

Complete heart block and neutropenia due to SARS - corona virus - 2 in a patient with chronic lymphocytic leukemia: Misery of an elderly gentleman

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Abstract

An 84 year old patient with a background history of chronic lymphocytic leukemia, hypertension and type 2 Diabetes Mellitus presented with recurrent episodes of loss of consciousness and falls, with fever, cough, loss of taste and smell for 4 days. He was found to be bradycardiac with normal blood pressure. On further evaluation he was detected with Covid-19 infection with a complete heart block. Disease course was further complicated with neutropenia and heart failure. Following recovery from neutropenia he was subjected for a permanent pacemaker and he made a full recovery. Complete heart block secondary to Covid 19 infection is a rarely described entity.

Keywords

complete heart block; covid-19; pacemaker; neutropenia.

Abbreviations

CLL: Chronic lymphocytic leukaemia; COVID 19: SARS corona virus 2; CVD: Cardiovascular disease; EF: Ejection fraction; ACE: Angiotensin converting enzyme.

Introduction

Different complications of SARS Corona-2 (COVID 19) have been described as we are in a pandemic of the infection. Cardiac arrhythmias are one of the rarely reported complications of the above disease. This case report highlights unique hospitalization course of complete heart block and neutropenia in the setting of COVID-19 infection. This case highlights the importance of screening for COVID 19 infection in a relevant setting.

Case Presentation

An 84 year old gentleman admitted following new onset recurrent falls for few days. He denied episodes of loss of consciousness and was able to recall the events prior to fall. He had further witnessed falls following admission and in some instances he could not recall the event of falling. It was reported that he just loses his balance. There were no jerky movements of the limbs or incontinence of urine. There was no altered level of consciousness. He denied a history of chest pain, palpitations or shortness of breath. Concurrently he was having a fever, dry cough with loss of taste and smell from the onset of falls for 4 days. He was diagnosed to have type 2 diabetes mellitus, hypertension with a good glycemic control. He was further diagnosed to have chronic lymphocytic leukemia 1 month back and was awaiting hematology review. He was living alone and was mobilized using a frame.

On examination he was febrile and mildly breathless at rest. He was conscious, rational and was oriented in time place and person. There was no lymphadenopathy. His pulse rate was 44/min on admission, regular and good volume. His Blood pressure was 130/70 mmHg and cardiac auscultation was normal. Respiratory system examination revealed few crepitation at both lung bases (L>R) and abdominal examination revealed moderate splenomegaly. Neurological examination including fundoscopy was normal.

His blood tests on admission showed a white cell count of $14.7 \times 10^9/l$ on admission with predominance of lymphocyte count. Initial CRP was elevated (41.9) with negative procalcitonin levels. Few days later he was detected to have neutrophil count of $0.22 \times 10^9/l$ suggestive of absolute neutropenia. His renal and liver functions did not show significant abnormalities. As he had fever spikes with anosmia and loss of taste he was further investigated with Covid 19 RT-PCR which became positive. As he was bradycardic he was investigated with an ECG which showed 1st degree followed by a complete heart block later which was new. CXR showed features of heart failure with evidence of early pneumonitis and Troponin was negative repeatedly excluding an acute ischemic event. 2D echo showed normal left ventricular size and globally impaired systolic function (EF 36-49%), normal right ventricular size and function with a mild aortic regurgitation, however there was no focal hypokinetic segments. Thyroid function tests and HbA1C were within normal limits. D-dimer level was 0.32 (<0.5). Septic screening including blood and sputum culture was negative. He was diagnosed with Covid pneumonitis causing complete heart block leading into acute cardiac failure. Furthermore the disease course got complicated with neutropenic sepsis. He was treated with diuretics, fluid restriction, IV Piperacillin for 5 days and G-CSF. Once stabilized he was offered a permanent pacemaker. Prophylactic Dalteparin was offered given normal D-dimer level. He made a good recovery and is under cardiology and haematology follow up at the moment.

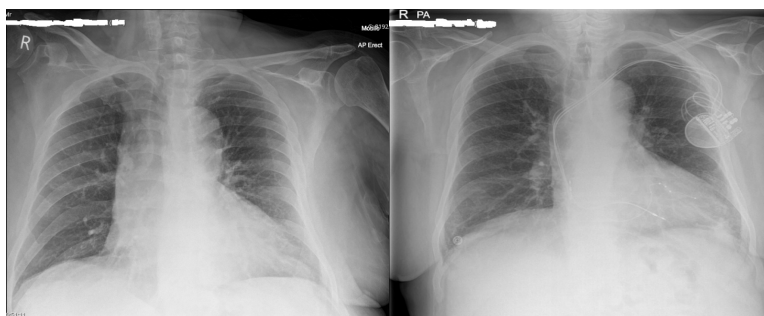


Figure 1: CXR on admission and after pacemaker insertion. There is upper lobe diversion with cardiomegaly and left basal pneumonitis in the initial CXR.

Date	26/11/20	03/12/20	05/12/20	08/12/20	20/12/20	04/01/21	08/01/21	16/01/21
WBC	14.70	13.88	9.78	16.72	12.36	23.36	15.17	21.22
Neutrophils	0.99	1.18	0.28	0.87	0.22	1.39	0.31	6.63
Lymphocytes	12.56	11.50	8.49	14.70	11.31	20.68	13.64	12.72
Hb	126	119	125	114	111	114	108	111
Platelet	186	119	113	158	146	114	190	131
ALT	6	6					6	
ALP(30-130)	60	69					72	
T Bilirubin (0-21)	9	<5					<5	
Protein	69	64					64	12
Albumin	37	38					31	
Na	132		134	134	134	134	138	135
K	4.5		4.4	4.8	4.1	4.2	4.4	3.9
Creatinine`	119		130	108	110	111	129	123
D-dimer						0.32		
Trop T(0-14)	8							
BNP							2345	
TSH(0.35-5.0)	0.91							
Free T4(11-23)	11.2							
CRP	41.9	88.7	40.3					14.7
Procalcitonin (<0.25)		0.26						
Blood culture	Negative		Sputum culture	Negative		Urine culture	Negative	

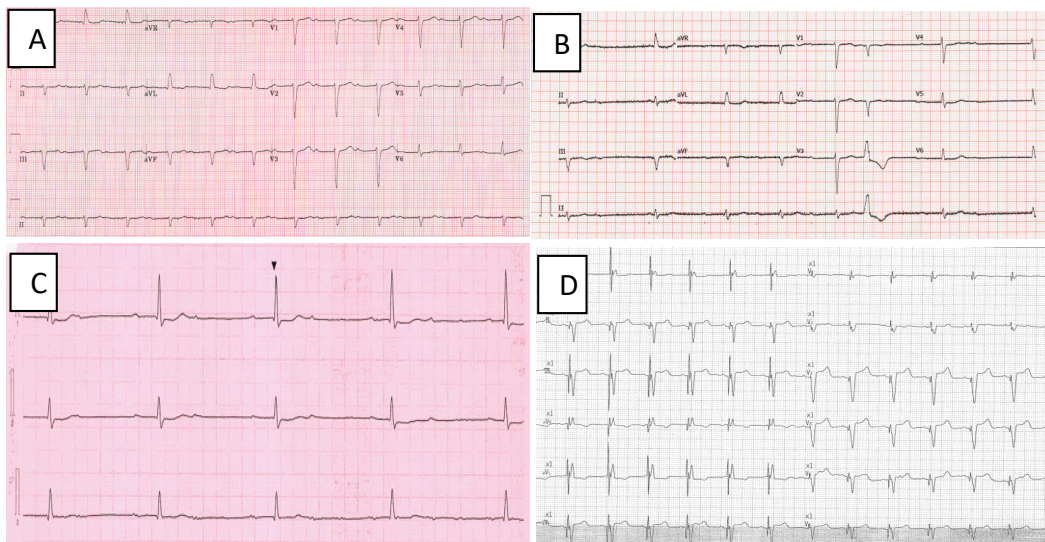


Figure 2: Showing serial ECGs A- 1st degree heart block, B,C-Complete heart block, D- Following pacemaker insertion.

Discussion

Cardiac arrhythmias including complete heart blocks have not been widely reported due to COVID-19 infection. These episodes are usually associated in a setting of myocardial infarctions or hypoxia. A remarkable proportion of patients are diagnosed with pre-existing Cardiovascular Disease (CVD) which has been shown to be associated with higher mortality and morbidity. One study has revealed that the

mortality of COVID -19 patients with CVD is 10.5% compared to overall mortality of 2.3% due to COVID [1]. COVID-19 affects the human body via interacting with ACE 2 receptors predominantly found in pneumocytes of the lung. Different mechanisms are postulated to explain the adverse effects of COVID-19 virus on the heart. These include cytokine storm, myocarditis, defective ACE 2 signaling pathway and hypoxia [2-4].

Number of causes such as viral myocarditis, myocardial ischemia, cardiogenic shock, thrombo-embolic phenomena and direct invasion of the cardiomyocytes are considered for the arrhythmogenic effects of COVID-19 infection [7]. Our patient did not have evidence of acute myocardial ischemia based on the ECG, blood and Echocardiogram findings. He was maintaining his blood pressure although there were episodes of significant reduction in heart rate. Reduced cardiac function with arrhythmia may be due to possible myocarditis induced by the virus. Given the increased arrhythmogenic effects related to the viral infection complicated patients should be monitored for arrhythmias with telemetry which may be subclinical.

Myocarditis can cause arrhythmias which may be the presenting feature. Despite this patient had risk factors for ischemic cardiac events including type 2 diabetes mellitus, hypertension and advanced age which can contribute to conduction abnormalities, there was a low index of suspicion for a coronary artery ischemia provided lack of chest pain, negative cardiac biomarkers, absence of focal hypokinesia on ventricular wall motion on echocardiogram, and the lack of ischemic changes on his ECG. In fact he had good control of hypertension and diabetes for the past few years. The concurrent onset of symptoms of COVID infection and falls were more suggestive of COVID induced pathology on the heart.

While a rise in troponin has been reported in COVID-19, a meta-analysis of four studies (a total of 341 patients) showed that a significant troponin rise was associated with more severe COVID-19-related illness as opposed to those with mild disease [5]. A cardiac biopsy from a 50-year-old male patient infected with COVID-19 revealed interstitial mononuclear inflammatory cell infiltrate suggesting an inflammatory process in myocytes [6].

Our case becomes unique as he was concurrently diagnosed to have new onset neutropenia following admission. Initially he was managed as neutropenic sepsis as he had fever with elevated CRP and was offered IV Piperacillin as per guidelines. Further evaluation with procalcitonin and cultures did not reveal evidence of bacterial infection and fever was attributed to COVID itself. It was considered that the toxic viral effects on a preexisting malignant marrows may be the underlying reason for the new onset neutropenia. Patient was offered 3 days of G-CSF and neutropenia recovered. Although neutrophil count remained low in the first 12 days of infection it recovered to normal following that, confirming the viral effect on the marrow. As he was diagnosed to have CLL, lymphopenic effects of COVID could not be observed in our patient.

Furthermore our patient had few risk factors making him prone to get COVID -19 infection. This includes his age, Diabetes Mellitus and hematological malignancy. These factors are usually associated with an adverse outcome although he made a complete recovery despite his age. He was not offered steroid therapy targeting his lungs despite his complicated disease process as there was no episodes of desaturation and he had heart failure. Timely diagnosis and early interventions minimized the adverse outcome in him. We believe it is important for clinicians to be aware of detrimental effects of SARS CoV -2 infection and the

aim is to highlight the effect on the cardiovascular system by the above virus.

Conclusion

This rare case of new onset complete heart block in a patient with COVID 19 infection adds more inputs to understand the effects of COVID-19 virus on cardiovascular system in the spectrum of cardiovascular complications due to COVID-19 pneumonia.

Declarations

Author Contributions: Sugeesha Wickramasinghe – Literature review, gathering data and writing the article. Katherina Koesling - Literature review, gathering data and writing the article. Firaz Charfare - Literature review, gathering data and writing the article. Musab Ahmad - Literature review, gathering data and writing the article. Syed Ahmad – Reviewing the article before submission and guiding its intellectual content.

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