

Co-Occurrence of COVID-19 Infection and Intracerebral Hemorrhage in an Older Adult: A Case Report

Malarkodi Suppamutharwyam¹, Tiong Ing Khieng²

¹Department of Internal Medicine, Sarikei General Hospital, Sarikei, Malaysia

²Geriatric Unit, Sarawak General Hospital, Kuching, Malaysia

Email: malar2407@gmail.com, ingkhieng@yahoo.com

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Abstract

Coronavirus disease 2019 (COVID-19) often has multifaceted presentations, even in young adults, which poses a significant challenge to clinicians who are caring for older adults. Older patients often present with subtle atypical manifestations, and failure to recognize these may lead to a cascade of negative events. Age-related immune system changes, comorbidities, and atypical presentations often make early diagnosis of COVID-19 difficult. Here, we report a case of an 82-year-old moderately frail male patient who presented with generalized body weakness and tested positive for COVID-19. On the second day of admission, he developed unilateral body weakness and aphasia, and computed tomography of the brain revealed acute right frontal spontaneous intracerebral hemorrhage with no vascular anomaly. He did not have any traditional risk factors for intracerebral hemorrhage and was not on any anti-coagulants. The course of this case illustrates the delicate balance between the atypical presentations of COVID-19, the importance of a comprehensive geriatric assessment, and the management of older adults during the COVID-19 pandemic.

Keywords

Advance Care Planning, Atypical Presentation, Comprehensive Geriatric Assessment, COVID-19, Intracerebral Hemorrhage

1. Introduction

Coronavirus disease 2019 (COVID-19) is caused by the severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) and typically presents with fever, respiratory symptoms, and severe pneumonia. However, a growing body of evidence

shows that it can also have extrapulmonary manifestations, mainly gastrointestinal, cardiac, and renal manifestations [1] [2]. The course of the disease and its presentation can vary among older adults owing to the higher prevalence of frailty. Older adults have been severely affected by the COVID-19 pandemic, thereby requiring more hospitalizations, and having a high mortality rate. This is partly attributed to the physiological changes of aging, decreased innate and acquired immune function, multimorbidity, physical disability, cognitive impairment, sarcopenia, depression, and anxiety [3]. The above-mentioned conditions are exacerbated during the acute COVID-19 infection and often lead to the negative progression of the disease and poor health outcomes in older adults.

Considering the novel emergence of this virus, which is constantly evolving, it is crucial that relevant clinical data on atypical manifestations and predictors of poor health outcomes among older patients are collected to develop evidence-based strategies for the protection of this vulnerable patient population in the future. To date, there is scarce information available on case reports on COVID-19 in older adults aged > 80 years and far less information on comprehensive geriatric assessment (CGA) among those affected by COVID-19 [3]. Clinicians caring for older patients should broaden their awareness of the atypical presentations of COVID-19 in older adults and understand the importance of performing CGA and patient wishes to facilitate prompt treatment. It is crucial that every patient is holistically assessed and receives personalized treatment, especially older adults with frailty and multimorbidity.

To our knowledge, this is the first case report that highlights the importance of recognizing the atypical presentations of COVID-19 in older adults aged > 80 years. Our findings recognize the value of CGA, multidimensional assessment processes, and holistic management of COVID-19 in older adults, with a focus on what matters most to the patients and family members during the COVID-19 pandemic.

Here, we present a case of an older adult with generalized body weakness and COVID-19 who subsequently developed spontaneous intracerebral hemorrhage (ICH).

2. Case Presentation

An 82-year-old man, with well-controlled hypertension prescribed amlodipine 5 mg once daily, presented with generalized body weakness for 2 days in September 2021. Previously, he was able to dress and bathe with minimal assistance; however, for the past 2 days, he required significant assistance from his son. The patient reported that his bodily weakness was associated with neck pain and bifrontal throbbing headache, with a pain score of 2 out of 10. He denied having fever, respiratory symptoms, blurred vision, or diplopia. He was able to recognize his family members, had coherent speech, and denied any visual hallucinations or abnormal behavior. His body mass index was 19.5 kg/m², with a weight of 45 kg and a height of 152 cm.

The patient's vital signs during admission were stable, with a blood pressure of 128/78 mmHg, a pulse rate of 90 beats/min, a respiratory rate of 18 breaths/min, and an oxygen saturation of 100% breathing ambient air. The patient was afebrile on admission. The patient's pupils were equal and bilaterally reactive. The power over the bilateral upper and lower limbs was normal, and he was cooperative and able to obey commands. There was no evidence of falls or head injuries, and the range of neck movements was full. His gait was normal, and cerebellar signs were negative. Other cranial nerve functions were intact.

Considering the subtle atypical manifestations of COVID-19 in older adults and the higher prevalence of this contagious disease worldwide, the physician ordered a combined throat and nasopharyngeal swab reverse transcription-polymerase chain reaction test. The patient was admitted to the COVID-19 isolation ward after testing positive for SARS-CoV-2. Routine blood test results at admission were normal, except for elevated creatinine level, likely secondary to dehydration (Table 1).

Table 1. Changes in patient's relevant blood parameters during admission.

Blood parameters	Reference range	Day 1 of admission	Day 2 of admission (during an acute event)	Day 14 of admission
White cell count ($10^3/\mu\text{L}$)	3.6 - 10.20	10.7	9.6	9.8
Hemoglobin (g/dL)	12.5 - 16.0	12.7	12.1	11.3
Platelet ($10^3/\mu\text{L}$)	152 - 347	229	279	366
Absolute lymphocyte count ($10^3/\mu\text{L}$)	1.0 - 3.0	0.39	0.87	1.38
Urea (mmol/L)	1.7 - 8.3	4.7	6.3	4.7
Creatinine (umol/L)	80 - 115	112	52	57
Sodium (mmol/L)	133 - 145	136	127	134
Potassium (mmol/L)	3.3 - 5.1	3.6	3.2	3.6
Serum albumin (g/L)	38 - 51	43	32	32
Aspartate aminotransferase (U/L)	5 - 41	20	119	49
Alanine aminotransferase (U/L)	5 - 37	12	134	73
Prothrombin time (sec)	11 - 16		16.9	
Partial thromboplastin time (sec)	30 - 40		25.6	
International normalized ratio			1.2	
C-reactive protein (mg/L)	<5	3.94	53.37	26.71

The patient's chest radiography findings were normal, and his C-reactive protein (CRP) level at admission was only 3.94 mg/L. Opportunistic geriatric assessment revealed a clinical frailty score of 6 and a mini-mental state assessment score of 26/30, without mood disturbances and malnourished nutritional status. The confusion assessment method did not reveal any acute changes in the mental state, inattention, or disorganized thinking. Regarding his moderate frailty status, an arrangement was made to admit his son, who also tested positive for COVID-19 to accompany him in the ward. The patient received symptomatic treatment for headache and intravenous normal saline for hydration.

However, on the second day of admission, the patient developed a sudden onset of confusion, weakness in the left side of the body, and expressive aphasia, and his Glasgow Coma Scale (GCS) score was 11 (eye opening, 4; verbal response, 1; motor response, 6). His pupils were equal in size and reactive to light bilaterally. The patient remained normotensive and afebrile and was able to maintain saturation under ambient air. Computed tomography (CT) of the brain revealed acute ICH of the right frontal lobe with intraventricular extension (**Figure 1**). Computed tomographic angiography of the brain did not reveal any vascular anomaly. Magnetic resonance imaging (MRI) and positron emission tomography (PET) of the brain were not performed owing to limited access and availability. The patient's coagulation profile and platelet count were normal. His CRP level increased to 53.37 mg/L during the acute event (**Table 1**).



Figure 1. Computed tomography scan of the patient's brain at day 2 of admission shows acute intraparenchymal hemorrhage in the right frontal lobe measuring $5.0 \times 4.6 \times 2.8$ cm (AP \times W \times H) with intraventricular extension.

Furthermore, we applied the simplified Edinburgh criteria that include only CT features and the absence of predictors, such as subarachnoid hemorrhage and finger-like projections in ICH, which effectively ruled out cerebral amyloid angiopathy (CAA)-associated lobar ICH [4] [5]. As the patient was not on any anticoagulant, remained normotensive, had no prior history of bleeding tendency or fall, and had no subarachnoid hemorrhage, we concluded that the current presentation of acute spontaneous primary ICH could be an atypical manifestation of COVID-19 in older adults.

A physical and virtual family conference was organized to discuss the wishes of the patient and the expectations of the family members. We were informed that the patient had expressed a prior wish not to undergo any high-risk surgical intervention and would prefer to be in a painless and comfortable environment. Therefore, no neurosurgical referral was made, and he was managed in the COVID-19 isolation ward, accompanied by his son, and nasogastric tube feeding was initiated. The patient's GCS score of 11 and modified Rankin scale (mRS) score of 4 did not change throughout admission. He remained afebrile throughout admission, and there were no episodes of desaturation. Repeated CT of the brain on day 10 of admission revealed a reduction in the right frontal lobe hemorrhage with residual intraventricular hemorrhage (Figure 2).



Figure 2. Computed tomography scan of the patient's brain at day 10 of admission shows a smaller acute intraparenchymal hemorrhage of the right frontal lobe measuring $4.5 \times 4.1 \times 2.8$ cm (AP \times W \times H) with minimal residual intraventricular hemorrhage.

The patient was deisolated on day 14 after admission to the general medical ward for rehabilitation and to optimize his nutritional status. Patient was subjected to physical therapy and nutritional monitoring. He received two sessions of physical therapy daily, with each session lasting for 30 minutes. Home situation assessment was performed to ensure the suitability of transition to home care, and caregivers were taught nursing care. He was later discharged on day 17 of admission, with an mRS score of 4 with subsequent follow-up. The caregivers were informed about how and when to seek medical attention should the patient's condition deteriorate at home.

3. Discussion

Older adults are the worst-affected population by the COVID-19 pandemic, and those aged > 75 years have a high mortality rate [6]. They often have atypical presentations, such as fatigue, anorexia, delirium, and falls, in the absence of fever and cough [7]. The complete clinical spectrum of COVID-19 remains unclear; however, the association between SARS-CoV-2 infection and ICH has been increasingly recognized [8]. As such, this case report is unique and relevant. In our patient, a thorough evaluation did not reveal other potential causes for the development of ICH except for SARS-CoV-2 infection. Further imaging tests, such as MRI or PET of the brain, were not performed owing to the unavailability and scarcity of the resources. Furthermore, CAA-associated lobar ICH seemed an unlikely diagnosis based on the simplified Edinburgh criteria [4] [5]. Although the adjunctive clinical history, elevated CRP level, and low absolute lymphocyte count levels were strongly suggestive of an association between COVID-19 and ICH, a definitive conclusion could not be drawn without additional detailed imaging techniques. COVID-19 has neurotropic potential; however, it remains unclear whether SARS-CoV-2 infection causes spontaneous ICH, is an atypical manifestation, or is a coincident in frail older adults. Therefore, more attention and data are required to understand the neurotropic and neuro-invasive manifestations of this novel virus, especially in older adults.

Considering that we are moving toward the endemic phase of COVID-19 and that the clinical knowledge of COVID-19 continues to evolve, any presentation to the acute care unit must be considered COVID-19 until proven otherwise. A high index of suspicion and early appropriate testing help in prompt diagnosis, isolation, and contact tracing and influence further assessment and treatment in frail older adults. Delayed diagnosis in older adults can further contribute to detrimental health effects and increased mortality rates. Older adults often have heterogeneous presentations, with multimorbidity being the cause of acute illnesses. Other non-COVID-19 causes of acute illnesses should be investigated appropriately and managed accordingly as these are possibly treatable and reversible. Clinicians must keep differential diagnoses broad and should always be willing to revise their working diagnoses if the patient's clinical condition deteriorates further despite treatment.

Symptoms of COVID-19 and non-COVID-19 conditions may be more diffi-

cult to recognize and overlap in the context of multimorbidity and frailty when SARS-CoV-2 infection manifests together with other conditions. Older adults are unique and heterogeneous; therefore, they should be systematically managed according to the principles of CGA. All healthcare workers caring for older adults should be taught the simplest and most effective ways to perform CGA promptly. We believe that the incorporation and implementation of CGA in healthcare worker education will yield a long-term positive effect in the clinical management of older adults not only during the COVID-19 pandemic but also during future global pandemics and in day-to-day clinical practice. Emphasis should be placed on frailty assessment, as it allows new and clinically meaningful risk stratification and the identification of the most vulnerable patients with high risk of adverse health outcomes. This will encourage clinicians to be proactive in providing individually tailored interventions based on the deficits or impairments identified and will help in shared decision-making with patients and family members.

Physicians caring for older adults should approach their multidimensional health problems with great aptitude and establish good relationships with patients and family members, especially during this pandemic, which places vulnerable older adults in risky social isolation situations [9]. Managing this group of patients requires extensive collaboration and effective communication involving multidisciplinary teams and a significant contribution from family members during the acute and recovery phases [10]. Hence, with a better understanding of the virus and disease progression, improved vaccination coverage, and more effective infection control measures, new visitation policies with tight protocols should be reconsidered for frail older adults, those approaching the end of life, and terminally ill patients, instead of one-size-fits-all policies. The intention is to isolate the virus and not the frail, vulnerable older adults.

Our patient reported moderate frailty and required admission after testing positive for COVID-19. To minimize the risk of social isolation and anxiety, an arrangement was made to admit one of his family members, who also tested positive, to accompany him in the ward. We believe that the presence of an immediate family member during acute stressful life events provides comfort and confidence and reduces the risk of social isolation and anxiety in vulnerable, frail older adults. However, with a high turnover of positive COVID-19 cases, this approach might not be practical in many other health institutions. Furthermore, clinicians should act as “sentinels” who provide the most appropriate care by understanding what matters most to older adults and their family members during this global pandemic. Clinicians should explore whether patients have made anticipatory care plans concerning their changing health scenarios. If advance care planning is not available, clinicians should find practical time points to discuss the realistic and suitable care options available for the patients during this pandemic.

The scarcity of resources during the pandemic has forced us to select and decide the maximum level of care, that is, ward-based, intensive care, or palliative

care, for older adults with acute SARS-CoV-2 infection [11]. However, this does not mean that we should put less effort into those who end up receiving ward-based care; instead, we should enhance our services, lead, and train non-geriatric health-care professionals to provide holistic, appropriate, and essential care to those who have been excluded from intensive care services [12]. Furthermore, long-term coordinated follow-up for older COVID-19 survivors is not widely available in many institutions, and stakeholders should address this issue as soon as possible to avoid post-COVID-19 functional dependency, malnutrition, and caregiver distress.

4. Conclusion

In summary, first, a better understanding of the atypical symptoms and cerebrovascular manifestations of COVID-19 in older adults is needed. Clinicians should be aware of the potential association between COVID-19 and ICH, and such cases need to be reported to the scientific community. With more reported cases, the temporal relationship between COVID-19 and ICH can be better identified. Second, our findings suggest that acute SARS-CoV-2 infection should be considered as a differential diagnosis among all older adults who present with non-specific symptoms in the acute care unit. Third, the global pandemic has placed the focus on healthcare systems that have not been adapted to treat older adults when an unexpected significant health emergency occurs, highlighting the lack of preparedness for acute and long-term care for older adults with SARS-CoV-2 infection or any other global pandemic that might occur in the future. This global pandemic acts as a catalyst and has led to the dramatic evolution and adaptation in healthcare management at various stages. As the medical fraternity worldwide has adapted drastically to the treatment of this new virus, care for older adults should be organized, coordinated, and evolve similarly.

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Data Availability

The patient data used to support the findings of this case report are available from the corresponding author upon request.

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Informed Consent

Written informed consent was obtained from the patient's daughter for the publication of this article (including a case history and radiographic imaging).

Author's Contribution

MS was directly involved in the treatment of the patient, literature search, and drafting the manuscript. TIK provided expert opinion on patient care and reviewed the manuscript.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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