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Cardiovascular Disease with COVID-19 in Rural Area: Case Series

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ABSTRACT

Introduction: COVID-19 is a pandemic situation involving more than 100 countries with a total case globally that has reached more than 700 million cases. Data from WHO reports that about > 7% of patients experience myocardial injury, and 22% of them are patients with critical illness conditions. COVID-19 is caused by the SARS-CoV-2 virus (Severe Acute Respiratory Syndrome Coronavirus 2). SARS-CoV-2 infection occurs when the surface spike protein of the virus binds to the angiotensin-converting enzyme 2 (ACE2) receptor. ACE2 is a receptor that can bind directly to viral surface spike proteins which is expressed in the lungs as well as in intestinal epithelium, kidneys, vascular epithelium and heart.
Cases: There are three confirmed cases of COVID-19 reported. Case one is about Inferior ST-Elevation ACS. Case two is Non-ST Elevation ACS with differential diagnose Unstable Angina Pectoris and lastly case number three is about Ventricular Tachycardia.
Conclusion: Cardiovascular Disease now causes the most deaths in low-and middle-income countries. Many COVID-19 patients have comorbid cardiovascular disease, or have experienced an acute injury to the heart during the course of their illness.

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INTRODUCTION

COVID-19 is a pandemic situation involving more than 100 countries where the number of cases globally has reached more than 700 million cases as of 2022. The total cases of COVID-19 in Indonesia as of 2022 have reached more than 6 million confirmed cases with more than 100 thousand deaths where the first case appeared on March 2nd, 2020 or about 4 months after the first case in Wuhan, China.[1–3]

Many COVID-19 patients have comorbid cardiovascular disease, or have experienced an acute injury to the heart during the course of their illness. Data from WHO reports that about > 7% of patients experience myocardial injury, and 22% of them are patients with critical illness conditions.[4,5]

There are evidence of cardiovascular disease (CVD) has a correlation with COVID-19. In this case series, we present three cases of covid-19 with cardiovascular disease.

CASE 1

A 47-year-old man with a complaint of chest pain felt like he had been stabbed five hours ago before being admitted to the hospital, a duration is more than 20 minutes and was not accompanied by radiation, nausea, vomiting, shortness of breath or cold sweat. Complaints other than chest pain were denied. Prior history of chest pain was denied. The patient previously had no history of heart disease, hypertension or other medical history. There was no history of previous treatment.

His vital sign: he was alert, blood pressure 101/81 mmHg, heart rate 79 x/min, respiratory rate 20 x/min with 99% oxygen saturation and afebrile. Body weight is 60 kg. On physical examination found normal.

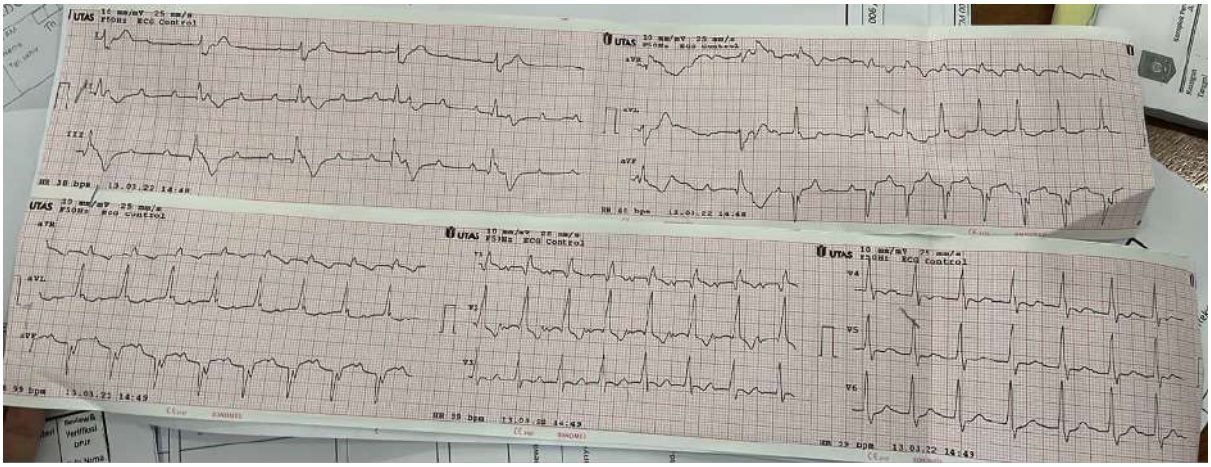

Figure 1. Case 1, EKG shows ST elevation in II, III, aVF.

Laboratory examination showed hemoglobin level of 13.8 gr/dL, hematocrit 44%, leukocytes 12000/uL, blood sugar on site 129 mg/dl, sodium 131.2 mEq/L, potassium 4 mEq/L, and chloride 105.1 mEq/L. PCR test examination obtained positive results.

The patient was then diagnosed with STEMI Inferior TIMI score of 1/7. While in the emergency room the patient was given oxygen via nasal canul 2 lpm, ISDN 5 mg, loading aspilet 160 mg followed by 1x80mg, loading clopidogrel 300 mg continued 1x75mg, atorvastatin 1x20 mg, heparin bolus 4000 units then 500 units/hour. After the patient is stable, the patient is referred for further treatment.

CASE 2

A 69-year-old man with left-sided chest pain felt like a heavy burden had been placed on him accompanied by radiation to his left shoulder since 1 month ago and has been getting worse for about 1 day ago. One month ago, the duration of chest pain was less than 20 minutes and disappeared when rest. One day ago, the chest pain lasted more than 20 minutes and still hurts even after resting. Shortness of breath, cold sweat and nausea is present. Prior history of chest pain was denied. The patient previously had no history of heart disease, hypertension or other medical history. There was no history of previous treatment.

His vital sign: he was aware, blood pressure 140/71 mmHg, heart rate 96 x/min, respiratory rate 24 x/min with 98% oxygen saturation and afebrile. On physical examination, there was an increase in jugular venous pressure (5+4 cm), other than that the physical examination was within normal limits.

Laboratory tests showed hemoglobin levels of 13.7 gr/dL, hematocrit 41%, leukocytes 15600 /uL, sodium 129 mEq/L, potassium 2.4 mEq/L, and chloride 95 mEq/L. PCR test examination obtained positive results.

The patient was then diagnosed with UAP dd NSTEMI. While in the emergency room the patient was given nasal cannula oxygen 3 lpm, ISDN 5 mg, loading aspilet 160 followed by 1x80mg, loading clopidogrel 300 mg followed by 1x75mg, injection of arixtra 2.5mg/24 hours, atorvastatin 1x40 mg, ramipril 1x5mg, bisoprolol 1x2.5mg. Before the patient was stable, the patient requested he didn't want to be admitted to the hospital. For his medicine at home, he was given aspilet 1x80mg, clopidogrel 1x75mg, ISDN 3x5mg, atorvastatin 1x40mg, bisoprolol 1x2.5mg, captopril 3x25mg.

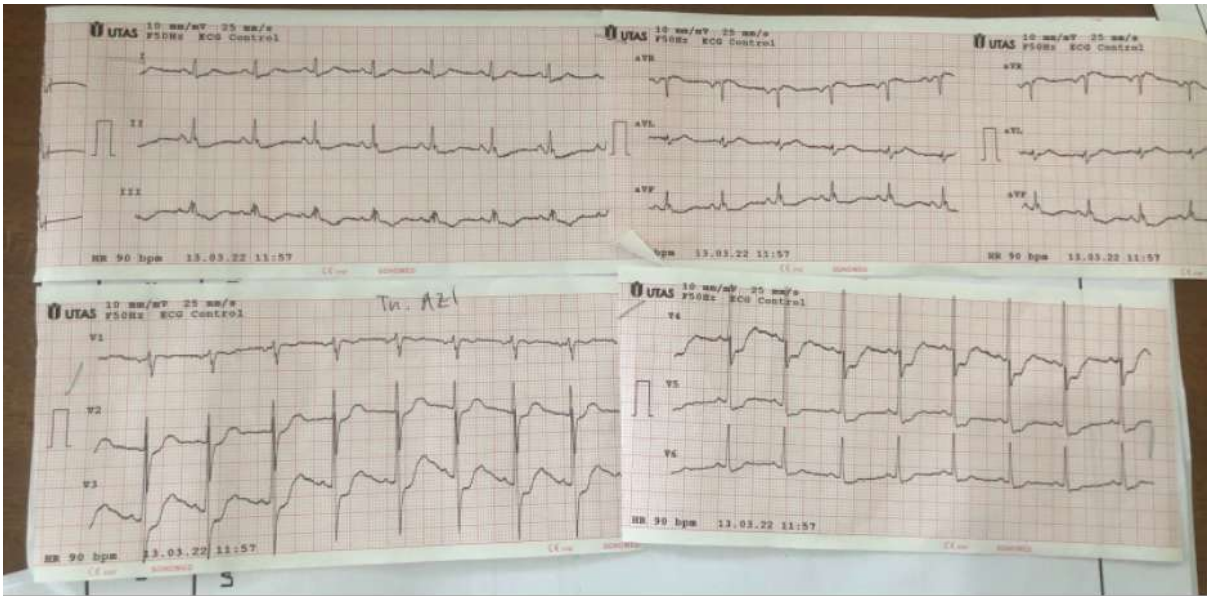

Figure 2. Case 2, EKG shows ST depression in V3, V4

CASE 3

A 45 year old man came to the Emergency Room feeling fatigue since 2 days ago and has been getting worse for 1 day. No fainting. Heart palpitations since 2 days ago. Chest pain on the left as if a heavy burden had been felt since the morning before entering the hospital. No radiating chest pain, and not accompanied by cold sweat. Shortness of breath, nausea, vomiting, abdominal pain absent. He has a history of acute coronary syndrome 4 years ago and a history of treatment with clopidogrel 1x75mg, atorvastatin 20mg 1x1, nitrocaf 2x1, ISDN 5mg 1x1, cartylo 1x1.

On physical examination, he was compos mentis, with blood pressure 110/70 mmHg, heart rate 240 x/min, respiratory rate 32 x/min with 98% oxygen saturation and afebris. On physical examination found within normal limits.

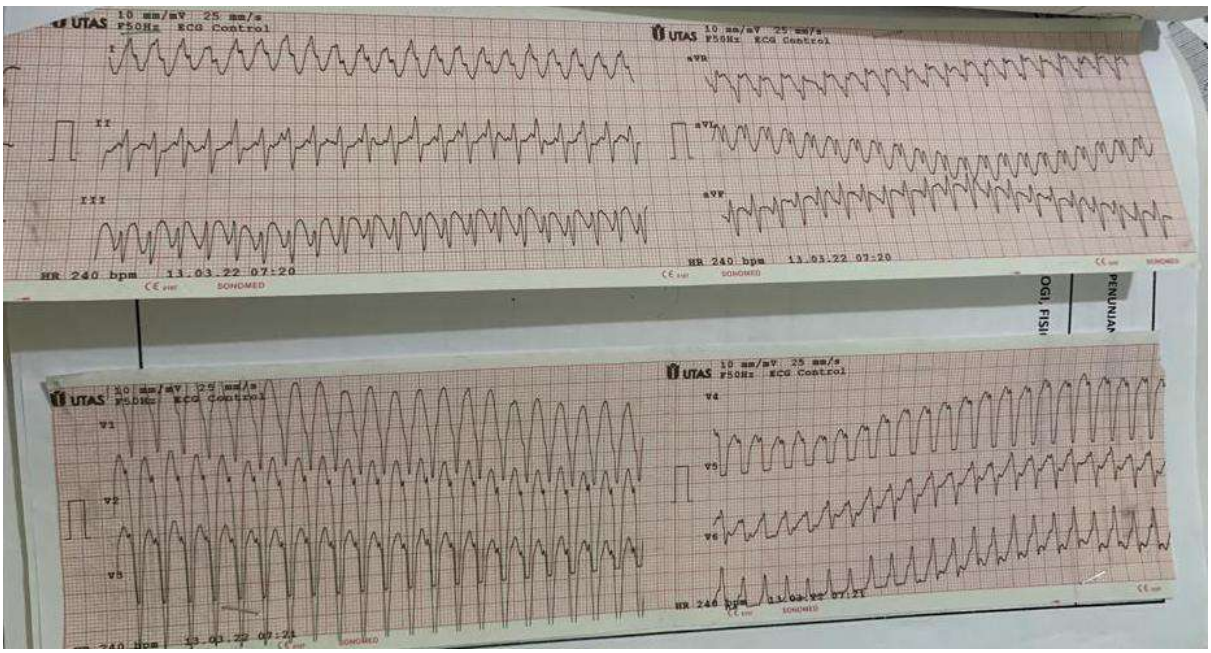

Figure 3. Case 3, EKG shows a ventricular tachycardic rhythm with a QRS rate of 240 beats per minute.

Laboratory examination showed hemoglobin level of 17.7 gr/dL, hematocrit 52%, leukocytes 12400 /uL, blood sugar 122 mg/dL, sodium 136 mEq/L, potassium 3.12 mEq/L, and chloride 107.8 mEq/L. PCR test

examination obtained positive results. While in the emergency room, 100 J synchronized cardioversion was performed. After cardioversion, an ECG was performed again. Post cardioversion ECG shows sinus rhythm with QRS rate 73 beats per minute with T inverted V1-V4, III, avF.

The patient was then diagnosed with post cardioversion on the indication of VT with a pulse with unstable hemodynamics and NSTEMI dd UAP

Treatment after cardioversion were oxygen nasal cannula 3 lpm , 160 mg aspilet loading followed by 1x80 mg, 300 mg clopidogrel loading continued 1 x 75 mg, arixtra injection 2.5 mg/24 hours, atorvastatin 1 x 40 mg, candesartan 1 x 8 mg, bisoprolol 1 x 2.5 mg. After the patient is stable then transferred to the ICU treatment room.

DISCUSSION

COVID-19 is caused by the SARS-CoV-2 virus (Severe Acute Respiratory Syndrome Coronavirus 2). SARS-CoV-2 infection occurs when the surface spike protein of the virus binds to the angiotensin-converting enzyme 2 (ACE2) receptor after being activated by transmembrane protease serine 2 (TMPRSS2). Binding of the viral spike protein to the ACE2 receptor will lead to downregulation of ACE2 activity on the cell surface so that the protective effect of the enzyme is lost. Continued infection and viral replication will reduce ACE2 expression. Down-regulation of ACE2 activity in the lungs can facilitate neutrophil infiltration in response to endotoxin and lead to accumulation of unopposed angiotensin II and excessive local activation of renin-angiotensin system (RAS) which can lead to lung and myocardial injury.[6,7]

The renin-angiotensin system (RAS) plays an important role in cardiovascular system and contributes to cardiovascular diseases such as hypertension, coronary heart disease, and heart failure. The components of RAS consist of angiotensinogen, renin, angiotensin II, angiotensin II receptors (AT1 and AT2), and angiotensin-converting enzyme (ACE). It is known that ACE is an enzyme that plays a role in catalyzing the conversion of angiotensin I to angiotensin II which plays a role in vasoconstriction and an increase in blood pressure. ACE2 is a receptor that can bind directly to viral surface spike proteins which is expressed in the lungs as well as in intestinal epithelium, kidneys, vascular epithelium and heart.[8,9] Cardiovascular Disease now causes the most deaths in low-and middle-income countries.[10] Men more often have Acute Myocardial Infarction (AMI) than women also men have AMI at an earlier age than women, have typical symptoms in AMI more often than women, while women have atypical symptoms.[11] The 40-49 year old male group and the 60-69 year old male group had more typical angina than atypical symptoms or non-anginal pain.[12] As presented in our case series, three patients are men in age 47 years old, 69 years old, and 45 years old, respectively with typical angina.

CONCLUSION

Cardiovascular Disease now causes the most deaths in low-and middle-income countries. Many COVID-19 patients have comorbid cardiovascular disease, or have experienced an acute injury to the heart during the course of their illness.

DECLARATIONS

Ethics approval and consent to participate. Permission for this study was obtained from General Hosital Drs. H. Abu Hanifah.

CONSENT FOR PUBLICATION

The Authors agree to publication in Journal of Society Medicine.

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COMPETING INTERESTS
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AUTHORS' CONTRIBUTIONS
All authors significantly contribute to the work reported, whether in the conception, study design, execution, acquisition of data, analysis, and interpretation, or in all these areas. Contribute to drafting, revising, or critically reviewing the article. Approved the final version to be published, agreed on the journal to be submitted, and agreed to be accountable for all aspects of the work.

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