Pharmacogn J. 2022; 14(6) Suppl: 1033-1036
A Multifaceted Journal in the field of Natural Products and Pharmacognosy
www.phcogj.com

Research Article

Successful Intrapericardial Fibrinolysis on Acute Recurrent Purulent Pericarditis with Impending Cardiac Tamponade during Pandemic Situation: A Rare Case Report

Muhammad Dedy Pratama, Budi Baktijasa Dharmadjati*, Muhammad Rafdi Amadis, Ahmad Faisal Dwi Raharja, Muhammad Ramadhan, Dwika Rasyid Firmanda

Department of Cardiology and Vascular Medicine, Airlangga University, Surabaya, INDONESIA.

Correspondence

Budi Baktijasa Dharmadjati

Department of Cardiology and Vascular Medicine, Airlangga University, Surabaya, INDONESIA.

E-mail: budi.baktijasa@fk.unair.ac.id

History

- Submission Date: 01-10-2022;
- Review completed: 25-11-2022;
- Accepted Date: 12-12-2022.

DOI : 10.5530/pj.2022.14.206

Article Available online

http://www.phcogj.com/v14/i6

ABSTRACT

Introduction: Acute recurrent purulent pericarditis is an uncommon pericardium infection that can be life-threatening due to pus production, leading to cardiac tamponade. **Case presentation:** We report a 36-year-old man referring to our hospital with impending cardiac tamponade who needed urgent pericardiocentesis. The patient's complaints were worsening dyspnea and palpitations in the last two days. The patient had been hospitalized for the same complaint and had pericardiocentesis due to cardiac tamponade approximately three weeks earlier. Physical exam, ECG, and CXR suggest impending cardiac tamponade. Echocardiography indicated massive right and left pericardial effusion and right atrial collapse. The Covid-19 screening test was positive; however, RT-PCR revealed a negative result. The patient was diagnosed with recurrent acute purulent pericarditis with impending cardiac tamponade requiring urgent pericardiocentesis. After the procedure, 1.5 million units of intrapericardial fibrinolytic were administered to patients. His improved hemodynamic and clinical symptoms indicate a successful procedure. **Conclusion:** This case highlights the challenges of managing an acute recurrent purulent pericarditis patient due to *Staphylococcus A.* infection in the current pandemic era, including distinguishing it from other contagious diseases due to nonspecific dyspnea, limited therapeutic options, and the effectiveness of intrapericardial fibrinolytic in improving the overall patient conditions, and reducing the mortality rate.

Key words: Purulent pericarditis, *Staphylococcus aureus*, Intrapericardial fibrinolysis, Rare Case Report.

INTRODUCTION

Acute recurrent purulent pericarditis can be life-threatening due to pus production causing cardiac tamponade. There is currently no global prevalence estimate for purulent pericarditis (PP). A 20-year retrospective study found 1 case of PP per 18,000 participants.[1] Although acute purulent pericarditis is a rare disease, the mortality rate is very high if it causes cardiac tamponade. If it is treated, the death rate is reduced to 40%. Patients who survive are at risk of complications such as constrictive pericarditis and recurrent purulent pericarditis.[2] These complications can be prevented by performing an early pericardiotomy, a surgical procedure known to have a risk of morbidity. intrapericardial fibrinolysis, a less invasive procedure, is a promising alternative to pericardiotomy that can also reduce the mortality risk and complications of PP.[3] A 9-year randomized clinical trial showed intrapericardial fibrinolysis reduced pericardial thickness, bleeding incident, and risk of constrictive pericarditis (HR = 0.185, P <0.0001).[4] The efficacy of intrapericardial fibrinolysis as an effective procedure in managing pericarditis patients, although still controversial, encouraged the authors to present this case report.

CASE REPORT

A 36-year-old man was referred to our tertiary emergency hospital with impending cardiac tamponade. He complained of dyspnea, palpitations, and dry cough since the previous week, which had deteriorated in the last two days. About three weeks ago, the patient was admitted to our hospital to undergo pericardiocentesis for pericardial effusion. The referring hospital administered inotropic & vasopressor drugs to the patient due to unstable hemodynamics. When the patient arrived at our hospital, his symptoms were still present. On physical exam showed blood pressure (105/88 mmHg) was supported by 50 nano/kg/minute Norepinephrine, increasing heart rate (117 bpm), increased respiratory rate (26 bpm), and peripheral oxygen saturation at 96% using a nasal cannula. Examining the head and neck revealed elevated jugular venous pressure. During cardiac auscultation, the sound of pericardial friction rub is audible. The ECG revealed electrical alternans and low limb lead voltage (Figure 1A). An enlarged heart silhouette with the Water Bottle/Erlenmeyer sign, indicating pericardial effusion and cardiac tamponade, was seen on CXR. CRX also suspected a mediastinal mass and mild bilateral pleural effusion (Figure 1B). Echocardiograms show massive pericardial effusion on the right lateral (4.6 cm), left lateral (3.1 cm), posterior (4.5 cm), inferior (5.4 cm), apex (2.1 cm), basal (2.2 cm), and anterior (0.8 cm). And a sign of right atrial collapse (right atrial index of 44%, mitral respirophasic variation index: 23%, tricuspid respirophasic variation index: 12%) (Figure 1C),

As part of our hospital's infection control protocol, patients must take a rapid screening COVID-19 test,

Cite this article: Pratama MD, Dharmadjati BB, Amadis MR, Raharja AFD, Ramadhan M, Firmanda DR. Successful Intrapericardial Fibrinolysis on Acute Recurrent Purulent Pericarditis with Impending Cardiac Tamponade during Pandemic Situation: A Rare Case Report. Pharmacogn J. 2022;14(6)Suppl: 1033-1036.

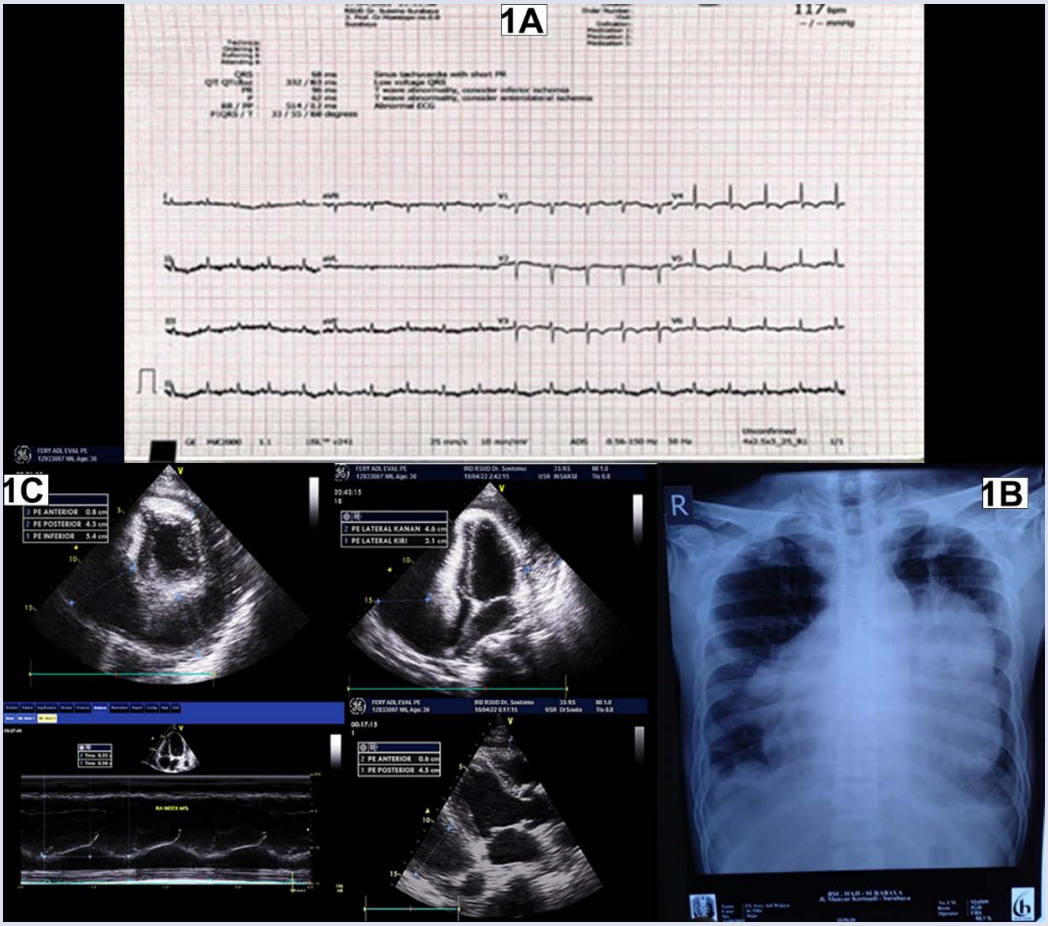

Figure 1: (A) ECG reveals electrical alternans and low voltage, (B) CRX reveals the Erlenmeyer sign, and a mass in the mediastinum is suspected based on this finding, (C) The echocardiogram reveals a significant pericardial effusion.

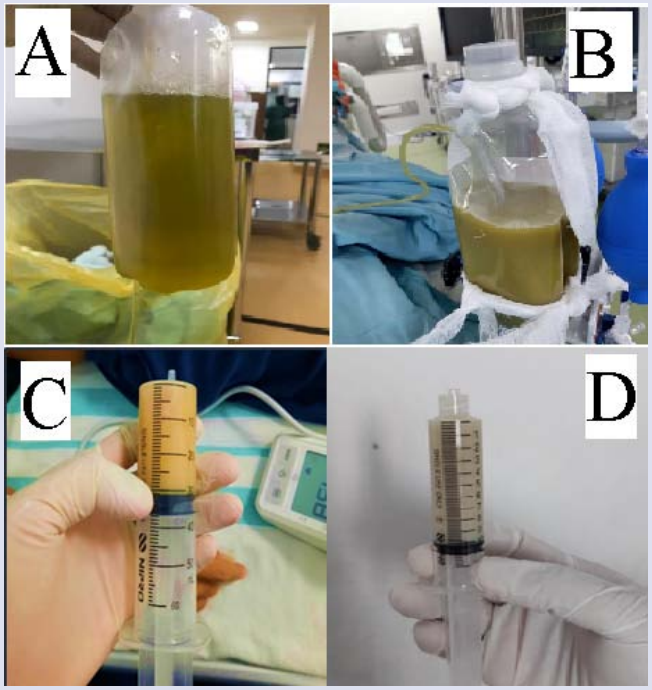

Figure 2: (A) purulent discharge resulting from the first pericardiocentesis, and (B) second pericardiocentesis. (C) Fluid characteristics from the second pericardiocentesis follow pericardial tapping every six hours on day five and (D) day nine after the intra-pericardial fibrinolytic.

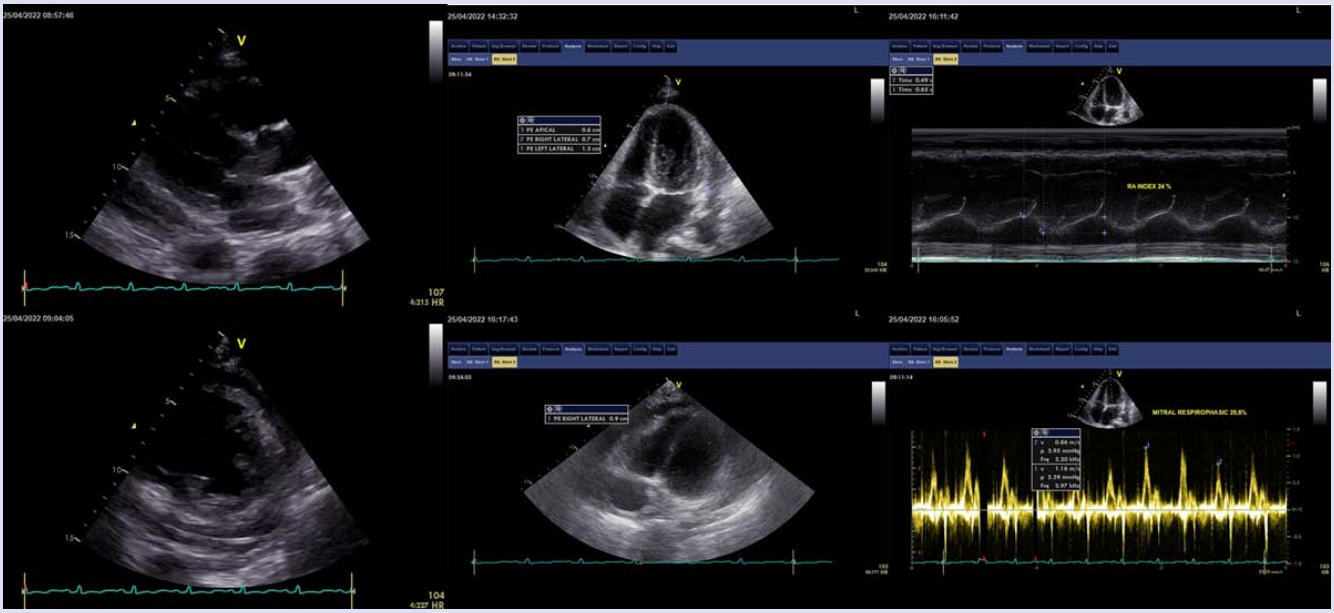

Figure 3: Echocardiographical findings of the patient after the intra-pericardial fibrinolytic.

and the result was positive. Due to these results, the patient will be treated with a conservative approach until RT-PCR results are obtained. Our initial diagnosis was acute recurrent purulent pericarditis, impending cardiac tamponade, and suspected COVID-19 infection. An urgent pericardiocentesis followed by optimal medical therapy was planned as a conservative approach. The pericardiocentesis collected 1,000 ml of purulent fluid with a lot of fibrin formation (Figure 2B). The fluid is cultured and analyzed with GeneExpert. The current pericardiocentesis, the second pericardiocentesis, produce cloudier and contains more fibrin than the previous pericardiocentesis (first pericardiocentesis, three weeks ago) (Figure 2A).

We prescribe colchicine 0.5 mg orally three times daily, ibuprofen 600 mg orally four times daily, and codeine 10 mg orally three times daily. Until the pus culture result is already, the patient gets an empiric antibiotic, 1 gram of Ceftriaxone IV, twice a day. On the fifth day of treatment, the patient's health has not improved, and the production of a lot of purulent fluid (Figure 2C), despite receiving optimal medication as part of a conservative approach. Intrapericardial fibrinolytic therapy is planned to prevent further worsening of the condition. Intrapericardial fibrinolytic with 1.5 million units of Streptokinase divided into three doses every 12 hours**.** The administration method is as follows 500,000 Streptokinase units diluted in 20-50 mL of normal saline, and the drug is inserted through the catheter into the pericardial cavity through the pigtail slowly within 10 minutes, followed by administration of 10 mL of saline. The catheter is clamped for 2-4 hours before being reopened to allow draining until the next drug administration. The drug was administered thrice in 24 hours (10 AM, 10 PM, 10 AM).

Following the procedure, the patient's condition appeared to have improved. As the patient's condition improved, vasopressor and inotropic doses were reduced and subsequently stopped. The pus culture showed Staphylococcus aureus, and GeneExpert results showed no growth of Mycobacterium tuberculosis. The test confirmed the patient's resistance to ampicillin-sulbactam and ticarcillin. Based on these results, the prior antibiotic was discontinued and replaced with intravenous gentamicin 180 mg daily for 14 days. On the fourteenth day, the pericardial fluid was nearly clear (Figure 2D) and had minimal production (25-50 ml per 24 hours), and the echocardiography showed minimal or no effusion (Figure 3); therefore, the pigtail was removed. Then, the patient will be discharged for routine polyclinic care. Three days follow-up after discharge, the patient had no complaints, was able to carry out daily activities as before, and showed no sequelae.

DISCUSSION

PP is a localized infection of the pericardial cavity characterized by profuse pus in the pericardium or microscopic purulence (> 20 leukocytes per oil immersion field). The incidence and etiology of purulent pericarditis have changed significantly in the era of antibiotics.[5] The exciting part of this case report is that *Staphylococcus aureus* is the etiology behind recurrent acute purulent pericarditis with complications of cardiac tamponade in the modern/post-antibiotic era.[6] The 2015 ESC Guidelines have classified several types of minimally invasive measures in purulent pericarditis. Intrapericardial fibrinolytic procedures, a pericardiectomy by attaching the pericardial layer, have a recommendation class of 2A with a level of evidence of C. Nevertheless, the cornerstone of PP treatment is the complete eradication of the foci of infection.[3,7]

The intrapericardial fibrinolysis procedure has been proposed as a minimally invasive method aimed at targeting the destruction of fibrin, optimizing the evacuation of thick effusion fluid; where according to several experimental studies, fibrin formation in the first week is the key to the progression of PP to constrictive pericarditis and also cardiac tamponade.[3] Thus, intrapericardial fibrinolysis has the primary goal of preventing constrictive pericarditis, recurrent pericarditis, and cardiac tamponade in purulent pericarditis patients [8,9]

Many authors have tried to demonstrate the benefits of intrapericardial fibrinolysis over surgical procedures such as pericardiectomy or simple pericardiocentesis.[3] The efficacy of this measure was demonstrated in a randomized controlled trial (RCT) and meta-analysis.[3,10] Two experimental studies indicate that fibrin influx increases during the first week of the disease and that fibrosis may appear after two weeks. These studies suggest that earlier administration can lead to optimal results.[3] However, data regarding the optimal timing are based only on animal models and a few cases reports, limiting the ability to draw definitive statements.[3,10]

The patient was administered with Streptokinase injection of 1.5 million units divided into three doses of intrapericardial administration every 8 hours. Before the procedure, there were no relative or absolute

contraindications to fibrinolytic. After the procedure, there were no complications such as anaphylactic shock reactions, signs of bleeding, acute heart attacks, malignant arrhythmias, or cardiac decompensation. The post-fibrinolytic clinical examination and echocardiography of the patient significantly improved. From the clinical point of view, the patient's complaints of dyspnea and palpitations significantly decreased, vital signs returned to normal from signs of shock, and the chest X-rays indicated an improvement. The echocardiogram examination before his discharge also indicated improvement with minimal pericardial effusion in the anterior (0.6 cm); inferior (0.7cm); basal (0.5cm), left lateral (0.7cm), apical (0.5cm), and right lateral (0.6cm). No signs of RA collapse were found (RA index 29.11%). No RV collapse was found (Mitral respirophasic variation: 17.34; tricuspid respirophasic variation: 20.31%. RA Area: 10.6 cm2; RVDB/LVDB: 0.880) (Figure 3).

CONCLUSION

Despite the controversy, intrapericardial fibrinolysis treatment resulted in a satisfactory improvement, with no evidence of additional bleeding or arrhythmias in any of the patients observed in this case report. This case report is intended to aid in developing guidelines for the comprehensive and minimally invasive management of patients with purulent pericarditis in Indonesia.

ACKNOWLEDGMENT

The author would like to thank the Center for Integrated Cardiac Services at the Dr. Soetomo Hospital in Surabaya, Indonesia, and the patients who consented to be published.

DISCLAIMER

None to declare.

CONFLICTS OF INTEREST

None to declare.

FUNDING DISCLOSURE

None to declare.

REFERENCES

1. Sagristà-Sauleda J, Barrabés JA, Permanyer-Miralda G, Soler-Soler J. Purulent pericarditis: review of a 20-year experience in a general hospital. J Am Coll Cardiol. 1993;22(6):1661-5.
2. Maisch B, Members TF, Seferović PM, Members TF, Ristić AD, Members TF, *et al.* Guidelines on the Diagnosis and Management of Pericardial Diseases Executive SummaryThe Task Force on the Diagnosis and Management of Pericardial Diseases of the European Society of Cardiology. Eur Heart J. 2004;25(7):587-610.
3. Augustin P, Desmard M, Mordant P, Lasocki S, Maury JM, Heming N, *et al.* Clinical review: Intrapericardial fibrinolysis in management of purulent pericarditis. Crit Care. 2011;15(2):1-8.
4. Cui H, Chen X yi, Cui C cong, Shou X ling, Liu X hong, Yao X, *et al.* Prevention of pericardial constriction by transcatheter intrapericardial fibrinolysis with urokinase. undefined. Chin Med Sci J. 2005;20(1):5-10.
5. Adler Y, Charron P, Imazio M, Badano L, Barón-Esquivias G, Bogaert J, *et al.* 2015 ESC Guidelines for the diagnosis and management of pericardial diseases. Eur Heart J. 2015;36(42):2921-64.
6. Klacsmann PG, Bulkley BH, Hutchins GM. The changed spectrum of purulent pericarditis. Am J Med. 1977;63(5):666-73.
7. Maisch B, Ristić AD, Seferović PM, Tsang TSM. Interventional Pericardiology. Berlin, Heidelberg: Springer Berlin Heidelberg; 2011.
8. Tomkowski WZ, Gralec R, Kuca P, Burakowski J, Orłowski T, Kurzyna M. Effectiveness of Intrapericardial Administration of Streptokinase in Purulent Pericarditis. Herz. 2004;29(8):802-5.
9. Abdelnabi M, Almaghraby A, Saleh Y, el Sayed A, Rizk J. Acute purulent pericarditis treated conservatively with intrapericardial fibrinolysis and intrapericardial and systemic antibiotics. Baylor Uni Med Center Proceed. 2021;34(4):498-9.
10. Cameron RJ, Davies HRHR. Intra-pleural fibrinolytic therapy versus conservative management in the treatment of adult parapneumonic effusions and empyema. Cochrane Database Syst Rev. 2008;(2):CD002312.

Cite this article: Pratama MD, Dharmadjati BB, Amadis MR, Raharja AFD, Ramadhan M, Firmanda DR. Successful Intrapericardial Fibrinolysis on Acute Recurrent Purulent Pericarditis with Impending Cardiac Tamponade during Pandemic Situation: A Rare Case Report. Pharmacogn J. 2022;14(6)Suppl: 1033-1036.