CASE REPORT

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COVID-19 in a patient with neuroendocrine pancreatic cancer – Case Report

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Abstract

Coronavirus disease 2019 (COVID-19) has developed into a pandemic and caused thousands of deaths worldwide. SARS CoV-2 infection can have a significant impact on cancer diagnosis, prognosis, and therapeutic effects. Some studies show a worse trend among cancer COVID-19 patients. However, other studies also indicate that the percentages of SARS-CoV-2 infection and severe events in cancer patients are not higher compared to the general population. It may be complicated in cancer patients, a high-risk group for SARS CoV-2 infection. The case study describe SARS CoV-2 infection in a 71-year-old male patient with neuroendocrine pancreatic cancer, who presented relatively mild illness without the need for intensive care. Complete recovery was achieved without short-term sequelae, and systemic oncological therapy was discontinued.

Key words

pancreas, neuroendocrine tumour, cancers, COVID-19

INTRODUCTION

Coronaviruses are a group of important human and animal pathogens that cause diseases. In November 2019, in the city of Wuhan, Hubei Province, China, cases of pneumonia occurred. The novel coronavirus was identified as the cause of the cluster of pneumonia cases. The virus spread rapidly, resulting in an epidemic throughout China, followed by a global pandemic. The identified coronavirus has been named the 2019 novel coronavirus (2019-nCoV). This severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) appears to be a new human pathogen. The World Health Organization (WHO) defined the disease as 'COVID-19' in February 2020 [1–4].

The Chinese Center for Disease Control and Prevention published a report concerning 72,314 cases of COVID-19 in which 81% of cases were classified as mild (no pneumonia or mild pneumonia), 14% as severe, and 5% as critical [5].

The SARS-CoV-2 virus continues to evolve and, as with other viruses, its variants appear. The variant known as Alpha or B.1.1.7 or 20I/501Y.V1 was first detected in the UK at the end of 2020 [6–9], and has also been identified in other countries. Some studies indicated that Alpha is about 50–75% percent more transmissible than that previously circulating, and is associated with an increased risk of death.

Cancer patients are included in the high-risk group for SARS CoV-2 infection. A more severe course of the disease and a high case fatality rate is observed among these patients [10–12].

Pancreatic neuroendocrine tumours (NETs) are rare neoplasms (approximately 3% of pancreatic cancers) that develop from the endocrine tissues of the pancreas [13]. Peptide hormones, including insulin, gastrin, glucagon, and vasoactive intestinal peptide (VIP), can be secreted by these tumours, resulting in multiple clinical syndromes. The risk of viral infections can be increased due to systemic oncological treatment with somatostatin analogues (SSAs) and intensive chemotherapy.

This case report describes an NET patient with SARS-CoV-2 infection who completely recovered without sequelae.

The research was approved by the Medical University of Lublin Ethics Committee and by GCP (Good Clinical Practice) regulations (No. KE-0254/295/2019, 26 September 2019). Written informed consent was obtained from the patient.

CASE REPORT

The 71-year-old male, a smoker and occasional drinker was diagnosed in 2014 with a locally invasive pancreatic body mass, intraabdominal adenopathies and liver nodules, suggestive of metastases. After surgery of the pancreatic head, body, part of the tail, duodenum and cholecystectomy (December 2014) histopathological diagnosis was obtained through biopsy: NEN G2, Ki-67 5–10% proliferation index, T3N1M1, R1. Anticancer therapy: Somatostatin analogue.

On 1 November 2020, the patient developed cold symptoms with cough, headache, muscle and joint pain, anxiety and tachycardia. Nasopharyngeal swabs were taken for SARS CoV-2 immediately. RT PCR test was positive.

The nasopharyngeal sample was previously extracted using an automated TANBead Maelstrom™ 8 (TANBead Nucleic Acid Extraction Kit), and tested for SARS-CoV-2 at the SARS Laboratory of the Medical University in Lublin, Poland. The genesig® Real-Time PCR Coronavirus COVID-19 (CE IVD) was used to detect SARS-CoV-2 viral RNA (Primerdesign Ltd, School Lane, Chandler's Ford, UK). Reaction system

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and amplification conditions were performed according to the manufacturer's specifications. The result was considered positive when the cycle threshold (Ct) value of the viral gene was 38 or less, and negative when it was greater than 38. Coronavirus (COVID-19) CE IVD genesig® kit detects 0.58 copies/µl of SARS-CoV-2 viral RNA with confidence ≥95%.

Samples were collected every week – on 2, 9, 16, 23 and 30 November. The viral load decreased in each subsequent test (Fig. 1). According to analytical sensitivity, in an analysis of the infection cycle threshold (Ct) over time, it was found that the mean viral load substantially decreased: 10^6 copies/mL – 2.11.2021; 10^4 copies/mL – 9.11.2021; 10^2 copies/mL – 16.11.2021; 10 copies/mL – 30.11.2021 (Fig. 2). On 6 December, the test was negative.

The high viral load in the first test may suggest that infected individuals can be infectious before they become symptomatic. The viral load early after onset was high ($>1 \times 10^6$ copies per mL).

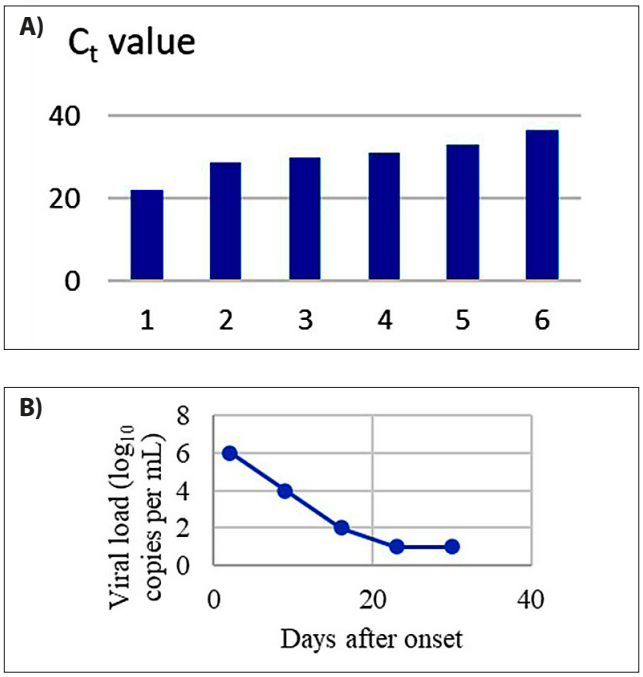

Figure 1. Viral dynamics of SARS-CoV-2 in a NET patient. A) Relative quantification of viral load – C_t value; B) Viral load in log_{10} copies/mL

Genotyping was performed by real-time PCR using commercially available test SARS-CoV-2 (20I/501Y.V1, Primerdesign Ltd.) Variant UK was detected.

Antibiotic (Zinnat), steroid (Budesonide), anticoagulant (Clexane) and SCIgG (subcutaneous immunoglobulin) were used in the treatment of COVID-19. The patient was vaccinated with the Pfizer vaccine 6 months later. The serum sample was tested for antibodies against SARS CoV-2 using Microblot-Array COVID-19 IgG (TestLine Clinical Diagnostics Ltd. Brno, Czech Republic – CoVMA96). The test was performed according to the manufacturer's instructions. Immunogenicity results are reported as an international standard unit (IU/mL). After 2 doses of vaccine, the following antibodies were detected: NP 240 IU/mL, RBD 250 IU/mL, S2 – negative. Six months later, the patient was vaccinated with a booster dose. One month later, in the serum were detected: NP 266 IU/mL, RBD 956 IU/mL, S2 – negative.

DISCUSSION

SARS CoV-2 infection can have a significant impact on cancer diagnosis, prognosis, and therapeutic effects. A worse trend among cancer COVID-19 patients is shown by some studies, whereas other studies point out that the amount of SARS-CoV-2 infection and severe cases in cancer patients does not differ significantly from the general population. Liang et al. [11] proved that patients with cancer were at higher risk of SARS-CoV-2 infection, and also showed an increased risk of severe clinical events in oncology patients (admission to the intensive care unit, invasive ventilation, or death) than those non-oncological.

The frequency of different types of cancer is still unknown in COVID-19 patients. Patients with lung cancer and colorectal cancer are more susceptible to infection with the SARS-CoV-2 virus compared to patients with other types of cancers. Amongst the patients with cancers infected by the SARS-CoV-2 virus, the percentage of patients with different types of cancers were: with lung cancer – 24.7 %, colorectal cancer – 20.5 %, breast cancer – 13.0 %, oesophagal cancer – 7.6 %, bladder cancer – 7.3 %, pancreatic cancer – 6.1 % and cervical cancer – 6.0 %. [14].

A group of 105 cancer patients with COVID-19 participated in a multi-centre retrospective study. This study showed that there was a relatively high risk of severe symptoms of 66.6% and 34.29% in patients with haematological malignancies and metastatic solid tumours, respectively. [15]. A retrospective study showed that for oncology patients with COVID-19, the most common symptoms were fever, dry cough, and fatigue. [16]. In the current case report, the patient did not have a fever. During the course of the disease, the morphological parameters decreased. After the month, the values of these parameters were similar to those before COVID 19.

There are other complications, besides respiratory symptoms, which can develop in oncology patients with COVID-19: acute respiratory distress syndrome (ARDS) (28.6%), followed by pulmonary embolism (7.1%), septic shock (3.6%), and acute myocardial infarction (AMI) (3.6%). They are the most common complications and cause of death in these patients [17,18]. The described patient recovered without complications. After 3 months, in serum samples of infected patients antibodies were detected against SARS CoV-2 (qualitative test). Mara et al. [19] indicated that the prevalence of SARS CoV-2 specific IgG antibody does not differ between cancer patients and healthy subjects.

The observations in this case report are similar to those described by Fazio et al. [20] who conducted a worldwide collection of data through an international database to characterise the clinical course of patients with NETs infected by the virus SARS-CoV-2. Their analysis shows that most patients with NET and COVID-19 infection presented a relatively mild illness, with the most frequent symptoms being fever and cough. Some patients were asymptomatic, one-third of the patients had pneumonia, and antibiotics were the most common medical therapy. Moreover, most patients did not require a change in their anti-cancer therapy.

CONCLUSION

COVID-19 in the reported NET patient was relatively mild and did not require intensive care. The patient recovered

without any short-term sequelae. There was no need to stop systemic oncological therapy.

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