



INTISARI SAINS MEDIS

Published by Intisari Sains Medis

# Acute Decompensated Heart Failure (ADHF) with aortic dissection Stanford A in middle aged man: a case report



CrossMark

Anbiya Khairul Umam<sup>1</sup>, Ida Bagus Wisnu Widiarta<sup>1</sup>, Marwa Humaira Intizam<sup>2</sup>,  
Aizar Vesa Prasetyo<sup>2</sup>, Ketut Putu Yasa<sup>3\*</sup>

## ABSTRACT

**Background:** Heart failure is a clinical syndrome with shortness of breath, fluid retention, and the heart's structural and functional disorder. Each year, there were 7,2 cases every 1000 people on male and 4,7 cases every 1000 people on the female. Aortic dissection is an emergency disease in which the symptoms are similar to ischemic heart disease, that 38% of patients got misdiagnosed on the first evaluations. Because of the clinical course of heart failure and misdiagnosed aortic dissection that frequently happened, authors are interested in making a case report with both conditions.

**Case report:** A male patient, 39 years old, complained of shortness of breath and epigastrium pain. The patient was diagnosed with Acute Decompensated Heart

Failure (ADHF) profile B with emergency hypertension and suspected aortic dissection based on history and physical examination. The patient was also diagnosed with acute kidney injury stage 1. CT angiography showed widening of the aorta ascending until arcus aorta with a Stanford type A aortic dissection diagnosis.

**Conclusion:** The condition of aortic dissection can coincide with acute heart failure. Therefore, a clinician must be aware of the emergency of dissection and know the initial symptoms of dissection. The typical clinical symptoms of dissection lead us to perform imaging studies that ultimately lead to a thoracoabdominal CTA to diagnose the dissection.

**Keywords:** ADHF, Aortic Dissection, Hypertension.

**Cite This Article:** Umam, A.K., Widiarta, I.B.W., Intizam, M.H., Prasetyo, A.V., Yasa, K.P. 2021. Acute Decompensated Heart Failure (ADHF) with aortic dissection Stanford A in middle aged man: a case report. *Intisari Sains Medis* 12(2): 489-493. DOI: [10.15562/ism.v12i2.930](https://doi.org/10.15562/ism.v12i2.930)

<sup>1</sup>Bachelor of Medicine, Faculty of Medicine, Universitas Udayana, Bali;

<sup>2</sup>Undergraduate Student, Faculty of Medicine, Universitas Udayana, Bali;

<sup>3</sup>Cardiovascular and Thoracic Surgery Division, Department of Surgery, Faculty of Medicine, Universitas Udayana, Sanglah General Hospital, Bali;

\*Corresponding author:

Ketut Putu Yasa;

Cardiovascular and Thoracic Surgery Division, Department of Surgery, Faculty of Medicine, Universitas Udayana, Sanglah General Hospital, Bali; [ketut.putuyasa07@gmail.com](mailto:ketut.putuyasa07@gmail.com)

Received: 2021-01-18

Accepted: 2021-06-29

Published: 2021-07-16

## INTRODUCTION

Heart failure is a clinical syndrome with shortness of breath as the primary symptom, which might be worsened by activity. It could be accompanied by or without fatigue, fluid retention like congestive pulmonary or peripheral edema within the structural or functional disorder of the heart that disturbs filling function and heart pumping.<sup>1</sup> Heart failure is the end-stage condition of another heart disease such as hypertension, coronary heart disease, myocardial infarction, valve abnormalities, congenital disease and cardiomyopathy.<sup>2</sup>

Based on a study, 7.2 heart failure cases in every 1000 males and 4.7 cases in every 1000 females each year.<sup>3</sup> The variety of patients with Acute Decompensated Heart Failure (ADHF) is dominated by

elderly males aged above 70 years old with ischemic heart disease and Congestive Heart Failure (CHF). The majority of patients (66-75%) have a history of previous heart failure, and the following comorbidity is diabetes mellitus on 40% of patients and chronic obstructive pulmonary disease on 20% of patients.<sup>4</sup> Incidents of heart failure estimated will increase on another day because of increasing life expectancy. The mortality rate in the last four years recorded about 50% of total cases. Among 15.8% came to the hospital with heart failure and lead to death, while others, 32% come back to the hospital on one-year period.<sup>5</sup>

Aortic dissection is considered an emergency condition in the cardiovascular field. The symptoms felt by the patient are similar to myocardial ischemic, resulting

in misdiagnoses in about 38% of the patients. The incident of aortic dissection based on hospitals report about 3-5 cases every 100.000 people each year. However, that incident did not present all incidents of aortic dissection.<sup>5</sup> This disease was ranked 13<sup>th</sup> place as the most cause of death in USA and more than 15.000 people die every year. Aortic dissection is related to heart disease owned by the patient, such as hypertension, which is hypertension increased morbidity up to 60%.<sup>6</sup>

Because of the clinical course of heart failure and misdiagnoses of aorta dissection that frequently happened with the low incident and high mortality, authors are interested in proposing a patient case report with two conditions above.

## CASE ILLUSTRATION

A male patient, 39 years old, complains of fluctuating shortness of breath for two weeks, accompanied by pain in the epigastrium. Shortness of breath and pain was fluctuating and was not affected by activity. There was no fever, and there was nausea but no vomiting. Defecation and urinary were normal. Before that, the patient was hospitalized in Rural Hospital for five days. Complaints of shortness of breath and pain felt well now. However, on October 14<sup>th</sup>, 2020, the patient felt stabbed-like pain in the area below the left breast. The patient did not have a history of Coronary Heart Disease or Diabetes Mellitus. The patient had a history of hypertension since five years ago. The patient also had a history of smoking. The physical examination found that the patient was compos mentis with blood pressure 170/80 mmHg, pulse rate 97 bpm, and respiration rate 30x/minute. The eye was neither anemic nor icteric. The ear, nose and throat were within normal limits. Lymph and thyroid node enlargement was not found in the neck. Heart sound 1 and 2 are regular, with no gallop or murmur. Breath sounds vesicular on both lungs with the additional sound of bilateral rhonchi. On abdominal examinations, there is no distension, no mass, and no muscular defense. There is acute pain in the epigastrium. Palpating of extremities was warm, and no edema was found. The patient used a dower catheter G16 with urine productions about 2900cc/24 hours (1.86 cc/hours).

The patient was diagnosed with Acute Decompensated Heart Failure (ADHF) profile B with emergency hypertension and suspected of aorta dissections based on history and physical examinations. The patient was treated in the emergency room and given Nitroglycerin with initial doses of 40 mcg/minutes and titrated appropriately with the patient's hemodynamics. The patient is also given oxygen 10 L with a non-rebreathing mask (NRM). The patient was positioned semi-fowler, observing the vital sign, ECG monitoring, laboratory examinations, and cito thorax imaging.

The result of complete blood count found leucocyte  $12.09 \times 10^3/\mu\text{L}$ , Neutrophil#  $9,69 \times 10^3/\mu\text{L}$ , Hemoglobin 10,34 gr/dL,

Hematocrit 35.00%, MCV 77,49 fl. MCH 22.89 pg, MCHC 29,54 g/dL, RDW 17,02%, Platelet  $441,30 \times 10^3/\mu\text{L}$ , NLR 6,33. Hemostasis physiology examinations was found longer PPT and INR with 19,7 seconds and 1,44 seconds. Blood chemistry examinations was found SGOT 1176,3 U/L, SGPT 828,00 U/L, BUN 23,90 mg/dL, Creatinine 1,51 mg/dL, e-GFR 57,35 and Uric Acid 7,8. Blood Gas Analysis was found pH 7,45, pCO<sub>2</sub> 47,1 mmHg, pO<sub>2</sub> 132,60 mmHg, BEecf 7,7 mmol/L, HCO<sub>3</sub> 31,70 mmol/L, potassium 2,64. Hepatitis examinations was found non-reactive both of HBsAg and anti-HCV. SARS CoV-2 Antibody examinations was found non-reactive both of IgM and IgG.

On thorax photos (Figure 1), bone and soft tissues are within normal limits. The right and left sinus pleura are covered with infiltrating. There is cardiomegaly with CTR 68% and consolidation on bilateral lungs on above until below zone. Photo impressions are cardiomegaly, bilateral pleural effusion with suspected of pneumonia. The patient has done echocardiography and was found dilatation of aortic root with proximal ascending 2,83 cm/m<sup>2</sup>, aortic sinus 2,6, aortic sts 2,65, aortic annulus 1,33. The patient is suspected of an intimal flap on aortic ascending until aortic arcus and moderate-severe aortic regurgitation are obtained.

Based on supporting examinations, the patient was diagnosed with Observation of chest pain et causa suspected Stanford type A aorta dissection, ADHF profile B et causa Hypertension Heart Disease with emergency hypertension, observation of transaminitis et causa suspected Hepatopathy congestive. The patient was consulted to the internist and diagnosed with Acute Kidney Injury stage 1 dd Acute on Chronic Kidney Disease et causa suspected prerenal on Chronic Kidney Disease et causa Nephrosclerosis with Community-Acquired Pneumonia with Pneumonia severity index Class IV. The patient was treated with Ivabradine 5 mg b.i.d, KSR 600 mg t.d.s, acetylcysteine 200 mg t.d.s and Irbesartan 300 mg once daily. Drip NTG up titrated to 200 mcg/minute and given Nicardipine 1 mcg/kg body weight/minute and Furosemide 5 mg/hour. Complain of shortness of breath

felt decreased, high hemodynamics with blood pressure 139/70 mmHg, pulse 79 bpm and ECG sinus rhythm.

On October 15<sup>th</sup>, 2020, shortness of breath decreased; however patient complained of fatigue and cough with phlegm. Blood pressure 105/59 mmHg, pulse 70 bpm with low potassium 2,22 mmol/L. The utilization of furosemide might cause hypokalemia, and later suggest combining furosemide and spironolactone to prevent hypokalemia and monitor potassium level. The patient has given kidney diets 1600 kcal with 40gr protein. Drip nicardipine down titrated to 0,75 mcg/minute, and also NTG was down titrated to 140 mcg/minute. Ivabradine, acetylcysteine and furosemide continued with additional amlodipine 10 mg once daily, spironolactone 100 mg once daily, ceftriaxone 2gr once daily, and levofloxacin 750mg once daily. On October 17<sup>th</sup>, 2020 patient complain of cough with phlegm. Patient breath spontaneously with O<sub>2</sub> nasal cannula 4L/minute, blood pressure 114/60 mmHg, pulse 70 bpm, ECG sinus rhythm.

On October 19<sup>th</sup>, 2020, the patient underwent a thoracoabdominal CT angiography examination (Figure 2) and obtained dilation of the aortic arch to the ascending aorta with a Stanford type A aortic dissection diagnosis. Administration of heart failure drug regimens was continued with the target of increasing cardiac output. Ceftriaxone and levofloxacin were given for seven days and a chest X-ray was performed again; cardiomegaly still present and pulmonary abnormalities were not seen. Patients were treated as having heart failure until November 15<sup>th</sup>, 2020, with no complaints when going home; awareness is compost



Figure 1. Thorax photo AP



**Figure 2.** Thoracoabdominal CTA

mentis, blood pressure 98/58 mmHg, pulse 50 bpm and pain scale 0/10. On November 16<sup>th</sup>, 2020, the patient was discharged after undergoing treatment at Sanglah General Hospital with a stable hemodynamic condition and was subsequently referred to RSPJN Harapan Kita Jakarta for aortic dissection repair intervention.

## DISCUSSION

Heart Failure (HF) is a health condition commonly found in society. This condition occurs when the heart muscle cannot function normally to pump blood. Symptoms of new or worsening

heart failure with rapid progress are called Acute Decompensation Heart Failure (ADHF). The clinical symptom can vary from decreased cardiac output to impaired ventricular function.<sup>7</sup> Acute Decompensated Heart Failure (ADHF) patients are predominantly older men with a mean age above 70 years with ischemic heart disease accompanying Congestive Heart Failure (CHF). The majority of patients (66-75%) had a history of previous heart failure, as well as comorbidities such as diabetes mellitus in 40% of patients and Chronic Obstructive Pulmonary Disease (COPD) in 20% of patients.<sup>4</sup> Based on Framingham's criteria

for establishing CHF; patients must have both the major and minor criteria, namely, there are at least two major criteria or one major criteria plus two minor criteria.<sup>3</sup>

Diagnosis of heart failure uses the Framingham criteria where there were two major criteria and one minor criteria in this patient. The major criteria for patients were rhonchi and cardiomegaly, while the minor criteria were pleural effusions. Furthermore, the classification of acute heart failure was carried out, and the patient entered into profile B, cause of evidence of congestion in the lungs (wet) and acral that was still warm (warm). Following the 2016 ESC algorithm regarding the management of heart failure patients, all heart failure patients with reduced ejection fraction were given a combination of ACEi and beta-blockers, which can be titrated to the maximum dose. If there are remaining symptoms, aldosterone antagonists can be added and can be titrated up to the maximum dose, and if it is still symptomatic with sinus heart rhythm and pulse  $\geq 75$  bpm, ivabradine can be added. Especially in patients with symptoms of congestion, diuretics can be given to reduce symptoms.<sup>8</sup> Treatment in CHF patients aims to improve symptoms and maximize heart pumping function. The benefit of ACE inhibitors is seen in patients with HF and patients with coronary heart disease. Long-term use of beta-blockers can reduce symptoms of HF and improve clinical status. It has been shown that ACE inhibitors and beta-blockers can reduce the risk of death and hospitalization of HF patients. The benefit of beta-blockers was also seen in patients with or without DM.<sup>9,10</sup>

Aortic dissection is a severe condition in which there is a distortion of the media layer triggered by intramural bleeding, causing the separation of the aortic wall layer accompanied by the formation of the false lumen and the true lumen. In many cases, a tear of the intima is the initial condition for dissection of the aorta, which then causes blood to enter the media layer. Dissection can occur anterogradely and retrogradely. It can be classified in line with the extent of dissection according to Stanford and the location of the tear according to DeBakey.<sup>11</sup> The most common clinical manifestation of aortic dissection

is stabbing in the chest, abdomen, or back. This pain can also spread to other parts of the body.<sup>11</sup>

Based on hospital reports, the incidence of aortic dissection is 3 in 100,000 people each year. Meanwhile, studies with prospective population analysis show that aortic dissection is estimated to occur in 6 out of 100,000 people each year. The prevalence of aortic dissection in hospital reports was less than in analytical studies due to retrospective reporting data, excluding pre-hospital admission mortality, and the increased effectiveness of vascular imaging. The reported incidence of aortic dissection is more common in men, and the risk increases with age. As claimed by the International Registry of Aortic Dissection, the average age of patients with aortic dissection is 63 years, of which 65% are men. The most common risk factor for patients is hypertension, which is 65-75%. Other risk factors are the history of aortic disease, family history of patients with aortic dissection, heart surgery, smoking, chest trauma, and intravenous drug users.<sup>12</sup>

The suspicion of aortic dissection in this patient was a new occurred stabbing pain under the left breast. Pain is sharp and appears suddenly, and it is a symptom that generally appears in aortic dissection patients. It is said that 93% of patients will experience complaints of pain (can be in the back, abdomen, or thorax), and 85% will appear suddenly. It is also reported that patients with Stanford type A aortic dissection will experience pain in the anterior (abdominal or thoracic), opposite Stanford type B aortic dissection, where the pain is felt in the back.<sup>13</sup> In addition, this suspicion is strengthened by the patient's cardiovascular condition, where the patient has a history of chronic hypertension as a risk factor for aortic dissection.

The results of the imaging studies in this patient reinforce the suspicion of aortic dissection. Cardiomegaly and pleural effusions were obtained from chest radiographs, common in patients with Stanford type B aortic dissection. However, chest radiographs are still nonspecific and cannot be used as diagnostic tools for patients with dissection. From echocardiography results, the dissection

condition was confirmed, in which the aortic root was dilated, with suspicion of an intima flap from the ascending aorta to the aortic arch. The definitive diagnosis of dissection was made after the patient had undergone a thoracoabdominal CTA and a Stanford type A aortic dissection was obtained.

Kidney and heart have a very close relationship, especially concerning hemodynamics. So that when kidney dysfunction occurs in heart failure patients, this is a consequence of damage to systolic and diastolic function, leading to decreased cardiac output, arterial filling, glomerular arteriolar constriction, and poor renal perfusion.<sup>14</sup> Based on the RIFLE criteria (Risk, Failure, Loss of kidney function, End-stage renal disease) is found that 20 to 40% of patients with ADHF will develop a degree of kidney failure. According to the ADHERE (Acute Decompensated Heart Failure Registry), as many as one-third of HF patients will experience Chronic Kidney Disease (CKD), and more than 20 percent have elevated serum creatinine levels. Renal dysfunction in ADHF patients generally develops in conjunction with other comorbidities such as hypertension, diabetes, dyslipidemia, metabolic syndrome or obesity. Based on the ESCAPE (Evaluation Study of Congestive Heart Failure and Pulmonary Artery Catheterization Effectiveness), a reduction in GFR (<60mL / min) was found in more than 30 percent of ADHF patients. In ADHF conditions, there is a decrease in cardiac output and blood pressure, which eventually leads to reduced renal blood flow, resulting in a compensatory mechanism in which the renal tubular filtration fraction increases and the GFR can be maintained. However, over time the compensatory mechanism is no longer able to maintain GFR, and in the end, the patient would fall into a condition of acute renal impairment.<sup>14</sup>

Heart failure can be divided into systolic or diastolic heart failure, in which any cause of right ventricular dysfunction will be related to liver congestion. The primary pathophysiology of liver dysfunction includes passive congestion from increased filling pressure, or low cardiac output and impaired perfusion.

Increased Central Venous Pressure (CVP) allows an increase in liver enzymes, both direct and indirect. In addition, inadequate tissue perfusion can also lead to liver necrosis with a marked increase in serum aminotransferase.<sup>15</sup> Liver injury in patients with heart failure is characterized by increased alkaline phosphatase, gamma glutamyltransferase, bilirubin and hypoalbuminemia. Several studies in patients with Acute Decompensated Heart Failure (ADHF) have associated an increase in total bilirubin.<sup>16</sup>

## CONCLUSION

Aortic dissection is a cardiovascular emergency that should receive important attention. Failure to diagnose a dissection can lead to complications and life-threatening circumstances. In this case, a 39-year-old male patient diagnosed with the observation of chest pain suspected Stanford type A aortic dissection, ADHF profile B, observation of transaminitis, Acute Kidney Injury stage 1, and Community-Acquired Pneumonia with Class IV Severity Index Pneumonia. Treatment in patients was carried out with control of blood pressure, pain, rate and cardiac contractility. This approach is taken to reduce the burden on the heart, increase cardiac output and improve the patient's general condition. After the general condition stabilized, the patient was referred for a further procedure such as aortic dissection repair.

## DISCLOSURE

### Conflict of Interest

The authors declared no inherent conflicts of interest.

### Funding

None.

### Author Contribution

AKU and KPY contributed to case report design and concept. All authors contributed to literature searching, data collecting, and preparing the manuscript. KPY supervised the manuscript.

### Ethics Statement

This case report has been approved by the Ethic Commission of Faculty of Medicine,

Universitas Udayana. The patient also has given consent to participate and permit to publish the data.

## REFERENCES

1. Benjamin EJ, Blaha MJ, Chiuve SE, Cushman M, Das SR, Deo R, et al. Heart disease and stroke statistics—2017 update: a report from the American Heart Association. *Circulation*. 2017;135(10):e146–603.
2. Santoso A, Mariyono HH. *Gagal Jantung*. Buku Ajar Penyakit Dalam. 2007;
3. Mahmood SS, Wang TJ. The epidemiology of congestive heart failure: the Framingham Heart Study perspective. *Glob Heart*. 2013;8(1):77.
4. Kurmani S, Squire I. Acute heart failure: definition, classification and epidemiology. *Curr Heart Fail Rep*. 2017;14(5):385–92.
5. Nienaber CA, Clough RE, Sakalihasan N, Suzuki T, Gibbs R, Mussa F, et al. Aortic dissection. *Nat Rev Dis Prim*. 2016;2(1):1–18.
6. Mabun JMH. Diseksi aorta: Kegawatdaruratan kardiovaskular. *Cermin Dunia Kedokt*. 2016;43(12):892–5.
7. Maughan B. Acute decompensated heart failure. *Pract Emerg Resusc Crit Care*. 2013;164.
8. UK NA-A, Atherton JJ, Bauersachs J, UK AJC, Carerj S, Ceconi C, et al. 2016 ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure. *Eur Heart J*. 2016;37:2129–200.
9. Lindenfeld J, Albert N, Boehmer J. HFSA 2010 Comprehensive Heart Failure Practice Guideline. *J Card Fail*. 2010;16(6):e1–2. Available from: <http://dx.doi.org/10.1016/j.cardfail.2010.04.004>
10. Carnethon MR, Biggs ML, Barzilay J, Kuller LH, Mozaffarian D, Mukamal K, et al. Diabetes and coronary heart disease as risk factors for mortality in older adults. *Am J Med*. 2010;123(6):556–e1.
11. European Society of Cardiology. 2014 ESC Guidelines on the diagnosis and treatment of aortic diseases. *Eur Heart J*. 2014;35(41):2873–926. Available from: <http://dx.doi.org/10.1093/eurheartj/ehu281>
12. Nienaber CA, Clough RE. Management of acute aortic dissection. *Lancet*. 2015;385(9970):800–11.
13. Mark F, Richard P. Aortic Dissection. In: Rutherford's Vascular Surgery. 9th ed. Philadelphia: Elsevier; 2018. p. 3546–77.
14. Ronco C, Bellasi A, Di Lullo L. Implication of Acute Kidney Injury in Heart Failure. *Heart Fail Clin*. 2019;15(4):463–76. Available from: <http://dx.doi.org/10.1016/j.hfc.2019.05.002>
15. Alvarez AM, Mukherjee D. Liver abnormalities in cardiac diseases and heart failure. *Int J Angiol*. 2011;20(3):135–42. Available from: <https://pubmed.ncbi.nlm.nih.gov/22942628>
16. Correale M, Tarantino N, Petrucci R, Tricarico L, Laonigro I, Di Biase M, et al. Liver disease and heart failure: Back and forth. *Eur J Intern Med*. 2018;48:25–34. Available from: <http://dx.doi.org/10.1016/j.ejim.2017.10.016>



This work is licensed under a Creative Commons Attribution