Jurnal Ners Volume 9 Nomor 4 Tahun 2025 Halaman 6476 - 6481
JURNAL NERS
Research & Learning in Nursing Science
http://journal.universitaspahlawan.ac.id/index.php/ners

TIME IS LIFE: A CASE REPORT ON EARLY CARDIOPULMONARY RESUSCITATION IN A WITNESSED CARDIAC ARREST

Hersinta Retno Martani[1,2], Rizki Puji Agustin[3], Abu Bakar[4]

[1]Medical-Surgical Nursing Specialist Student, Faculty of Nursing, Airlangga University
[2]Basic and Emergency Nursing Department, Faculty of Medicine, Public Health and Nursing, Universitas Gadjah Mada
[3]Academic Hospital, Universitas Gadjah Mada
[4]Advance Nursing Department, Faculty of Nursing, Airlangga University

Abstract

Cardiac arrest can occur unexpectedly in a hospital setting, even in individuals who were not patients. A cardiac arrest happened at the hospital, subsequently addressed with rapid and effective intervention due to sufficient resources. Main symptoms a patient caregiver in the ward experienced cardiac arrest, prompting the nurse to promptly activate the code blue system. He had previously reported back pain to his wife, who was a patient in the ward at the time. Therapeutic intervention the Code Blue team from emergency department (ED) and intensive care unit (ICU) immediately arrived to administer high-quality cardiac pulmonary resuscitation. Timely intervention and defibrillation were critical in preserving the patient's life. The electrocardiogram obtained post-return of spontaneous circulation (ROSC) exhibited ST-segmen depression accross multiple leads. The patient was promptly transported to the ED for stabilization and scheduled for primary percutaneous coronary intervention. Conclusion prompt and effective cardiopulmonary resuscitation enhance patient survival rates. Subsequently, thorough and effective treatment is essential to minimize the risk of patient morbidity.

Keywords**:** *Cardiopulmonary Resuscitation, Cardiac Arrest, Return Of Spontaneous Circulation*

* Corresponding author :
Address : Jalan Farmako, Sekip Utara, Mlati, Sleman
Email : hersinta.retno.martani-2024@fkp.unair.ac.id

INTRODUCTION

Sudden cardiac arest (SCA) represents a primary contributor to cardiovascular mortality and constitutes a considerable public health challenge (Krokhaleva & Vaseghi, 2019). The incidence of SCA varies according to age and underlying health conditions. In younger people, primary arrhytmia syndromes and inherited cardiomyopathies are the predominant causes, whereas coronary artery disease is the most common cause in individuals older than 35 years (Myerburg, 2017).

The incidence of SCA is influenced by location and circumstances, with notable difference between out-of-hospital (OHCA) and in-hospital (IHCA) occurences (Lomivorotov et al., 2021). Studies indicate that the survival rate for IHCA is higher than that OHCA (Strömsöe & Herlitz, 2024). The higher survival rate is due to the prompt availability of medical personnel and equipment.

Witnessed cardiac arrest demonstrated an higher survival rate due to the immediacy of resuscitation efforts (Fan et al., 2025). Cardiac arrest management is optimal in a hospital setting, where it can be witnessed by healthcare provider and handled in monitored environment, thereby enhancing clinical outcomes (Kaplow & Mota, 2022).

Myocardial infarction can lead to cardiac arrest; however, ECG recordings following ROSC can additionally show signs of myocardial infarction. The early post-ROSC phase may exhibit ischemic signs not exclusively attributable to coronary cause, and hypoperfusion following ROSC can compromise ECG reliability (Compagnoni et al., 2021). The rate of false-positive ECGs for ST-Elevation Myocardial Infarction (STEMI) following ROSC is considerable. Research indicates that early ECG acquisition following ROSC correlates with an increased rate of false-positive results for STEMI (Baldi et al., 2021). This case report aims to demonstrate the management of cardiac arrest in ha hospital visitor who was not proviously patient until ROSC.

METHODS

This case report complies with the CARE Case Report guideline. The patient signed written informed consent for this case report.

PATIENT INFORMATION

A 49-year-old male patient caregiver in the inpatient ward experienced a sudden collapse and loss of consciousness. His spouse reported that he had previously expressed concerns regarding back pain. Subsequently, he leaned against the bed rail and fell backward. Health workers in the ward administer cardiopulmonary resuscitation (CPR) and activated code blue protocol.

CLINICAL FINDING

The code blue team from the ED and ICU responded within four minutes. Simultaneous assessment of pulse and respiration indicated that the patient remained in cardiac arrest; therefore, resuscitation efforts were sustained. Resuscitation was performed on a flat surface, specifically the floor, due to the patient losing consciousness following a fall.

The code blue team performed high-quality CPR following the 2020 guidelines established by the American Heart Association, recognized as the standard protocol for implementation in hospital. Initially, intravenous access was not established during resuscitation; therefore, epinephrine 1 mg was aministered intramuscularly at the beginning. During the resuscitation, the code blue team placed a 7.5 endotracheal tube (ETT) to a depth of 20 cm, while the nurse worked to establish intravenous access. Following the establishment of intravenous access, medication is administered via this route. The patient received two doses of 1 mg epinephirne, administered one intramuscularly and the other intravenously.

A bedside monitor and defibrillator were installed upon the availability of the equipment. Chest compression were briefly stop during the assessment of the heart rhytm. The heart rhytm reading indicated that the patient was in ventricular fibrillation, prompting the team to prepare for defibrillation using 200 joules of energy. The nurse applied gel to the defibrillator pad to minimize the risk of skin burns for the patient. Defibrillation was performed by confirming that all team members were in a secure position and were not in contact with the patient. Following defibrillation, resuscitation was maintained for 2 minutes, after which a pulse and heart rhytm assessment was conducted. Cardiopulmonary resuscitation was administered for a duration of 10 minutes until the ROSC. The findings from assessments indicated that the patient had recovered; consequently, the team immediately initiated the post-ROSC treatment.

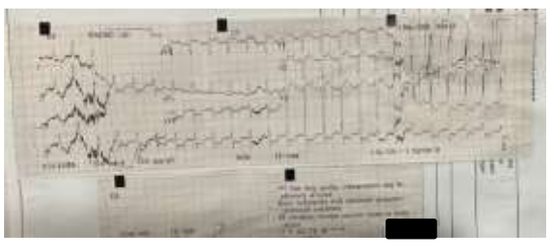
Post-ROSC management prioritize maintaining a patent airway, as significant vomiting has increased intra-abdominal pressure, leading to the expulsion of the ETT. The patient head was positioned at an angle and suctioning performed to prevent the risk of aspiration of vomit. An attempt to insert a nasogastric tube to prevent aspiration was made; however, the attempt at the site of cardiac arrest was unsuccessful. The patient received oxygen therapy via a nasal cannula at a flow rate of 3 liters per minute and transported to the ED covered with a warm blanket. The vital signs post-ROSC were as

follows: heart rate was 112 beats per minute, blood pressure was 129/71 mmHg, respiratory rate was 25 breaths per minute, oxygen saturation was 96%.

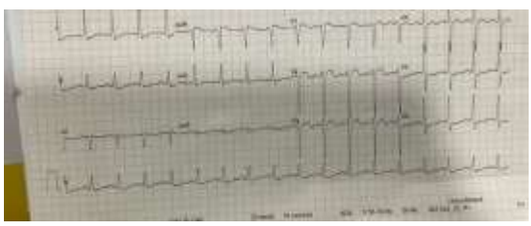
DIAGNOSTIC ASSESSMENT

Following the ROSC, blood samples were collected for analysis, including blood gas evaluation (BGA). The abnormal result of the patient's blood test were as follows: glucose level was 239mg/dl (60-199 mg/dl), kalium was 3 mmol/L (3.5-5.1 mmol/L), blood gas analysis; pH was 7.24, pCO_2 was 33.3 mmHg, pO_2 was 280 mmHg, $cHCO_3$ was 15mmol/L, BE was -11.4, $AaDO_2$ was 251 mmHg. The BGA interpretation results suggest that the patient was experiencing partially compensated metabolic acidosis.

Electrocardiogram were obtained immediately following the patient's ROSC and upon arrival at the ED. Both ECG recordings indicated ischemia in the patient's myocardial tissue.



Picture 1. Post-ROSC ECG



Picture 2. ECG in ED (10 minutes post-ROSC)

The patient underwent a CT-Scan of the head, revealing no abnormalities. The CT-Scan results indicated the absence of infarction, intracranial hemorrhage, or space-occupying lesions (SOL).

The results of physical and diagnostic examinations led to a diagnosis of Non-STEMI (NSTEMI) Killip III for the patients, characterized by AVR elevation and depression in six leads in ECG, indicating very high risk. Following a consultation with a cardiologist, the patient was scheduled for primary percutaneous coronary intervention (PPCI).

THERAPEUTIC INTERVENTION

Following the explanation of the procedure and the acquisition of informed consent from the family, nurse prepared the patient for PPCI. The nurse explains the procedure and its intended purposes to the patient. The patient expressed his willingness and readiness to undergo multiple procedures required for PPCI preparation.

The nurse ensured the proper functioning of both intravenous accesses, which included 18 and 20 iv catheters attached to the patient. The nurse inserted nasogastric tube to prevent aspiration, anticipating potential vomiting by the patient. A size 16 fr foley catheter was inserted for the purpose of monitoring urine output.

Pharmacological preparations consists of oral loading doses of clopidogrel at 300mg, aspirin at 80 mg, and atorvastatin at 40 mg. Furosemide 10 mg is administered via intravenous route. In the absence of bleeding on the head CT-Scan, heparinization could be initiated with a bolus dose of 60 IU/kg body weight, succeeded by a continuous infusion of 12 IU/kg body weight per hour. The patient, weighing 60kgs, requires a heparin dose of 3600 IU as an IV bolus, followed by a continuous IV infusion of 720 IU per hour.

Despite the patient's regained consciousness, health provider must ensure airway patency due to the recent ROSC. Airway maintenance was achieved via intubation and mechanical ventilation. The patient's ventilator on Pressure Support Intermittent Mandatory Ventilation (PSIMV) mode. Ventilator parameters included Pressure Control (PC) 17, Pressure Support (PS) 12 cmH_2O, Positive End Expiratory Pressure (PEEP) 5 cmH_2O, Respiratory Rate 18 breaths per minute and Fraction of Inspired Oxygen (FiO_2) 100%.

The nurse coordinated with the catheterization laboratory to arrange PPCI for the patient. The nurse verifies the completion of all informed consent forms and ensures that the patient's family comprehends the procedure to be perfomed on the patient. Once the catheterization laboratory was prepared, the nurse transported the patient to the facility.

FOLLOW-UP AND OUTCOMES

The coronary angiography results indicated that the left main (LM) coronary artery was normal with detail the left anterior descending (LAD) and left circumflex (LCX) also normal. A 40% mid-stenosis was identified in the right coronary arteri (RCA). The coronary angiography examination concluded non-significant coronary artery disease (CAD). The results provided justification for the decision to cancel PPCI plan.

Following normal angiography results, the patient transported to the ICU. Patient undergo heparinization for a duration of up to 5 days. The patient demonstrated improvement and was extubated on the second day of ICU care. On the

third day of ICU treatment, the patient was scheduled to the high care unit (HCU).

After four days of treatment in the HCU, the patient demonstrated improvement condition and had been transferred to a regular inpatient ward. Echocardiography was performed on the patient during inpatient care. The echocardiography findings indicated left ventricular dilatation and reduced systolic function, evidenced by a left ventricular ejection fraction of 42%, along with concentric left ventricular hypertrophy. The finding suggest the presence of grade I left ventricular diastolic dysfunction. At the sime time, right ventricular systolic function remained within normal limits, and the valves were found to be intact. The patient was discharged following two days of treatment in the ward, resulting in a total hospital stay of 8 days.

DISCUSSION

The patient in this case report exhibited no symptoms suggestive of cardiac issue prior to the occurence of cardiac arrest. The family reported that the patient had no prior medical history and was not on any medication. This aligns with prior study indicating that many sudden cardiac arrest occur in individuals who appear healthy and lack known heart disease or other risk factors (Vijjaya et al., 2012). Sudden cardiac arrest is defined by the abrupt of cardiac function, frequently occuring without prior signs of heart issues (Gao et al., 2020).

Sudden cardiac arrest that occurs in a hospital has a higher survival rate than outside of a hospital. Increased survival rates may result from better chances for a shockable initial rhytm (ventricular fibrillation/tachycardia) (Kruger, 2015). Moreover, increased survival rates may result from the implementation of high-quality CPR and compliance with established resuscitation guidelines in hospital settings (Kaplow et al., 2020).

Patient exhibiting shockable rhytms demonstrated markedly improved survival rates relative to those with non-shocakble rhytm. Survival to hospital discharge is significantly greater in patients experiencing ventricular fibrillation (VF) or ventricular tachycardia (VT) than in those with pulseless electrical activity (PEA) or asystole (Holmstrom et al., 2023). This was similar with the patient in this case report, who experienced ventricular fibrillation and promptly received defibrillation, facilitating his survival and recovery.

This ECG findings post-ROSC in this patient indicated significant ischemia, evidenced by depression across six leads. This aligns with prior research indicating that myocardial ischemia frequently arises from global ischemia during cardiac arrest and subsequent reperfusion injury upon restoration of blood flow (Burstein & Jentzer, 2020). Delaying the ECG for minimum of 8 minutes following ROSC or conducting a repeat ECG may decrease the incidence of false positive to myocardial infarction (Naas et al., 2025). ST-segmen deviation on an ECG following ROSC neccessitates additional diagnostic evaluation, including coronary angiography, to verify obstructive coronary artery disease (McFadden et al., 2021). This resembles the procedue performed on the patient in this case report, in which coronary angiography was conducted post-ROSC to assess potential issues with the coronary arteries.

Impaired left ventricular function occurs in approximately two-thirds of patients who have been resuscitated following cardiac arrest (Jentzer et al., 2015). This myocardial dysfunction may present as reduced cardiac output or impairment in ventricular diastolic function, leading to heart failure. An ejection fraction of 42% categorizes the patient as experiencing moderate or borderline heart failure (Boulet et al., 2021).

In this case report, the ward nurse was the first to discover the patient in cardiac arrest and immediately administered CPR. The nurse promptly activated the code blue system to ensure the rapid arrival of the trained team to take over CPR efforts. The efficacy of code blue teams in administering CPR in markedly affected by their response time (Çelik & Kusderci, 2023). This case report indicates that the code blue team from ED and ICU responded within 4 minutes.

Effective CPR necessitates cohesive collaboration among resuscitation time. In addition to delivering CPR, nurses are essential in managing team-level logistics effectively to ensure the maintenance of high-quality CPR (Meaney et al., 2013). Nurse play a significant role in coordinating activities among code blue teams, ED, and cardiac catheterization laboratories. Nurses play a significant role in communicating with families regarding the patient's condition and planned interventions. In situation that required rapid treatment, nurses' communication skills were a critical component.

Patient care extends beyond the acute phase following ROSC and persists throughout the duration of hospitalization. Educating patients about their condition, anticipated outcomes, and care process aids in managing expectations and reducing anxiety (Kadda et al., 2012). Nurses can implement a spiritually-based care model when providing care to patients with coronary heart disease. This pertains to an enhancement in spiritual comfort for patients (Bakar et al., 2018).

CONCLUSION

The immediate administration of high-quality CPR to cardiac arrest patient has been shown to enhance survival rates. Effective coordination

among teams and associated units within the hospital were crucial for achieving optimal patient clinical outcomes. Nurses significantly contribute to this effort. Furthermore, serial ECGs were essential for identifying the etiology of cardiac arrest.

DAFTAR PUSTAKA

Bakar, A., Nursalam, Adriani, M., Kusnanto, Qomariah, S. N., & Efendi, F. (2018). The development of islamic caring model to improve psycho-spiritual comfort of coronary disease patients. *Indian Journal of Public Health Research and Development*, *9*(10), 312–317. https://doi.org/10.5958/0976-5506.2018.01362.1

Baldi, E., Schnaubelt, S., Caputo, M. L., Klersy, C., Clodi, C., Bruno, J., Compagnoni, S., Benvenuti, C., Domanovits, H., Burkart, R., Fracchia, R., Primi, R., Ruzicka, G., Holzer, M., Auricchio, A., & Savastano, S. (2021). Association of Timing of Electrocardiogram Acquisition after Return of Spontaneous Circulation with Coronary Angiography Findings in Patients with Out-of-Hospital Cardiac Arrest. *JAMA Network Open*, *4*(1), E2032875. https://doi.org/10.1001/jamanetworkopen.2020.32875

Boulet, J., Massie, E., & Rouleau, J. L. (2021). Heart Failure With Midrange Ejection Fraction—What Is It, If Anything? *Canadian Journal of Cardiology*, *37*(4), 585–594. https://doi.org/10.1016/j.cjca.2020.11.013

Burstein, B., & Jentzer, J. C. (2020). Comprehensive Cardiac Care After Cardiac Arrest. *Critical Care Clinics*, *36*(4), 771–786. https://doi.org/10.1016/j.ccc.2020.07.007

Çelik, H. K., & Kusderci, H. S. (2023). Comparison of code blue application and results in a training and research hospital before and during the COVID-19 pandemic. *Anaesthesia, Pain and Intensive Care*, *27*(1), 123–130. https://doi.org/10.35975/apic.v27i1.2121

Compagnoni, S., Gentile, F. R., Baldi, E., Contri, E., Palo, A., Primi, R., Currao, A., Bendotti, S., Ziliani, P., Ferrario Ormezzano, M., Oltrona Visconti, L., & Savastano, S. (2021). Peripheral perfusion index and diagnostic accuracy of the post-ROSC electrocardiogram in patients with medical out-of-hospital cardiac arrest. *Resuscitation*, *168*(August 2021), 19–26. https://doi.org/10.1016/j.resuscitation.2021.08.050

Fan, C. Y., Liang, Y. T., Huang, E. P. C., Chen, J. W., Chiang, W. C., Wang, C., & Sung, C. W. (2025). Which Matters More for Out-of-Hospital Cardiac Arrest Survival: Witnessed Arrest or Bystander Cardiopulmonary Resuscitation? *Journal of the American Heart Association* , *14*(4), 1–10. https://doi.org/10.1161/JAHA.124.038427

Gao, Z., Zhang, F., Yu, C., & Tang, Z. (2020). Improvement in Diagnosis of Sudden Cardiac Death. In *Sudden Death* (pp. 105–115). Springer Singapore. https://doi.org/https://doi.org/10.1007/978-981-15-7002-5_8

Holmstrom, L., Chugh, H., Uy-Evanado, A., Jui, J., Reinier, K., & Chugh, S. S. (2023). Temporal Trends in Incidence and Survival From Sudden Cardiac Arrest Manifesting With Shockable and Nonshockable Rhythms: A 16-Year Prospective Study in a Large US Community. *Annals of Emergency Medicine*, *82*(4), 463–471. https://doi.org/10.1016/j.annemergmed.2023.04.001

Jentzer, J. C., Chonde, M. D., & Dezfulian, C. (2015). Myocardial Dysfunction and Shock after Cardiac Arrest. *BioMed Research International*, *2015*. https://doi.org/10.1155/2015/314796

Kadda, O., Marvaki, C., & Panagiotakos, D. (2012). The role of nursing education after a cardiac event. *Health Science Journal*, *6*(4), 634–646.

Kaplow, R., Cosper, P., Snider, R., Boudreau, M., Kim, J. D., Riescher, E., & Higgins, M. (2020). Impact of CPR Quality and Adherence to Advanced Cardiac Life Support Guidelines on Patient Outcomes in In-Hospital Cardiac Arrest. *AACN Advanced Critical Care*, *31*(4), 401–409. https://doi.org/https://doi.org/10.4037/aacnacc2020297

Kaplow, R., & Mota, S. (2022). Nursing Roles and Responsibilities With Cardiopulmonary Arrest in Radiology/Procedural Areas. *Journal of Radiology Nursing*, *41*(4), 313–319. https://doi.org/10.1016/j.jradnu.2022.05.010

Krokhaleva, Y., & Vaseghi, M. (2019). Update on prevention and treatment of sudden cardiac arrest. *Trends in Cardiovascular Medicine*, *29*(7), 394–400. https://doi.org/10.1016/j.tcm.2018.11.002

Kruger, A. (2015). Cardiac arrest and post-cardiac arrest care. *Kardiologicka Revue*, *17*(3), 230–233.

Lomivorotov, V., Redaelli, M. B., & Boboshko, V. (2021). Pharmacological Management

of Cardiac Arrest. In *Reducing Mortality in Critically Ill Patients* (pp. 61–72). Springer. https://doi.org/https://doi.org/10.1007/978-3-030-71917-3_7

McFadden, P., Reynolds, J. C., Madder, R. D., & Brown, M. (2021). Diagnostic test accuracy of the initial electrocardiogram after resuscitation from cardiac arrest to indicate invasive coronary angiographic findings and attempted revascularization: A systematic review and meta-analysis. *Resuscitation*, *160*(July 2020), 20–36. https://doi.org/10.1016/j.resuscitation.2020.11.039

Meaney, P. A., Bobrow, B. J., Mancini, M. E., Christenson, J., De Caen, A. R., Bhanji, F., Abella, B. S., Kleinman, M. E., Edelson, D. P., Berg, R. A., Aufderheide, T. P., Menon, V., & Leary, M. (2013). Cardiopulmonary resuscitation quality: Improving cardiac resuscitation outcomes both inside and outside the hospital: A consensus statement from the American heart association. *Circulation*, *128*(4), 417–435. https://doi.org/10.1161/CIR.0b013e31829d8654

Myerburg, R. J. (2017). Sudden Cardiac Death: Interface Between Pathophysiology and Epidemiology. *Cardiac Electrophysiology Clinics*, *9*(4), 515–524. https://doi.org/10.1016/j.ccep.2017.07.003

Naas, C. J., Saleh, H. O., Engel, T. W., Gutterman, D. D., Szabo, A., Grawey, T., Weston, B. W., Monti, C. E., Baker, J. E., Labinski, J., Tang, L., Jasti, J., Bartos, J. A., Kalra, R., Yannopoulos, D., Riccardo Colella, M., & Aufderheide, T. P. (2025). Associations with resolution of ST-segment elevation myocardial infarction criteria on out-of-hospital 12-lead electrocardiograms following resuscitation from cardiac arrest. *Resuscitation*, *209*(January), 110567. https://doi.org/10.1016/j.resuscitation.2025.110567

Strömsöe, A., & Herlitz, J. (2024). Incidence and percentage of survival after cardiac arrest outside and inside hospital: A comparison between two regions in Sweden. *Resuscitation Plus*, *17*. https://doi.org/10.1016/j.resplu.2024.100594

Vijjaya, V., Rao, K. K., & Sahrudai, P. (2012). Identification of sudden cardiac arrest using the Pan-Tompkins algorithm. *Proceedings - 2012 14th International Conference on Modelling and Simulation, UKSim 2012*, 97–100. https://doi.org/10.1109/UKSim.2012.23