary care setting.

**Methods:** The study was conducted in Muscat, Oman, from March 24 to October 23, 2020. The data was collected from the cancer registry of the Directorate-General of Non-Communicable Diseases, Ministry of Health, Oman. Data of inpatient coronavirus cases were retrieved from the electronic medical records system of the Royal Hospital, Muscat, all tertiary hospitals linked electronically to the registry and the coronavirus registry of Oman. The data of cancer patients infected with coronavirus was analysed and compared with non-cancer coronavirus-infected patients. Data was analysed using IBM SPSS 2019 v26.

**Results:** Of the 16,260 cancer patients, 77(0.47%) were infected with COVID-19 compared to 111,837(2.17%) in the national population. Mortality among cancer patients with COVID-19 was high 27(35.1%) compared to 1,147(1.03%) in the national population. Cancer patients with COVID-19 also had diabetes 15(20%), hypertension 20(26%), renal complications 15(20%) and cardiac issues 9(12%). Of the total, 32(41.6%) cancer patients with COVID-19 had received active cancer treatment within the preceding 4 weeks.

**Conclusions:** The data on coronavirus infection outcome is emerging at a rapid pace focussing on the impact of underlying diseases, and the capacity of healthcare systems. Oncologists should customise cancer management, while cancer patients must practise social distancing, and seek prompt evaluation of suspicious symptoms.

**Keywords:** Cancer, COVID-19, Coronavirus, Cancer treatment in pandemic, Oman, Royal hospital. (JPMA 71: .2563; 2021)

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### Introduction

A quickly progressing infection like the coronavirus disease-19 (COVID-19) has not been witnessed in recent history. This contagious severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) has globally amended human life and behaviour intensely<sup>1</sup> as people have adapted to social distancing and lockdowns. There is no treatment at present, excluding tocilizumab in China, and remdesivir in the United States and Japan, which can be considered the standard of care.<sup>1</sup> There is a higher risk of acquiring infection, developing complications and subsequent higher mortality in elderly patients and in people with comorbidities.<sup>2-4</sup> Cancer patients are vulnerable due to older age, concurrent comorbidities, and an immunocompromised state due to both the disease and its treatment.<sup>5</sup>

The patho-physiology of COVID-19 infection in cancer patients is still far from completely understood due to small and diverse information available. The course of COVID-19 infection in cancer patients and normal non-cancer patients has not been directly compared.<sup>6</sup> There are reports

from Wuhan, China, that cancer patients are more susceptible and have a complicated course of infection.<sup>7-11</sup> It also showed a 2.2% prevalence rate in cancer patients, which is almost double compared to the average population.<sup>6-9</sup> A mortality rate of 28.6% has been reported, which is 10 times higher.<sup>7,10-12</sup> These studies suggested that COVID-19 infection in cancer patients frequently leads to a critical illness, intensive care unit (ICU) admissions, invasive ventilation and death. The impact of other factors, like age, gender and comorbidities, has not been determined, which may influence the outcome.<sup>5</sup> Early data from the United States has also registered higher rate of complications and death among cancer patients.<sup>5</sup>

An active cancer treatment, systemic therapy or radiation therapy, within two weeks prior to COVID-19 infection may lead to severe complications or even death.<sup>6</sup> Prolonged inpatient admission of cancer patients may also predispose to infection in up to one-third of patients.<sup>6-8</sup> The figures are alarming though small, retrospective and comprising only critical ventilated ICU patients. This cannot be generalised to other countries as prevalence of cancers in China may be different, and haematological malignancies are not included.<sup>6</sup> Additionally, the standard of care and management may be different in other regions of the world. COVID-19 complications and mortality rates are inconsistent with those reported from Italy, Spain and US.<sup>8</sup>

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Another recent study hints at greater severity of infection in cancer patients. This may be explained by delays in diagnosis and treatment, clinical assessment, limited transfusion support, irregular follow-up and saturation of healthcare system and supportive services.<sup>13,14</sup>

An appropriate clinical assessment, chest X-ray, computed tomography (CT) scan, real-time reverse transcription polymerase chain reaction (RT-PCR) in nasopharyngeal and throat swabs are cornerstones of the diagnosis.<sup>15</sup> The severity and outcome of COVID-19 infection is influenced by the immune status, nature of underlying disease, stage of malignant disease, and type of treatment.<sup>15</sup> However, some studies have suggested no impact of active anticancer treatment on complications or mortality.<sup>16</sup> Mortality from COVID-19 in cancer patients is further guided by age, gender and comorbidities. So far, the

available information is inadequate to draw definite conclusions about whether to modify or delay systemic treatment of cancer.<sup>5</sup>

The current study was carried out to assess the rate of COVID-19 infection in cancer patients along with demographics, laboratory findings and outcomes in a tertiary care setting, and to compare them with COVID-19 infection in non-cancerous patients.

## Patients and methods

The study was conducted in Muscat, Oman, from March 24 to October 23, 2020. The data was collected from the cancer registry of the Directorate-General of Non-Communicable Diseases, Ministry of Health, Oman. The cancer registry has an organised data-collection system since 1996. Data of inpatient COVID-19 cases were retrieved from the electronic medical records (EMR) system of the

## Appendix

### Case Serial Number:

#### Demographics

|                             |              |              |                          |                       |               |
|-----------------------------|--------------|--------------|--------------------------|-----------------------|---------------|
| EMR No:                     | Age          | Male/Female  | Local/Expatriate         |                       |               |
| Co-Morbid Disease           | Diabetes     | Hypertension | Ischaemic Heart Disease  | Chronic Renal Disease | Liver Disease |
| Hospitalization             | No Admission | In Patient   | High Dependency          | ICU                   |               |
| Duration of Hospitalization |              | Inpatient    | HD                       | ICU                   |               |
| ARDS                        |              | No           | Yes                      | Not Sure              |               |
| Intubated                   |              | Yes          | No                       |                       |               |
| Out Come                    |              | Recovered    | Shifted; Step up or Down | Mortality             |               |

#### Laboratory Data

|                       |       |       |              |              |
|-----------------------|-------|-------|--------------|--------------|
| White cell Count      |       |       | Neutrophils: | Lymphocytes: |
| CRP                   |       |       |              |              |
| eGFR                  |       |       |              |              |
| Serum Ferritin        |       |       |              |              |
| Serum Calcium         |       |       |              |              |
| Serum Troponin        |       |       |              |              |
| Bilirubin             |       |       |              |              |
| ALT                   |       |       |              |              |
| Lactate Dehydrogenase |       |       |              |              |
| Cultures              | Blood | Urine | Sputum       | Any other    |

#### Cancer Type

|                     |   |    |     |    |
|---------------------|---|----|-----|----|
| Cancer Type         |   |    |     |    |
| Stage of Disease    | I | II | III | IV |
| Sites of Metastasis |   |    |     |    |

#### Cancer Treatment

|                                           |              |                         |                 |               |                  |
|-------------------------------------------|--------------|-------------------------|-----------------|---------------|------------------|
| TREATMENT                                 | No           | Planned but Not Started | Palliative Care |               |                  |
| On Treatment                              | NACT         | Adjuvant and Curative   | Palliative      |               |                  |
| Lines of Chemotherapy                     | 1            | 2                       | 3               | 4             | 5 6              |
| Chemotherapy Received within Last 4 weeks | Chemotherapy | Targetted Therapy       | TKI             | Immunotherapy | Hormonal Therapy |
| Radiotherapy Received within Last 4 Weeks |              |                         |                 |               |                  |

|                  |       |
|------------------|-------|
| Data Entered by: | Date: |
| Checked by:      | Date: |

Royal Hospital, Muscat, all tertiary hospitals linked electronically to the registry and the COVID-19 registry of Oman. Approval was obtained from the ethics review committee of the Royal Hospital, Muscat.

The data was collected using an electronic proforma (Appendix). It included variables age, gender, nationality, admission in ICU, and hospital stay duration. It also included comorbid diabetes and hypertension as well as cardiac, respiratory and liver diseases. Also included clinical status on admission and outcome, ventilation, Septicaemia, renal impairment, CRP, leucocytosis, ferritin, hypocalcaemia, troponin, alanine aminotransferase (ALT), lactate dehydrogenase (LDH) levels.

Additionally, cancer patients with COVID-19 positivity data was collected from the oncology clinic EMR system and the electronic health records (her) system of other Ministry of Health hospitals across Oman. As the cancer patient data is centralised, any cancer patient having a COVID-19 positive test promptly appears in his/her medical record. Additionally, all cancer patients with symptoms, SARS-CoV-2 positive test, or on follow-up reported at the Royal Hospital, which is the only Ministry of Health facility taking care of cancer patients in Oman.

The total country population of Oman on October 23, 2020, was reported to be 51,45,145.<sup>17</sup> The number of tests performed was 309,212 (6%). The number of COVID-19 reported cases in Oman till October 23, 2020, were 111,837(2.17%) in the total population. The number of patients who died from COVID-19 was 1,147(1.03%).<sup>18</sup>

Overall, 31,561 cases were diagnosed with cancer in Oman since the cancer registry was established in 1996. Mortality due to cancer was 7093((22.5%). Taking into account the number of deaths and cases at other hospitals, it was estimated that around 16,260 cancer cases were alive and were under follow-up at the Royal Hospital.<sup>19</sup>

Data was analysed using Excel spreadsheet and IBM SPSS 2019v26. Data was expressed as frequencies and percentages or as mean  $\pm$  standard deviation, as appropriate. Chi-square and Fisher exact tests were used, as appropriate, except for the factor of hospital stay where Mann Whitney test was used to compare mean values.

## Results

Of the 16,260 cancer patients, 77(0.47%) were infected with COVID-19 compared to 111,837(2.17%) in the national population. Mortality among cancer patients with COVID-19 was high 27(35.1%) compared to 1,147(1.03%) in the national population. Cancer patients with COVID-19 also had diabetes 15(20%), hypertension 20(26%), renal complications 15(20%) and cardiac issues 9(12%) (Table 1).

Of the total, 32(41.6%) cancer patients with COVID-19 had received active cancer treatment within the preceding 4 weeks.

Demographic, clinical and laboratory characteristics of cancer patients with COVID-19 were noted (Tables 2-3) and were compared with corresponding data of non-cancer COVID-19 patients (Table s 4-5).

**Table 1:** Demographics of Cancer Patients infected with coronavirus disease (COVID-19) (n=77).

|                             | n (%)      | p-value |
|-----------------------------|------------|---------|
| Gender                      |            |         |
| Male                        | 36 (46.8)  |         |
| Female                      | 41 (53.2)  |         |
| Age (years)                 |            |         |
| < 30                        | 7 (9.1)    |         |
| 31-60                       | 39 (50.7)  |         |
| > 61                        | 31 (40.2)  |         |
| Omani                       | 71 (92.2)  |         |
| Non-Omani                   | 6 (7.8)    |         |
| Diabetes Mellitus           | 15 (19.5)  |         |
| Hypertension                | 20 (26.0)  |         |
| Respiratory diseases        | 6 (7.8)    |         |
| Liver diseases              | 6 (7.8)    |         |
| Cardiac diseases            | 9 (11.7)   |         |
| eGFR <70                    | 15 (19.5)  |         |
| Non-hospitalized            | 24 (31.2)  |         |
| Hospitalized                | 53 (68.8)  | < 0.001 |
| ICU Admissions              | 15 (19.5)  | < 0.001 |
| Duration of hospitalization | 1-29 days  |         |
| Mortality                   | 27 (35.1%) | < 0.001 |

ICU: Intensive care unit, eGFR: Estimated glomerular filtration rate.

**Table 2:** Laboratory Parameters of cancer patients infected with coronavirus disease (COVID-19) (n=77).

| Features                           | n (%)        | p-value |
|------------------------------------|--------------|---------|
| Septicaemia                        | 25/70 (35.7) |         |
| Intubation                         | 14/72 (19.4) | 0.005   |
| CRP High >10 (Highest 393)         | 41/47 (87.2) | 0.252   |
| Leucocytosis >10 (Maximum 48.4)    | 15/65 (23.1) | 0.091   |
| Leucopenia <2.2 (Minimum 1.5)      | 6/65 (9.2)   |         |
| Lymphocyte count <1.2              | 43/65 (66.2) | 0.241   |
| eGFR < 70                          | 15/76 (19.7) |         |
| Ferritin HIGH >708 (Maximum 16500) | 12/40 (30.0) |         |
| Ferritin LOW <48 (Minimum 7)       | 9/40 (22.5)  |         |
| Hypocalcaemia <2.1 (Minimum 1.82)  | 15/55 (27.3) | <0.001  |
| Hypercalcaemia >2.6 (Maximum 2.68) | 2/55 (3.6)   |         |
| Troponin HIGH >10 (Maximum 675)    | 24/33 (72.7) |         |
| ALT > 49 (Maximum 1058)            | 16/54 (29.6) | 0.295   |
| LDH > 246 (Maximum 949)            | 30/39 (76.9) | 0.072   |
| ARDS                               | 19/68 (27.9) |         |

CRP: C-reactive protein, eGFR: Estimated glomerular filtration rate, ALT: Alanine aminotransferase, LDH: Lactate dehydrogenase, ARDS: Acute respiratory distress syndrome.

**Table-3:** Cancer types and treatment in cancer patients infected with coronavirus disease (COVID-19).

| Diagnosis                               | n (%)     |
|-----------------------------------------|-----------|
| 5 patients had two malignancies         |           |
| CAGB / CholangioA/Pancreas              | 4 (5.2)   |
| Eosophagus / Gastric CA                 | 4 (5.2)   |
| Colo-rectal CA                          | 10 (13.0) |
| Head and Neck CA                        | 3 (3.9)   |
| Osteosarcoma                            | 1 (1.3)   |
| Astrocytoma/GBM                         | 2 (2.6)   |
| Endometrial CA                          | 3 (3.9)   |
| Lung CA                                 | 5 (6.5)   |
| Breast CA                               | 16 (20.8) |
| Malignant Thymoma                       | 1 (1.3)   |
| CA Thyroid                              | 2 (2.6)   |
| Leukaemia (CML/ NHL)                    | 4 (5.2)   |
| Prostate CA                             | 3 (3.9)   |
| Mesothelioma Peritoneum                 | 1 (1.3)   |
| Ovarian CA                              | 2 (2.6)   |
| CA Cervix                               | 2 (2.6)   |
| Uterine Sarcoma                         | 2 (2.6)   |
| Germ Cell tumour                        | 2 (2.6)   |
| CUPS                                    | 3 (3.9)   |
| HCC                                     | 5 (6.5)   |
| Sarcoma (STS)/GIST                      | 6 (7.7)   |
| Bladder CA                              | 1 (1.3)   |
| Stage IV Metastatic Disease             | 50 (64.9) |
| On Treatment                            | 48 (62.3) |
| No Treatment                            | 24 (31.2) |
| Planned but No treatment started yet    | 3 (3.9)   |
| On Best Supportive Care                 | 2 (2.6)   |
| On Active Treatment                     |           |
| NACT                                    | 2 (3.3)   |
| Adjuvant treatment                      | 8 (13.1)  |
| Systemic treatment with curative Intent | 1 (1.6)   |
| Palliative systemic therapy             | 50 (82.0) |
| < 3 Lines                               | 37 (67.3) |
| 3 or more Lines                         | 13 (32.7) |
| Treatment Received within               |           |
| Last 4 weeks                            |           |
| Chemotherapy                            | 26 (33.8) |
| Targeted therapy                        | 6 (7.8%)  |
| TKIs                                    | 8 (10.4)  |
| Hormonal therapy                        | 8 (10.4)  |
| Radiotherapy/Isotopes                   | 5 (6.5)   |
| Immunotherapy                           | 3 (3.9)   |

CAGB: Cancer of gall bladder, CA: Cancer, CML: Chronic myeloid leukemia, HL: Non-Hodgkin lymphoma, CUPS: Cancer of unknown primary syndrome, HCC: Hepatocellular carcinoma, STS: Soft tissue sarcoma, GIST: Gastrointestinal stromal tumours, NACT: Neoadjuvant chemotherapy, TKI: Tyrosine kinase inhibitor.

**Table-4:** Demographics of Cancer Patients infected with coronavirus disease (COVID-19) (n=77).

| Features                   | n (%)      |
|----------------------------|------------|
| Gender                     |            |
| Male                       | 531 (60.1) |
| Female                     | 352 (39.9) |
| Hospitalized as In-patient | 445 (50.4) |
| ICU                        | 390 (44.2) |

ICU: Intensive care unit.

**Table-5:** Clinical and laboratory data of Hospitalized non-cancer patients infected with coronavirus disease (COVID-19) (n=445).

| Features                      | n (%)      |
|-------------------------------|------------|
| Age >60 years                 | 336 (38.1) |
| Non-Omani                     | 180 (40.5) |
| Re-Admissions                 | 53 (11.9)  |
| Hospitalization > 10 days     | 188 (42.3) |
| Diabetes Mellitus             | 204 (45.8) |
| Hypertension                  | 207 (46.5) |
| Dyslipidaemia                 | 106 (23.8) |
| Respiratory disease           | 49 (11.0)  |
| Cardiac disease               | 82 (18.4)  |
| Liver disease                 | 36 (8.1)   |
| Ordinal Scale on Admission <5 | 294 (66.1) |
| Septicaemia                   | 33 (7.4)   |
| Oxygen > 15 L                 | 132 (29.7) |
| NIV                           | 83 (18.7)  |
| Intubation                    | 159 (35.7) |
| CRP High                      | 407 (91.5) |
| Leucocytosis                  | 114 (25.6) |
| eGFR < 70                     | 407 (91.5) |
| Ferritin HIGH                 | 221 (49.7) |
| Ferritin Low                  | 161 (36.2) |
| Hypocalcaemia                 | 279 (62.7) |
| Troponin HIGH                 | 150 (33.7) |
| D-dimer HIGH                  | 293 (65.8) |
| ALT > 49                      | 159 (35.7) |
| LDH > 2X                      | 159 (35.7) |
| Mortality                     | 70 (15.7)  |

eGFR: Estimated glomerular filtration rate, NIV: Noninvasive ventilation, CRP: C-reactive protein, ALT: Alanine aminotransferase, LDH: Lactate dehydrogenase.

## Discussion

The current study showed that the ratio of COVID-19 infection in cancer patients was low (0.47%) compared to the national population (2.17%). The fatal outcome was significantly higher in cancer patients with COVID-19 infection (35.1%) compared to non-cancer infected patients (1.03%). Diabetes, hypertension and cardiac diseases were likely risk factors for COVID-19 infection. Both in non-cancer and cancer patients, males were in majority. COVID-19 infection was higher in normal non-Omani patients, possibly a reflection of living environment and lack of appropriate protective measures. Septicaemia was more frequently seen in cancer patients, which might be due to a low immune status. CRP was high in up to 90% of all cases, just an indicator of acute infection. A high white blood cell (WBC) count, renal impairment, high ferritin, hypocalcaemia, and high transaminases were seen more commonly in non-cancer patients having COVID-19 infection. Elevated LDH and high troponin were more common in cancer patients. This can be a finding related to underlying disease and tumour burden. The cancer patients acquiring COVID-19 infection mostly had breast cancer, gastric cancer, pancreatic cancer, lung cancer,

hepatocellular carcinoma (HCC), soft tissue sarcoma (STS), or colo-rectal cancer. These are in fact the common types of tumours and it may be a reflection of that as well. Around 72.8% of cancer patients received chemotherapy, targeted therapy, hormonal therapy, immunotherapy, or radiotherapy within the preceding four weeks before being diagnosed with COVID-19 infection. Approximately one-third of these had taken cytotoxic chemotherapy.

Many of the studies published so far are inadequate to draw definite opinions due to heterogeneous patient populations, small sample sizes, and improper comparisons. Yet, the care of cancer patients has often been adjusted, deferred or compromised.<sup>3,5</sup> A meta-analysis of 22 studies revealed 2.1% infection rate, 14.5% ICU admission, 11.7% ventilation support, and 21.1% mortality; which are higher than COVID-19 infected non-cancer patients.<sup>1</sup> Thrombocytopenia, D-dimer levels, C-reactive protein, protracted prothrombin time, prolactin, and interleukin-6 (IL-6) often correlate with severity of infection, and may predict prognosis and outcomes.<sup>19-22</sup> Another meta-analysis<sup>23</sup> showed that there were 2% cancer cases among COVID-19 infected patients. Many US institutions have reported higher COVID-19-related complications and death among cancer patients,<sup>5</sup> though a small study in young American patients reported contrasting results.<sup>3</sup>

Braur et al. showed that COVID-19-infected cancer patients were mostly aged >65 years and were mostly males, having genitourinary, gastrointestinal, haematological or breast cancer. The infected cancer patients had more neutropenia, thrombocytopenia, anaemia, and elevated D-dimer.<sup>5</sup> Almost half (45%) were on active therapy, and one-third had received cytotoxic therapy, immunotherapy, or radiotherapy within the preceding three months. The mortality in cancer patients was comparable to non-cancer cases, suggesting that continuing active treatment does not predict inferior outcomes. Hence, any intentions to restrain cytotoxic therapy must be reasoned cautiously and tailored while considering specific cancer-related outcomes.<sup>5</sup>

Campton et al. illustrated that COVID-19 infection in cancer patients was often mild, but fatality was considerable.<sup>16</sup> Issues of hospital policies and access to ICU resources for cancer patients were cited as the possible contributing factors, but the study did not find any relationship between active cytotoxic therapy with severity, complications, or death.<sup>16</sup> It suggested protective measures in cancer patients, like self-isolation, curtailing hospital visits, substituting oral medication in place of intravenous medications, and by diminishing the risk of neutropenia.<sup>16</sup> Mortality in COVID-19-infected cancer patients in the

National Health Services (NHS) cancer centres in the United Kingdom is mostly guided by age and comorbidities. Withholding effective cancer therapy is more contributory to cancer outcome than COVID-19 infection risk.<sup>16</sup> COVID-19 in cancer patients can influence the outcome in many other ways, like delay in diagnosis and treatment, regulated transfusion provision, and inundated healthcare services.<sup>13,14</sup> Healthcare systems and clinicians are dealing with the ongoing challenge, yet the interactions of COVID-19 with pre-existing cancer and anticancer treatments are far from understood.<sup>23</sup> Oncological care has been influenced for multiple reasons. Clinicians are under pressure for patient's perceived vulnerability, deferred surgery, a shift to telemedicine, resource-deficit, and misconception about continuing effective anticancer treatments. Large-scale studies are required to further improve understanding and knowledge.<sup>16,23,24</sup> The usual professional data dissemination infrastructure has been compromised due to the cancellation of clinical meetings. There is a need to have national and international strategies to share data effectively for learning and the evolution of practice guidelines.<sup>16,25</sup>

The current study has some obvious limitations owing to its cross-sectional design while dealing with an ongoing and evolving clinical issue. The cancer registry data was taken as per the actual till 2017, while the rest was added as projected data. The division of cases between two oncology facilities in Oman was also projected based on the last 20 years. All cancer cases are seen at the Royal Hospital on follow-up, and all symptomatic cancer cases are referred to the parent team for further management. At the time of the pandemic, primary, secondary and other medical services were curtailed down. All the primary and secondary Ministry of Health healthcare facilities were connected to cancer care services online. All positive cases are reported to the COVID-19 registry, irrespective of the location where the test is carried out. All these elements minimise the chances of cases being missed, but there is a possibility that a few cases or asymptomatic cases might still slip through the net. The inpatient cases were mainly admitted to the Royal Hospital or shifted there ultimately.

At best, the study has presented initial observations that need to be validated and further investigated. It is an ongoing study and further detailed statistical analysis will be done once the pandemic is over and a comprehensive national data is available. The current limited data with small numbers is insufficient to extract convincing interpretations of clinical course of COVID-19 in cancer patients, and the interaction of the two processes, and how to optimally manage these cases.



International haematology and oncology societies have issued guidelines for management of cancer patients infected with COVID-19.<sup>1,6,11,13</sup> In the absence of prospective data, the recommended pathway should be meticulous preventive care measures, maximum supportive care to minimise the risk of infection, minimising hospital visits and admissions, and using telemedicine technology. There are many unanswered questions, like: should active cancer management be delayed or modified; should cancer patients undergo a more intense screening for COVID-19; and how to reduce the rate of infection in cancer patients? There are further debatable issues, like the consequences of limiting cancer care, a conservative approach in elderly patients with metastatic cancer and multiple comorbidities, and continuation of therapy in patients with expected significant benefit.

There is a need to evaluate the role and efficacy of COVID-19 vaccines and antiviral agents in cancer patients, their impact on treatment, and the impact of COVID-19 infection in cancer management plan. More comprehensive studies are recommended on COVID-19 infection in cancer patients.

## Conclusion

The data on coronavirus infection outcome is emerging at a rapid pace focussing on the impact of underlying diseases, and the capacity of healthcare systems. Oncologists should customise cancer management, while cancer patients must practise social distancing, and seek prompt evaluation of suspicious symptoms.

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