



## Haemoptysis as symptom of SARS-CoV-2 infection – case study

### Krwioplucie jako objaw zakażenia SARS-CoV-2 – studium przypadku

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#### ABSTRACT

For over two years, doctors and scientists have been dealing with the issue of COVID-19, caused by infection with the new coronavirus SARS-CoV-2. The various signs and complications of COVID-19 are still being identified. In this article, we present the case of a 61-year old woman with a history of chronic bronchitis, who was admitted to the Pulmonology Department Prof. Stanisław Szyszko Independent Public Clinical Hospital No 1 in Zabrze for haemoptysis after having recovered from COVID-19. After clinical examination, laboratory investigation, and imaging scans, we considered that the haemoptysis was most likely caused by respiratory tract inflammation. The patient was treated with antibiotics, glucocorticosteroids, as well as antihaemorrhagic and antitussive drugs. During the patient's hospital stay, the haemoptysis gradually disappeared and the patient was discharged home in a very good clinical condition.

#### KEY WORDS

COVID-19, coronavirus, SARS-CoV-2, haemoptysis, chronic bronchitis, blood coagulation disorders

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## STRESZCZENIE

Od ponad dwóch lat lekarze i naukowcy zajmują się zagadnieniem COVID-19, czyli choroby wywołanej zakażeniem nowym koronawirusem SARS-CoV-2. Różnorodne objawy i powikłania COVID-19 nadal nie zostały poznane. W artykule przedstawiono przypadek 61-letniej kobiety z przewlekłym zapaleniem oskrzeli w wywiadzie, która po przebytym COVID-19 została przyjęta na Oddział Pulmonologiczny Samodzielnego Publicznego Szpitala Klinicznego nr 1 im. prof. Stanisława Szyszko w Zabrze z powodu krwioplucia. Badania kliniczne, laboratoryjne i obrazowe wykazały, że krwioplucie najprawdopodobniej było skutkiem zapalenia dróg oddechowych. Chora była leczona antybiotykami, glikokortykosteroidami, lekami przeciwkrwotocznymi oraz przeciwkaszłowymi. W trakcie pobytu w szpitalu krwioplucie stopniowo ustępowało i pacjentkę wypisano do domu w bardzo dobrym stanie klinicznym.

### SŁOWA KLUCZOWE

COVID-19, koronawirus, SARS-CoV-2, krwioplucie, przewlekłe zapalenie oskrzeli, zaburzenia krzepnięcia krwi

## INTRODUCTION

The ongoing pandemic caused by SARS-CoV-2 is a serious challenge for healthcare systems worldwide. The early symptoms of COVID-19 include fever, cough, myalgia or fatigue, and dyspnoea [1,2]. However, less common signs such as headache, haemoptysis, nausea or vomiting, and diarrhoea have also been reported [1,3]. Proper diagnosis on the basis of less representative symptoms of this disease might be difficult, especially when they occur without any other indications [4]. Although haemoptysis is not one of the most common symptoms of COVID-19, increasing numbers of people are being infected with SARS-CoV-2, which could lead to a significant number of cases of haemoptysis among diverse groups of patients [2]. In addition, “long COVID-19” – medical complications that can span months after recovering from COVID-19 – is being investigated. Early studies estimate that up to 80% of patients infected with SARS-CoV-2 develop at least one of the late manifestations. The five most common long-term symptoms are fatigue, headache, attention disorder, hair loss, and dyspnoea, and a frequent abnormal laboratory test is D-dimer elevation, prevalent in 20% of cases [5]. Taking all of this into consideration, haemoptysis should be considered a possible late manifestation of COVID-19, especially in patients with other pulmonary disorders.

## CASE REPORT

A 61-year old female patient was admitted to the Pulmonology Department Prof. Stanisław Szyszko Independent Public Clinical Hospital No 1 in Zabrze in January 2021 for haemoptysis. In the interview, the patient reported episodes of blood in the sputum occurring for 3 days, accompanied by a productive cough and deterioration of exercise tolerance. On presentation she was afebrile and demonstrated normal oxygen saturation (96%), with a blood pressure measurement of 160/80 mm Hg and a heart rate of

127 bpm. On physical examination we found oedema in both lower limbs.

The patient had been taking medications for diagnosed arterial hypertension since 2016, and had also suffered from glucose intolerance for the past 2 years. In 2016, the patient was diagnosed with chronic bronchitis with symptoms of a dry cough and mucus expectoration that typically exacerbated in the autumn, which may correspond to the increasing air pollution at that time. The factor leading to the development of this chronic pulmonary disorder could be frequent and recurring viral infections that the patient reported in the past (other factors – e.g. smoking and occupational exposure – were excluded). For this reason, the patient was prescribed inhaled glucocorticosteroids to control the exacerbation of chronic bronchitis.

In addition, the patient had an RT-PCR-confirmed SARS-CoV-2 infection in December 2020. At that time, her symptoms were dyspnoea, a dry cough, joint and muscle pain, fever, and diarrhoea, but she was not taking nonsteroidal anti-inflammatory drugs for this reason. The patient was hospitalized due to aggravation of COVID-19 symptoms. After 12 days in hospital, she was discharged home in good health on the 23rd of December, with a referral for further pulmonary rehabilitation as a continuation of COVID-19 treatment.

On the 5th of January 2021, slim strips of blood visible on a tissue appeared in the sputum for the first time. The patient did not observe this symptom during the acute phase of SARS-CoV-2 infection. Haemoptysis was also noted on the following day and it was initially associated with the intake of one of the two morning doses of inhaled glucocorticosteroids, but this incident had never happened before while taking the medication. At that time, the patient’s respiratory problems also worsened after taking up physical activity (walking). Due to the above-cited symptoms, the patient was admitted to the Pulmonology Department on the 7th of January.

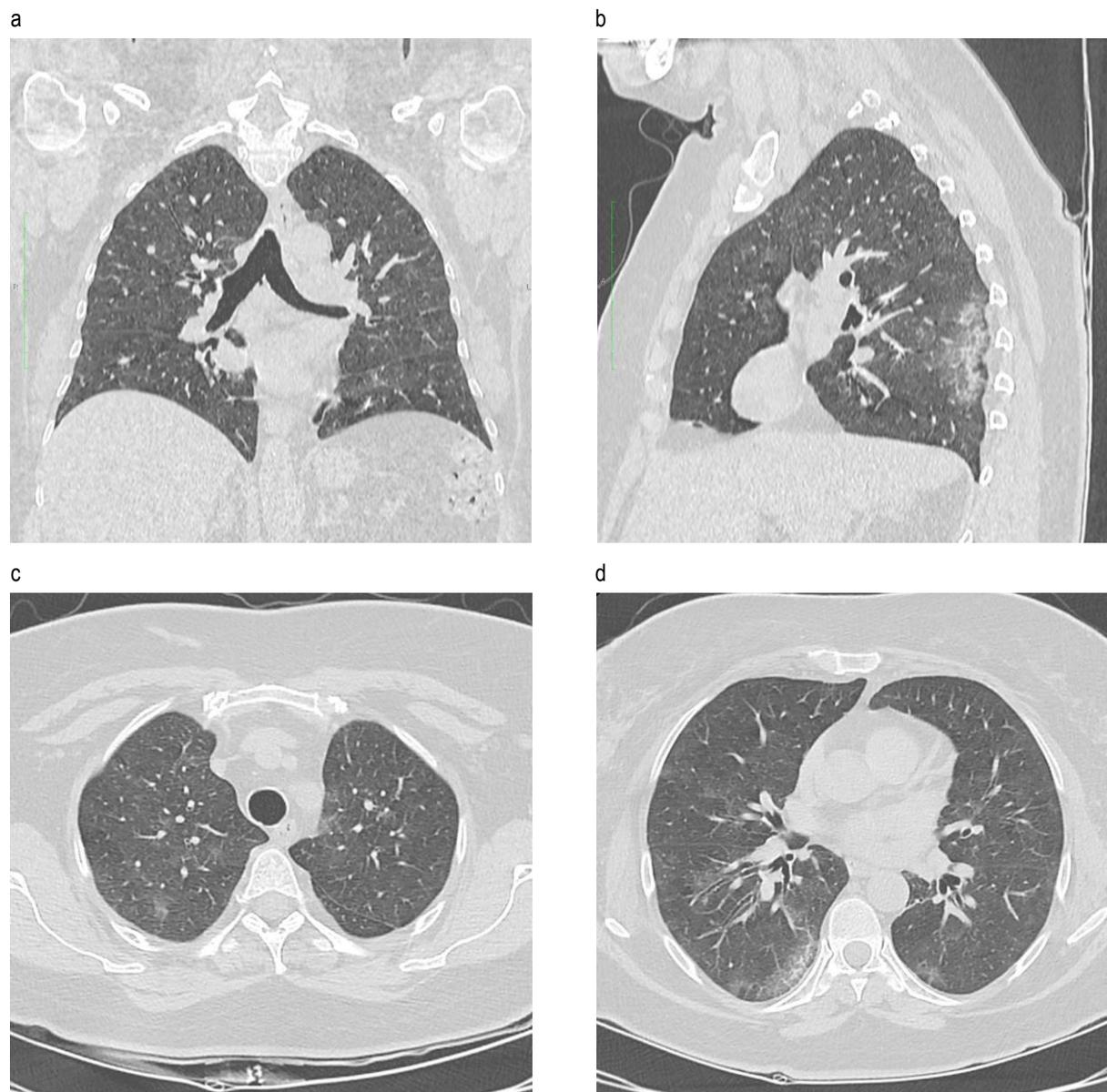
During hospitalization, the laboratory tests showed no abnormalities, except for a slight increase in D-dimer (0.71 µg/mL). The electrocardiogram (ECG) was within the normal range. On the chest X-ray we



observed intensification of the lung stroma, indicative of changes after a viral infection. Single streaked areas of fibrosis were also visible at the base of the left lung. Additionally, a computed tomography (CT) scan showed ground glass opacity with accompanying inflammatory infiltrates (Fig. 1). Bronchofiberscopy revealed slightly fragile mucosa and a small amount of mucous discharge in the lumen of the bronchi. The patient had a score of two on the Thompson bronchitis index. Single colonies of *Staphylococcus epidermidis* were also visualized in the culture of the bronchial secretion. *Mycobacterium tuberculosis* complex, *Pneumocystis jirovecii* antigen, or viruses causing respiratory tract infections were not detected in the broncho-alveolar lavage fluid. Tests for tumour

markers, including carcinoembryonic antigen, were also negative, confirming the absence of metastases or primary neoplastic changes on the CT scans of the lungs.

Based on the clinical picture, we decided to use glucocorticosteroid (dexamethasone), prophylactic antibiotics (ciprofloxacin) and anti-haemorrhagic (etamsylate) and antitussive drugs. During the patient's hospital stay, the haemoptysis gradually disappeared and she was discharged home in very good clinical condition with a renewed referral for pulmonary rehabilitation. The current medical recommendations highlight the importance of providing pulmonary rehabilitation in each COVID-19 convalescent [6,7].



**Fig. 1.** (a–d) Chest CT scans, January 2021. Post-inflammatory lung changes after COVID-19 in form of diffuse ground glass opacity in both lungs and consolidated subpleural compaction in posterior part of right lower lobe.

**Ryc. 1.** (a–d) TK klatki piersiowej, styczeń 2021 r. Zmiany pozapalne płuc po przebyciu COVID-19 pod postacią matowej szyby, rozproszone w obu płucach, oraz skonsolidowanego zagęszczenia podopłucnowego w tylnej części płata dolnego płuca prawego.



## DISCUSSION

From the literature review, the differential diagnosis of haemoptysis is very broad. Bronchiectasis, lung cancer, bronchitis, and pneumonia account for more than 70% of inpatient diagnoses [8,9]. As we mentioned above, haemoptysis is a rare symptom of SARS-CoV-2 infection, although it is also one of the independent predictors of severe COVID-19 [10,11]. Therefore, the correct diagnostic path and steps taken to clarify the aetiology of haemoptysis are very important. First, a thorough interview should be conducted with the patient, including the current symptoms, as well as past and chronic diseases. Then, an X-ray should be performed to assess the changes in the pulmonary parenchyma. If the diagnosis is questionable, a chest CT scan should be performed. The last diagnostic stage is bronchoscopy. All of these procedures allow the proper diagnosis to be made and further therapeutic management to be introduced. In the case described above, all of these steps were taken, which allowed us to conclude that the haemoptysis resulted from the history of SARS-CoV-2 infection accompanied by chronic bronchitis. In addition, Ahmed et al. [12] in their article also stated that haemoptysis may be one of the complaints reported by patients after recovery from this infectious disease. Among their study group, it was one of the three most common symptoms experienced by COVID-19 survivors.

We also took into account the increased concentration of D-dimer. COVID-19 is known to result in blood-coagulation abnormalities. Studies show that not only are levels of D-dimer increased in most patients, but also that elevated D-dimer is associated with disease progression and mortality [13,14]. Other studies highlight that prothrombin time and age are also positively associated with mortality [15], and the coexistence of chronic diseases may significantly increase the severity of COVID-19 in individual cases [16,17].

It was therefore indispensable to assess the possibility of pulmonary embolism in our patient. As a life-threatening condition, pulmonary embolism had to be quickly excluded. The first step was to clinically assess the probability of pulmonary embolism. On the Wells scale, the patient received 4 points (haemoptysis plus immobilization in the previous 4 weeks), indicating a low probability of pulmonary embolism. The patient did not have other symptoms of pulmonary embolism either, such as changes on ECG (tachycardia, non-specific changes in ST segment and T wave, supraventricular arrhythmia, or right bundle branch block) or chest X-ray (enlargement of cardiac silhouette, pleural effusion, elevated hemidiaphragm, or atelectasis) [18,19]. Based on the predictive scale and slightly elevated D-dimer levels, there was no need to further investigate the possibility of pulmonary embolism and this diagnosis was rejected.

## CONCLUSIONS

Haemoptysis may be one of the early symptoms of, as well as one of the later complications after, COVID-19, especially in patients with chronic bronchitis and other pulmonary diseases. As approximately 265 million people have already been infected with SARS-CoV-2 worldwide [20], haemoptysis should be considered an increasingly important medical issue during the pandemic. Nevertheless, physicians should remember that according to existing literature, haemoptysis is commonly caused by bronchiectasis, chronic bronchitis, and lung cancer [8,9], and is also one of the symptoms of pulmonary embolism. From a practical point of view, a precise medical history should be taken from the patient to assess the symptoms of haemoptysis, and SARS-CoV-2 infection should be considered as a possible reason for haemoptysis. Therefore, more research is needed and medical knowledge may need to be revised.

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### Author's contribution

Study design – D. Jastrzębski, D. Galle

Manuscript preparation – D. Galle, A. Galeczka-Turkiewicz, G. Tomaszewski

Literature research – D. Galle, M. Górka, A. Galeczka-Turkiewicz, J. Kulpa

Final approval of the version to be published – D. Jastrzębski, D. Ziara

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