



CASE REPORT MYOCARDITIS IN UNIDENTIFIED SNAKE BITE

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ABSTRACT

Background : Venomous snakebites are rare, with an estimated 1,000 cases annually, resulting in approximately 5 deaths. Venomous snakebites are a medical emergency that can result in life-threatening clinical effects. Cardiovascular complications in snakebite patients include myocarditis, shock, ventricular dysrhythmias, and cardiac arrest. Myocarditis caused by viper envenomation in humans rarely happens, but it could be dangerous if not detected and treated early.

Case Illustration: In the afternoon, a 74-year-old man made a fuss scene of a snake bite on his left leg, which happened in a rice field. The shape of the snake cannot be identified. The sense of the leg becoming increasingly swollen and turning purple. Additional complaints were shortness of breath (+). Risk factors were uncontrolled hypertension and smoking regularly, one pack a day. The bites are showing fang marks (+), swelling (+), and edema (+). On the second day, the bruises from the bite had spread.

Supporting examinations revealed leukocytosis, increased troponin I, an ECG recording showed ischemia in the inferior and anterolateral regions, and a PA chest X-ray showed cardiomegaly. Echocardiography results showed hypokinetic inferior septal, mitral regurgitation, tricuspid regurgitation, aortic regurgitation, and LVEF 37%. The treatment provided included immobilization of the bite site with a splint, administration of SABU, cefotiam, spironolactone, ramipril, and furosemide.

Conclusion : Venomous snakebites can cause adverse cardiovascular events. One of the complications, myocarditis, occurs as a direct result of the venom's toxins, which can damage myocardial cells.

Keyword : Myocarditis, Snake Bite, Ischemia

INTRODUCTION

Venomous snakebites are rare, with an estimated 1,000 cases occurring annually, with approximately 5 deaths. These incidents are still rare, and therefore cause adverse cardiovascular events (ACVE). [1] [2]

A venomous snakebite is a medical emergency that can result in life-threatening clinical effects. Cardiovascular complications, such as myocarditis, due to viper envenomation in humans are extremely rare but can be dangerous if not detected and treated early. [3]

Myocarditis refers to inflammation of the myocardium, which can lead to tissue degeneration or necrosis. Myocarditis was previously called inflammatory myocarditis.. [4] Myocarditis is an under-researched disease with diverse clinical manifestations, often leading to heart failure (HF). Furthermore, increased morbidity and mortality due to myocarditis have been noted in recent years. [5]

CASE REPORT

Mr. K, 74 years old, came with complaints of bruises due to a snake bite while in the rice field around Maghrib (4 hours before the hospital visit). The patient did not see the snake clearly. The patient was bitten on the left leg, currently the patient feels pain in the left leg, swelling (+), and blackness appears on the back of the left foot. Numbness (-) with a red color and bleeding gums are denied. Nausea (-) vomiting (-) headache (+). Other recent complaints the patient has had include shortness of breath when Having been walking for about 1.5 months, he feels tired, sleeping with one pillow. Chest pain, cold sweats. Coughing. The patient has risk factors such as uncontrolled hypertension and smoking one pack a day. On physical examination, the general condition was moderately ill, compos mentis. Blood pressure 168/98 mmHg, heart rate 96 bpm, breathing 20 bpm, spO2 96 %, and temperature 36.5 °c. A general physical examination revealed an elevated JVP, a positive/positive friction rub on the lungs, and a positive left fang mark (+), swelling (+), and edema (+). An ECG revealed a sinus rhythm, cardiac ischemia, and low blood pressure (LVH) (Figure 2).

A chest X-ray revealed cardiomegaly and pneumonia (Figure 3). Blood tests revealed : leukosit 18.170 /uL (3800-10600/uL) , creatinine 1.2 mg/dl (0.7-1.1 mg/dl), Natrium 147.1 mmol/L (135-145 mmol/L), troponin I 0.28 ng/mL (0.0-0.3 ng/mL). echocardiography : LVH eccentric, EF 37% , MR moderat, TR mild-moderat, AR mild, dan diastolic disfunction grade I, hipokinetik inferiorseptal (figure 4). As initial treatment in emergency instantiation, immobilization of the left cruris and pedis with a spalk, urinary catheter insertion, then the provision of therapy in the emergency room and inpatient care IVFD RL 400 cc + Gabaxa 100 cc : Futrolit 500 cc : RL 500 cc (1:1:1) 1500 cc/24jam Cefotiam 3x1gr (iv), Lansoprazol 2x30mg (iv), Ketorolac 3x30mg(iv), drip SABU Biosave 2 vial into NaCl 0,9% 500 cc in 5 hours, amlodipin 1x5mg (0-0-1) (oral), Furosemid 1x10mg (oral), Ramipril 1x10mg (1-0-0) (oral), Spironolacton 1x25mg (oral).

Days 2, The patient complained of pain at the bite site, bruising, and fever. He denied complaints of redness and bleeding gums. Physical examination revealed widespread bruising at the bite site (Figure 5). Addition therapy SABU biosave 2 vial into NaCl 0,9% 500 cc in hours (cycle 2) and paracetamol 3x1gr (iv), then repeat the EKG examination (figure 6).



Figure 1. Location of Bite on Left Foot on day 1

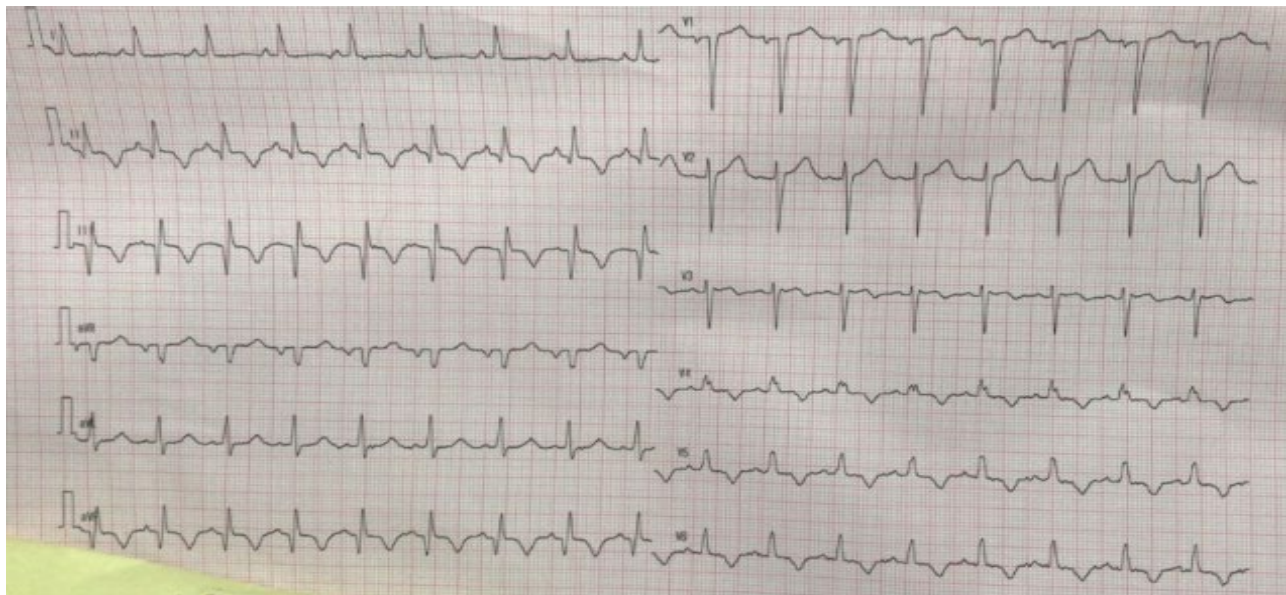


Figure 2. ECG Result

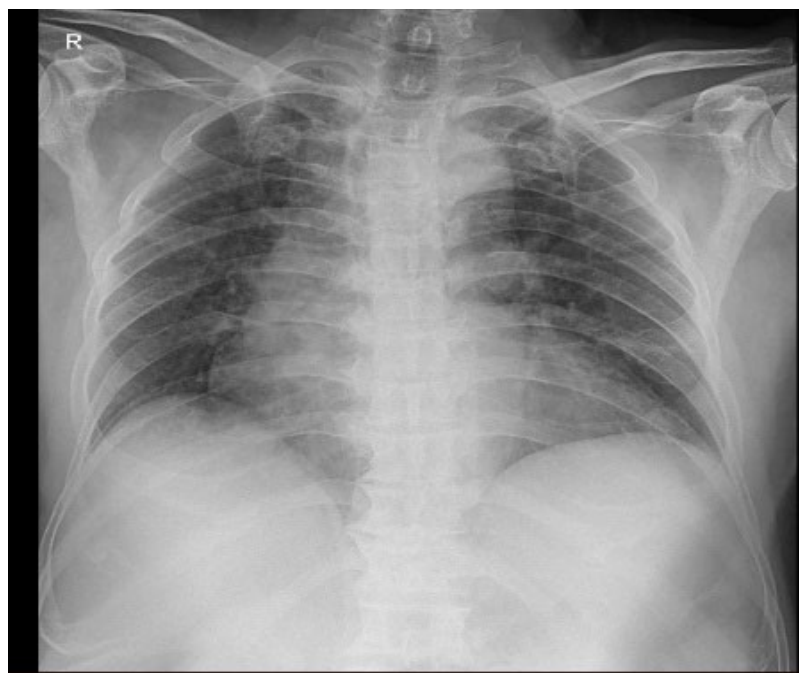


Figure 3. Thorax Rontgen Show Cardiomegali and Pneumonia

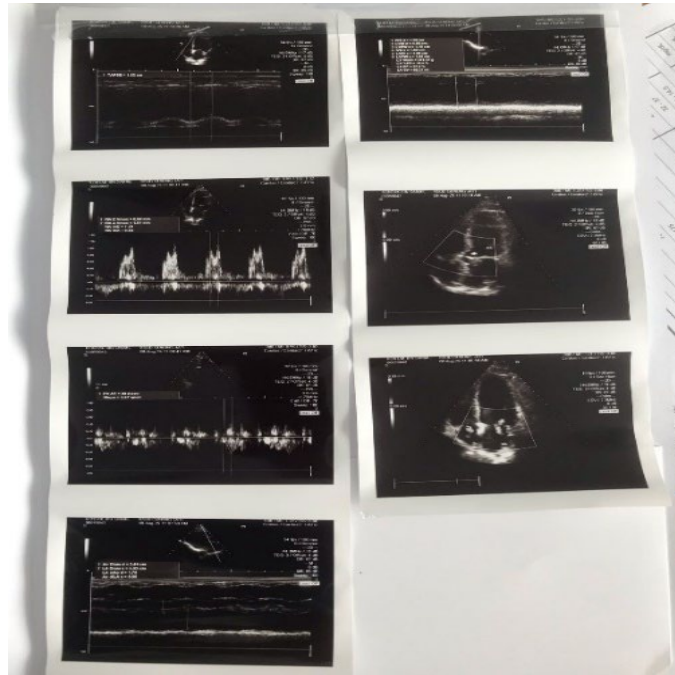
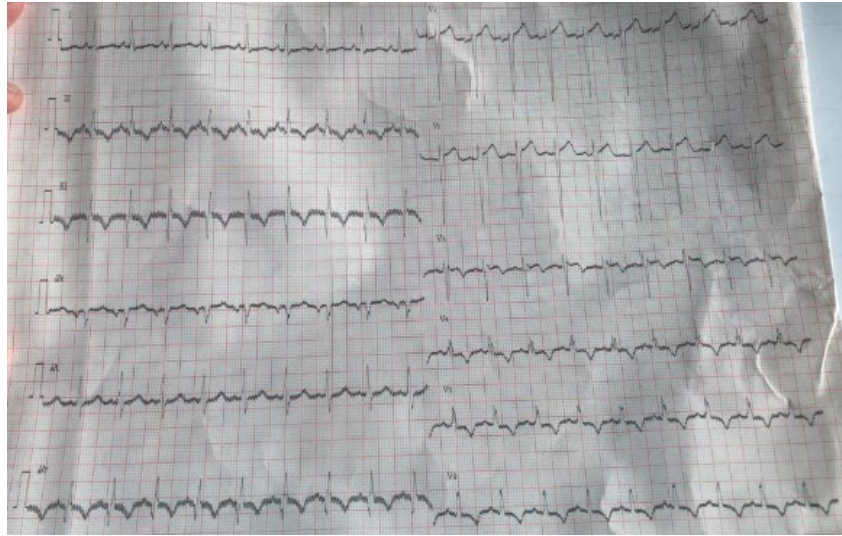


Figure 4. Echocardiography Result



Figure 5. Location of bite on left foot day-2



Gambar 6. EKG Result day-2

DISCUSSION

In this patient, symptoms of chest pain and cold sweats were denied. However, this patient complained of shortness of breath with symptoms of HF. The clinical presentation of myocarditis patients varies. Presentations range from asymptomatic cases to chest pain, dyspnea, signs of left and/or right heart failure, and/or arrhythmias[5]. ECG recording examination found changes in the T wave in II, III, avF and V4-V6. ECG recording changes are not specific for ST-T wave abnormalities, concave and diffuse ST-T segment elevation, as well as atrial and ventricular arrhythmias, and abnormal QRS [6] [5].

The patient described in this case report had a troponin level of 0.28 ng/dl (0.0-0.3 ng/dl) which is relatively normal. Cardiac troponin is known as a sensitive and specific marker of myocardial injury. Elevated cTnI levels can be detected in more than one-third of patients with myocarditis. [7] [8] However, a normal ECG, negative troponin and/or creatine kinase do not exclude the diagnosis of myocarditis [8] [9]. Myocarditis causes damage to myocytes, triggering an

increase in the permeability of the cardiomyocyte cell membrane, which then causes the release of troponin. [8] [10] [11].

Echocardiography should be performed on every patient to evaluate cardiac morphology and function, and assess potential complications (fluid, thrombus, valve regurgitation). Myocarditis can present with wall thickening, dilation, and wall motion abnormalities in the ventricles, resulting in decreased cardiac function. Myocardial inflammation results in increased wall thickness due to myocardial edema and pericardial effusion. [5, 12] To identify patients with subclinical myocardial dysfunction in the early stages of the disease, speckle tracking echocardiography (STE) is recommended. STE has high sensitivity and can correlate with endomyocardial biopsy (EMB) results, and STE has high sensitivity and can correlate with EMB results and Cardiovascular Magnetic Resonance (CMR) techniques. [13]

Currently, the primary diagnostic approach, if clinically suspected of myocarditis, is to perform CMR evaluation (using T2-weighted, early- and late-gadolinium-enhanced images), as this technique is the most reliable noninvasive means of establishing the diagnosis. The application of T1 and T2 mapping enhances the diagnostic capability of this technique. The presence of subepicardial late gadolinium enhancement, which is commonly present in this condition, does not appear to be conclusively associated with a worse prognosis when associated with preserved ventricular wall motion and a stable arrhythmia profile [8, 14].

EMB is the gold standard and provides a definitive diagnosis of myocarditis. EMB allows assessment of the specific histotype, immunological and virological status of the myocardium by immunohistochemistry and polymerase chain reaction analysis. [13]

Snakebites are a defense mechanism of snakes and can be a medical emergency. Snakebites can be life-threatening if the venom has neurotoxic, cytotoxic, or hemotoxic effects. [15] [16] In Indonesia, it is estimated that there were around 120,000 cases of snakebites with an estimated death toll of 20 to 11,581 people in 2007. This estimate is based on many influencing factors, such as the large number of snakebite cases occurring in rural areas, inappropriate traditional treatment, and treatment not reaching the hospital. [17]

In a study conducted by Kumar (2017), a 12-year-old boy who suffered a snakebite experienced complications such as coagulation abnormalities, shock, and myocarditis after being poisoned by the venom. The shock was caused by the cardiovascular effects of the venom, which caused myocarditis. The child also experienced complications such as thrombocytopenia and coagulation abnormalities [18].

In a retrospective review of 65 consecutive cases of venomous snakebites at Wonju Severance Christian Hospital, South Korea between May 2011 and October 2014, at least one of the following conditions was found: 1) myocardial injury, 2) shock, 3) ventricular dysrhythmia, or 4) cardiac arrest. [16]

A 2013 study by Alok Bhatt et al. reported that a 65-year-old man was bitten by a venomous snake, resulting in myocardial infarction and myocarditis. Troponin levels were elevated (0.325 ng/mL), an ECG showed LBBB, and echocardiography showed septal beaking. The myocarditis was suspected to be due to the direct effect of the toxin on the myocardium or hypersensitivity to the snake venom. [19]

In 2022, a case of a 62-year-old man with DM2, dyslipidemia, and a history of CAG was presented, bitten by a viper aspis snake. The patient's condition was hypotensive, GCS3, ROSC, ECG post-ROSC ST elevation in the anteroseptal-lateral leads and PTCA (percutaneous transluminal coronary angiography) was performed. Intracoronary thrombosis was found in the left anterior descending artery branch and diagonal 1 (LAD-D1). ACVE After a venomous snake bite, there may be: 1) myocardial injury based on an increase in troponin I within 48 hours after the bite or an ECG recording showing ischemic changes, 2) shock, 3) ventricular dysrhythmia (takikardi ventrikel, fibrilasi ventrikel, or torsades de pointes and cardiac arrest). [2] [1]

Myocardial cell damage after exposure to snake venom causes circulatory disorders and reduced myocardial perfusion. This leads to coronary spasm or hypovolemic shock. In 90% of MI cases described in the literature, venomous snakes that can cause ACVE come from the Viperidae family, which is distributed worldwide. Snake venom is a mixture of proteins and peptides that are part of various toxin families, including snake venom serine proteases (SVSP) and metalloproteinases that can target one or more coagulation factors, possibly leading to pro-

coagulative clinical complications. [2] Snake venom contains hypotensive components such as bradykinin-potentiating peptides, natriuretic peptides, three-finger toxins and specific hypotensive component (VEGF-like Heparin Binding Protein).[20] [21] According to research conducted by Kounis in 2016, MI could be a secondary Kounis syndrome in the context of an allergic reaction (hypersensitivity) [22]

This study shows that establishing a diagnosis of myocarditis in patients with venomous snakebites is similar to the case presented. Similarities with other studies, the diagnosis can be seen above, starting with a precise and focused history, although there is no specific history of myocarditis. Symptoms can include dyspnea, orthopnea, and signs of right or left heart failure. [5] The ECG findings are ischemic. The ischemic location in this case is the inferior and anterolateral regions. [6] [5] Myocardial muscle injury can elevate cardiac enzyme levels. In this case, cardiac enzymes were not elevated. However, a normal ECG, negative troponin, and/or creatine kinase levels do not exclude the diagnosis of myocarditis. [8] [9] Echocardiography results showed wall thickening, dilation, valve disorders and wall movement abnormalities in the ventricles resulting in decreased heart function. [5] [12] In this case, echocardiography results showed wall thickening, valve regurgitation (mitral, trikuspid and aorta), low EF values and inferoseptal hypokinesis.

Based on other studies, data and examinations were lacking in establishing a diagnosis in this case, namely the patient never underwent routine examinations so we did not know the clinical and supporting images before being bitten by a snake, then STE, CMR and EMB examinations were not carried out which are the gold standard for establishing a diagnosis of myocarditis.

CONCLUSION

Venomous snakebites can cause adverse cardiovascular events. One of the complications, myocarditis, occurs as a direct result of the venom's toxins, which can damage myocardial cells.

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