Case report:

Rescue-Thrombolysis in Cardiac Arrest: The 'Provider' of Last Resort.

Lim Khai Yen[1], Shahira Ismail[2], Shukri Saad[3], Mohd Hashairi Fauzi[4], Nik Hisamuddin Nik Ab Rahman[5]

Abstract:

Cardiac arrest is the leading cause of death globally, and heart disease is known to be a major risk factor for cardiac arrest. In practice, an arrest is presumed to be of cardiac origin unless it is known or likely due to non-cardiac causes. The prognosis of the patient following cardiac arrest is generally poor. Although thrombolytic therapy is well known to be the treatment for myocardial thrombosis, it is not routinely recommended in cardiac arrest due to its potential bleeding adverse effect. We described a case report of successful thrombolytic therapy in cardiac arrest patient

Keywords: cardiac arrest; thrombolytic therapy; emergency department

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Case

A 42-year-old lady visited to the Emergency Department (ED) complaint of left-sided chest pain with radiation to jaw, shortness of breath, nausea and vomiting. Her initial vital signs were normal. Physical examination was unremarkable. Her electrocardiogram (ECG) showed ST segment elevation at the inferior leads without right ventricle involvement (figure 1); and she was treated for inferior ST-elevation myocardial infarction. While preparing for thrombolytic therapy, patient developed ventricular fibrillation (VF). Cardiopulmonary resuscitation (CPR) was commenced and resuscitation was carried out according to Advanced Cardiac Life Support guidelines. Despite effective chest compression and active resuscitation for thirty minutes, there was no sign of return of spontaneous circulation (ROSC). Intravenous thrombolytic agent was then administered over an hour while CPR was ongoing. ROSC achieved at thirty minutes after thrombolytic therapy (figure 2). Subsequent ECGs showed gradual resolution of ST elevation myocardial infarction (STEMI) (figure3 & 4). The patient was admitted to Coronary Care Unit (CCU) for a week and was discharge well with good neurological function.

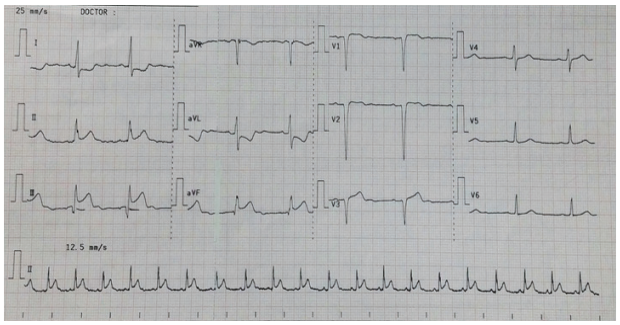

Figure 1. ST segment elevation at the inferior leads without right ventricle involvement.

1. Lim Khai Yen
2. Shahira Ismail
3. ShukriSaad
4. MohdHashairiFauzi, Email: hashairi@usm.my
5. Nik Hisamuddin Nik Ab Rahman MD,MMED
   Department of Emergency Medicine, School of Medical Science, Universiti Sains Malaysia Health Campus, 16150 KubangKerian, Kelantan, Malaysia

Correspondence to: Mohd Hashairi Fauzi, Department of Emergency Medicine**,** School of Medical Sciences, Universiti Sains Malaysia - Health Campus, 16150 Kota Bahru**,** KubangKerian, Kelantan, MY 16150**,** Email: hashairi@usm.my

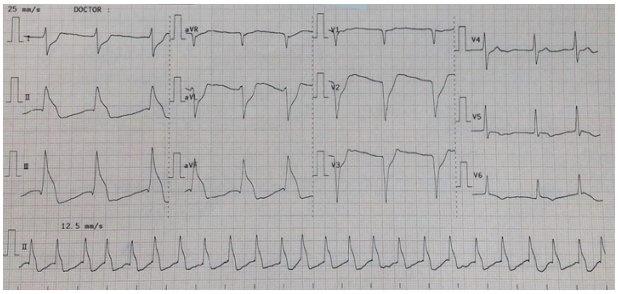

Figure 2. ECG upon ROSC at thirty minutes of rescue-thrombolytic therapy.

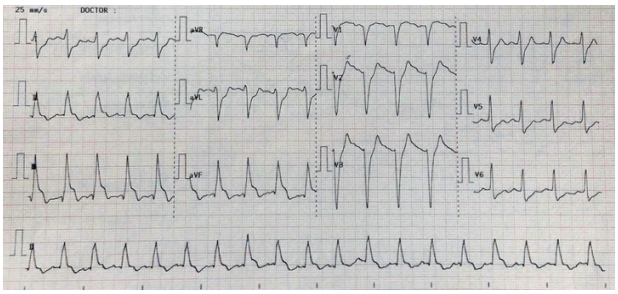

Figure 3. ECG at 30 minutes after completion of thrombolytic therapy.

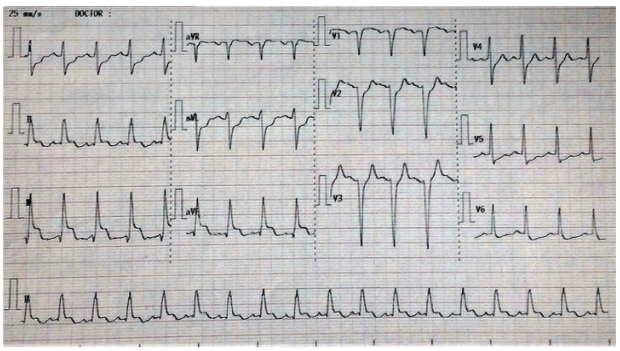

Figure 4. ECG at 90 minutes after completion of thrombolytic therapy.

Discussion

Thrombolytic therapy is used widely to treat cardiac and pulmonary thromboses. Due to potential bleeding, its usage in these conditions with cardiac arrest and CPR remains controversial. Previous data showed only 30.2% of cardiac arrest cases with cardiopulmonary resuscitation (CPR) performed achieved return of spontaneous circulation (ROSC) and only 9.5% had survival to ward admission[1].

Cardiac arrest and CPR is associated with activation of blood coagulation and fibrin formation. Without adequate concomitant activation of endogenous fibrinolysis leads to fibrin deposition and microthrombi formation, thus causing reperfusion disorders. Animal model experiment showed a relevant degree of cerebral 'no-reflow' phenomenon occurred during cardiac arrest and CPR, which may aggravate cerebral microcirculatory reperfusion disorder. Apart from lysis of thrombi, experimental and observational evidence suggests neuroprotective property in thrombolytic therapy when is used during cardiac arrest[2].

Cardiac arrest with thrombolytic therapy is associated with improved rate of the ROSC and increased primary survival. Guidelines listed prolonged CPR as contraindication for thrombolytic therapy; however clinical studies and case series statedthat thrombolysis during CPR were not frequently associated with serious bleeding complications and the benefit of thrombolysis might outweigh the risk of bleeding[3].

Subjects that were thrombolysed recover with good neurological function and long term good subjective quality of life. A clinical study, comparing thrombolytic therapy and primary percutaneous coronary intervention (PCI) after cardiac arrest, found that more patients in thrombolytic therapy group showed favorable neurological recovery and 6-months survival compared with the PCI group[4]. Hence it suggests thrombolysis as reperfusion strategy in cardiac arrest caused by myocardial infarction, especially in institutions where immediate PCI is not available.

On the contrary, there were studies which did not show significant benefit when thrombolytic therapy is being used during CPR in cardiac arrest. A few double blind, placebo controlled trial found no significant beneficial effect on ROSC, survival and neurological outcome in the thrombolytic therapy group compared to the placebo group. It even showed higher incidence of hemorrhagic complication (intracranial hemorrhage) occurred in thrombolytic therapy group than the placebo group[5]. These trials did not reproduce the promising result as described in several reports and studies, nor did it suggest thrombolytic therapy to be withheld in cardiac arrest of thrombosis causes.

Conclusion

Thrombolytic therapy during cardiac arrest and CPR can be administered only after taking into

consideration of patient's age, co-morbidity, cause of cardiopulmonary arrest, types of thrombolytic agent to be used and its cost effectiveness, until more concrete evidence and guidelines are available.

Ethical clearance:

Ethics approval was taken from School of Medical Science, Universiti Sains Malaysia Health Campus, 16150 KubangKerian, Kelantan, Malaysia.

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Conflict of interest: None declared

Individual Contribution of the Authors:

Conceptual work: Yen LK, Ismail S, Ab Rahman NHN

Data collection: Yen LK, Ismail S, Saad S, Fauzi MH, Ab Rahman NHN

Manuscript writing: Yen LK, Ismail S, Saad S, Fauzi MH, Ab Rahman NHN

Editing of final manuscript: Yen LK, Ismail S, Saad S, Fauzi MH, Ab Rahman NHN

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