

Asymptomatic COVID-19 infection in patients with cancer at a cancer-specialized hospital in Wuhan, China – Preliminary results

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Abstract. – OBJECTIVE: Patients with cancer are usually immunosuppressive and susceptible to COVID-19 infection. Asymptomatic COVID-19 cases are infective and cannot be identified by symptom-based screening. There is an urgent need to control virus spread by asymptomatic carriers at cancer centres. We aim to describe the characteristics, screening methods, and outcomes of cancer patients with asymptomatic COVID-19 infection and to further explore anti-tumour treatment for this population.

PATIENTS AND METHODS: We reviewed patients with cancer who were admitted to Hubei Cancer Hospital in Wuhan from February 1, 2020, to April 4, 2020. We collected demographic data, laboratory findings, treatment information, nucleic acid and serum test results, chest computed tomography (CT) information and survival status of cancer patients diagnosed with asymptomatic COVID-19 infection.

RESULTS: A total of 16 cancer patients with asymptomatic COVID-19 infection were confirmed. The most common cancer type was breast cancer. The blood cell counts of most patients were in the normal range. Lymphocytes of 100% of asymptomatic carriers were in the normal range. Thirteen (81.3%) patients were positive for virus-specific IgM antibodies, and three (18.8%) were positive by PCR; only one (6.3%) patient showed novel coronavirus pneumonia features on CT. Three (18.3%) patients died, and the cause of death was considered malignancy caused by delaying anti-tumour treatment.

CONCLUSIONS: Our study shows that the lymphocytes of 100% of asymptomatic carriers were in the normal range. This result indicates that the host immunity of asymptomatic carriers is not significantly disrupted by COVID-19. Single PCR detection is not sufficient to screen among asymptomatic individuals, and a combination of PCR tests, serological tests and CT is of great importance. Unless the tumour is life-threatening or rapidly progressing, we advise restarting active anti-tumour therapy after PCR tests become negative.

Key Words:
COVID-19, Asymptomatic, Cancer.

Introduction

The 2019 Novel Coronavirus Disease (COVID-19), caused by SARS-CoV-2, has spread rapidly globally and has been declared a pandemic by the WHO¹. The nature of asymptomatic COVID-19 infection makes the prevention and control of epidemics much more difficult. Many studies²⁻⁴ have observed person-to-person transmission and even aggregated transmission among those with asymptomatic infection. Patients with cancer are usually immunocompromised, and the risk of serious disease and mortality after infection with SARS-CoV-2 increase by 3.50 times compared to that of the general population (HR 3.50, 95% CI 1.60-7.64)⁵. However, related studies to date have mostly focused cancer patients with symptomatic infection, and asymptomatic infections among them are rarely reported. For this study, we collected and analysed data for patients with cancer and asymptomatic COVID-19 infection at a cancer-specialized hospital in Wuhan, China. We aim to describe the characteristics and outcomes of asymptomatic COVID-19 infection in patients with cancer and further explore anti-tumour treatment.

Patients and Methods

Study Design

We reviewed data for patients with cancer who were admitted to Hubei Cancer Hospital in Wuhan from February 1, 2020, to April 4, 2020. All pa-

tients and caregivers underwent nasopharyngeal swab testing for COVID-19 by polymerase-chain reaction (PCR), serological tests of virus-specific antibodies and chest computed tomography (CT). According to the sixth version of the Prevention and Control Proposal of COVID-19 issued by the National Health Commission of the People's Republic of China, asymptomatic infection of COVID-19 is defined as asymptomatic and positive results for novel coronavirus pathogens in the respiratory tract and other specimens or serum-specific IgM antibodies⁶. Asymptomatic means no typical clinical symptoms, such as fever or respiratory symptoms. The inclusion criteria were strictly based on confirmation of asymptomatic COVID-19 infection and malignancy. Patients with symptomatic COVID-19 infection or diagnosis of a benign tumour were excluded.

Data Collection and Statistical Analysis

A total of 16 cancer patients diagnosed with asymptomatic COVID-19 infection were identified. We collected information about demographic data, cancer type, cancer stage, comorbid conditions, smoking history, laboratory findings, treatments, nucleic acid and serum test results, chest CT examinations and survival status of all enrolled patients. The data were tabulated using IBM SPSS 26.0 software. This retrospective study was approved by the Hubei Cancer Hospital ethics committee (LLHBCH2020 LW-013). Informed consent was obtained from the patients or their family members.

Results

The clinical characteristics and blood test results for the 16 asymptomatic cases are summarized in Table I. The median age was 63 years (IQR 59 to 65), and there were 10 females and 6 males. The most common cancer types were breast cancer (5 [31.3%]), lung cancer (2 [12.5%]) and lymphoma (2 [12.5%]). Ten (62.5%) cancer patients were at stage IV of their disease. Nearly half of the patients (7 [43.8%]) had comorbidities in addition to the malignancy. Four (25%) patients had a smoking history.

Data for abnormal blood cell counts among the 16 patients are as follows: 1 (6.3%) case of leucocytosis, 1(6.3%) of leukopenia, 1(6.3%) of neutrophilia, 1 (6.3%) of thrombocytosis, and 4 (25%) of haemoglobin decrease. The blood cell counts of most patients were in the normal range. It is

worth noting that all 16 (100%) cases had normal lymphocytes.

For 13 (81.3%) patients, serological tests for virus-specific IgM antibodies were positive while PCR results were negative. There were 3 (18.8%) patients with positive PCR results, and only 1 (6.3%) patient showed novel coronavirus pneumonia features on CT (Table II).

Ten (62.5%) patients received anti-tumour treatment within three months before being diagnosed with COVID-19 infection, including chemotherapy, radiotherapy, targeted therapy and endocrine therapy. One patient with breast cancer received oral endocrine therapy with no interval, even though infected with COVID-19. Three (18.3%) patients died, and the cause of death was considered malignancy. None of the patients developed symptomatic disease. All close contacts of the 16 asymptomatic patients were isolated, and their PCR results for COVID-19 were negative.

Discussion

First, we found that the clinical characteristics of asymptomatic carriers differ from previous reports of symptomatic individuals among cancer patients. Lymphocytopenia is one of the characteristics of COVID-19, and the virus weakens the immune system⁷. In contrast to previous reports that 83.2% of infected patients develop lymphocytopenia⁸, our study showed that the lymphocytes of 100% of the asymptomatic carriers were in the normal range. This result indicates that the host immunity of asymptomatic carriers is not obviously disrupted by COVID-19.

PCR often yields false-negative results, and the positive detection rate is higher when the IgM ELISA assay is combined with PCR compared with a single PCR test⁹. According to our study results, 81.3% of the patients were positive for virus-specific IgM antibodies, 18.8% were positive by PCR tests, and only one patient showed novel coronavirus pneumonia features on CT. Asymptomatic carriers cannot be identified by symptom-based screening, and a single test is not sufficient. Thus, combining PCR tests, serological tests and radiography to screen asymptomatic carriers of COVID-19 before admission is of vital significance. We advise that the same screening should be carried out for caregivers before admission, as they may also be affected by COVID-19.

The mortality rate of asymptomatic COVID-19 carriers with cancer in this study was 18.75% (3/16),

Table I. Patient characteristics and blood results.

	Patients (n=16)
Patient demographics	
Median age, years (IQR)	63 (59-65)
Sex	
Female	10 (62.5%)
Male	6 (37.5%)
Tumour Type	
Breast cancer	5 (31.3%)
Lung cancer	2 (12.5%)
Lymphoma	2 (12.5%)
Nasopharyngeal carcinoma	1 (6.3%)
Cholangiocarcinoma	1 (6.3%)
Gallbladder cancer	1 (6.3%)
Ovarian cancer	1 (6.3%)
Chondrosarcoma	1 (6.3%)
Gastric cancer	1 (6.3%)
Abdominal malignancy	1 (6.3%)
Staging	
I	1 (6.3%)
II	2 (12.5%)
III	1 (6.3%)
IV	10 (62.5%)
Unknown	2 (12.5%)
Comorbid conditions	
Any	7 (43.7%)
Hypertension	3 (18.8%)
Chronic viral hepatitis B	2 (12.5%)
Chronic bronchitis	1 (6.3%)
Cardiovascular disease	1 (6.3%)
None	9 (56.3%)
Smoking history	
Yes	4 (25%)
No	12 (75%)
Blood test	
Leucocytes ($\times 10^9$ per L; normal range 4.0-10.0)	7 (3.8-12.5)
Normal	14 (87.5%)
Increased	1 (6.3%)
Decreased	1 (6.3%)
Neutrophils ($\times 10^9$ per L; normal range 2.0-8.0)	4.8 (2.2-11.1)
Normal	15 (93.7%)
Increased	1 (6.3%)
Decreased	0
Lymphocytes ($\times 10^9$ per L; normal range 0.8-4.0)	1.6 (0.9-3.1)
Normal	16 (100.0%)
Increased	0
Decreased	0
Platelets ($\times 10^9$ per L; normal range 100.0-300.0)	218 (103-315)
Normal	15 (93.7%)
Increased	1 (6.3%)
Decreased	0
Haemoglobin (g/L; normal range 110-0-170-0)	122.7 (88-156)
Normal	12 (75%)
Increased	0
Decreased	4 (25%)
Anti-tumour treatment within three months	
Yes	10 (62.5%)
No	6 (37.5%)
Survival status	
Alive	13 (81.3%)
Dead	3 (18.8%)

Table II. PCR and serological antibody test results of patients with asymptomatic COVID-19 infection.

PCR Antibody	PCR (positive, n %)	PCR (negative, n %)	Total (n %)
IgM+IgG+	0	3 (18.8%)	3 (18.8%)
IgM+IgG-	0	10 (62.5%)	10 (62.5%)
IgM-IgG+	0	0	0
IgM-IgG-	2 (12.5%)	0	2 (12.5%)
Unknown	1 (6.3%)	0	1 (6.3%)
Total	3 (18.8%)	13 (81.3%)	16

PCR indicates polymerase chain reaction test for severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) nucleic acid.

and the cause was considered malignancy rather than COVID-19. Balancing the risks of mortality derived from delaying anti-tumour treatment and infection is challenging for many oncologists. One patient with breast cancer in our study received oral endocrine therapy with no interval-proven safety of endocrine therapy. Targeted therapy in asymptomatic carriers may be safe if conditions permit¹⁰. Chemotherapy, radiotherapy and immunotherapy are controversial for patients with COVID-19. In a prospective cohort study, chemotherapy, immunotherapy, hormonal therapy, targeted therapy, and radiotherapy in the past 4 weeks had no significant effect on mortality when compared with those who had not received these treatments recently¹¹. In another retrospective study¹², receiving chemotherapy within 4 weeks before symptom onset was a risk factor for death after hospital admission. Immunotherapy can theoretically mitigate or exacerbate COVID-19 severity¹³. The mortality rate in patients with COVID-19 after surgery is high¹⁴. Adjusting the mode of administration (from infusion to oral) and intervals of chemotherapy is one solution¹⁵. Risk stratification helps clinicians tailor treatment decision making for cancer patients with asymptomatic or mildly symptomatic infection. In patients with rapidly progressing tumours, urgent anti-tumour treatment is required. In patients whose situation is not critical or in those who are generally healthy, a delay of treatment with intensive monitoring can be adopted¹⁶. Based on this, unless the tumour is life-threatening or rapidly progressing, we advise restarting active anti-tumour therapy after PCR tests become negative.

Conclusions

We found that the clinical characteristics of asymptomatic individuals among cancer patients

are unique from those of previously reported symptomatic carriers. We should strengthen the screening and administration of this specific population. It is not enough to rely on PCR detection alone, and combined technologies of PCR, serological testing and CT are very important for detecting COVID-19. Further studies are needed to explore anti-tumour treatment in asymptomatic carriers with cancer.

Conflict of Interest

The Authors declare that they have no conflict of interests.

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