Case Report

Management of Cardiac Arrest in a Patient with End Stage Renal Disease: a Case Report

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Abstract:

Cardiopulmonary resuscitation (CPR) performed due to cardiac arrest for return of blood circulation and oxygenation to the patient. We describe a case of successful CPR in a patient with several stages of pVT. She was a known case of end stage renal disease (ESRD) that was on hemodialysis. Advanced cardiac life support performed for her and after emergency hemodialysis. After that, she awoke with stable hemodynamics. Echocardiography revealed a moderate to severe MR and LVEF% of 40. The patient continued hemodialysis for 3 times a week and referred to cardiologist for further examination and angiography.

Keywords: Cardiac arrest, ESRD, Hemodialysis, Cardiopulmonary Resuscitation.

Introduction:

There are more than 135 million death resulting from cardiovascular disease each year and prevalence of coronary heart disease is increasing. In many cases prompt intervention can result in successful resuscitation. Cardiopulmonary resuscitation (CPR) performed due to cardiac arrest for return of blood circulation and oxygenation to the patient [1, 2]. The 2015 American Heart Association Guidelines recommended to begin the CPR sequence with chest compressions rather than breaths to minimize the time to initiation of chest compressions. It was noted that at least 100 compressions per minute with at least 2 inches in depth can promote high-quality CPR in adults [3]. In 2015 guideline updates, vasopressin was removed from the algorithm because it didn't offer an advantage over the use of epinephrine alone. This guideline noted that the initiation or continuation of lidocaine may be considered immediately after return of spontaneous circulation (ROSC) from ventricular fibrillation (VF)/pulseless ventricular tachycardia (pVT) cardiac arrest. Besides oral or intravenous (IV) ß-blocker may be associated with better outcomes after cardiac arrest due to VF/pVT [4]. Here, we describe a case of successful CPR in a patient with several stages of pVT. She was recovered and discharged with good status.

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Case Presentation:

A 51-year-old female referred to the emergency department with complain of nausea and lethargy. She was a known case of end stage renal disease (ESRD) that was on hemodialysis just two days before admission. Also, she had type 2 diabetes mellitus and was on treatment with losartan for her hypertension. The blood pressure was 140/85, plasma glucose was 124mg/Dl, and pulse rate and respiratory rate were normal. Venous blood gas analysis showed that the pH=7.23, PO2= 23, PCO2=49, and bicarbonate was 20.5. She was normothermic and didn't complain of abdominal pain but she had no appetite. There was not any significant problem on clinical examination except ocular tilt reaction (OTR 1+). Shortly afterwards, she got worse and had a cardiac arrest. Endotracheal intubation and external cardiac massage were performed. Calcium gluconate 10% and normal saline (100ml) were administered. ROSC occurred 2 minutes after cardiac massage. One hour later, the patient developed pulseless ventricular tachycardia. Amiodarone (150mg IV) was administered and she received two times of synchronized shock (100j). So the normal sinus rhythm was established. After that, the patient developed further pulseless ventricular tachycardia for three times. Amiodarone (1mg/min for 6 hours, and then 0.5mg for 18h), lidocaine (2mg/min for 24h), and magnesium sulfate (2g IV) were administered. Totally, she received 2 times of synchronized shock (100j), and 2 times of asynchronized shock (200j). During resuscitation, pantoprazole (80mg IV, and then 8mg/h) was administered because of gastrointestinal bleeding. Hemodialysis performed for 2.5 hours because of high serum potassium (9mEq/L) [figure 1].She awoke after dialysis with stable hemodynamics. Electrocardiography (ECG) revealed a left bundle branch block pattern (LBBB) [figure 1]. Medications continued with pantoprazole, trinitroglycerine (TNG) 5mg IV, midazolam (3mg IV), allopurinol (100mg po), carvedilol (6.25mg po), Lasix (40mg po), and hydrocortisone (100mg IV). Echocardiography performed for her and revealed a moderate to severe mitral regurgitation. Left ventricular ejection fraction was 40%. She recovered and extubated on the next day. Serum electrolytes were normal but urea and serum creatinine was 80mg/dL and 10.0 mg/dL, respectively. The troponin was also negative. The patient continued hemodialysis for 3 times a week and referred to cardiologist for further examination and angiography.

Discussion:

Arrhythmia is one of the leading causes of death in patients with ESRD. Sudden cardiac arrest may occur in these patients during or after hemodialysis treatment. Despite the improved techniques of CPR, patients with ESRD have poor survival rate after CPR and longer hospital course compared with general population [5, 6]. Patients may suffer from neurologic defects after CPR and need to permanent mechanical ventilation. In these patients, dose adjustment of medications and renal function should be considered [7].

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In the face of potentially reversible pVT, it is important to resolve the underlying causes. In the case of refractory VF/pVT, acute coronary ischemia or myocardial infarction should be considered as a potential etiology. Patients receiving diuretics or hemodialysis are at increased risk for developing hyperkalemia [4, 8]. Our patient had severe hyperkalemia after the last time dialysis which made her susceptible to developing tachyarrhythmia. Wide and bizarre QRS waves supported the diagnosis of hyperkalemia in this patient [figure 1]. Emergency hemodialysis performed for her and she became conscious immediately. Amiodarone described as class III anti-arrhythmic drug that can block the potassium channels. In adults with refractory pVT, administration of amiodarone should be considered as first line anti-arrhythmic drug. Amiodarone is more effective in the treatment of shock-resistant VT compared with lidocaine [9, 10]. We started a bolus injection of 150mg for her followed by 1mg/min for 6 hours, and then 0.5mg for 18h for refractory pVT.

Successful resuscitation is the time when the patient is discharged from hospital without neurologic complications. Controlling the hemodynamics by using cardioversion or drugs is critical to maintenance the cerebral oxygenation. After improving the hemodynamics and ROSC, monitoring of serum electrolytes, blood glucose, and temperature of the patient must be considered due to avoidance of recurrent arrhythmia or organ damage. In our case, after emergency hemodialysis and dispelling the hyperkalemia as underlying cause of arrhythmia, the patient got awake but echocardiography showed the cardiac problems. So she referred to cardiologist to determine whether the ischemic heart disease could cause the difficulties during resuscitation.

Consent :

Written informed consent was not available because of the replacement of residence but oral agreement from the patient was obtained.

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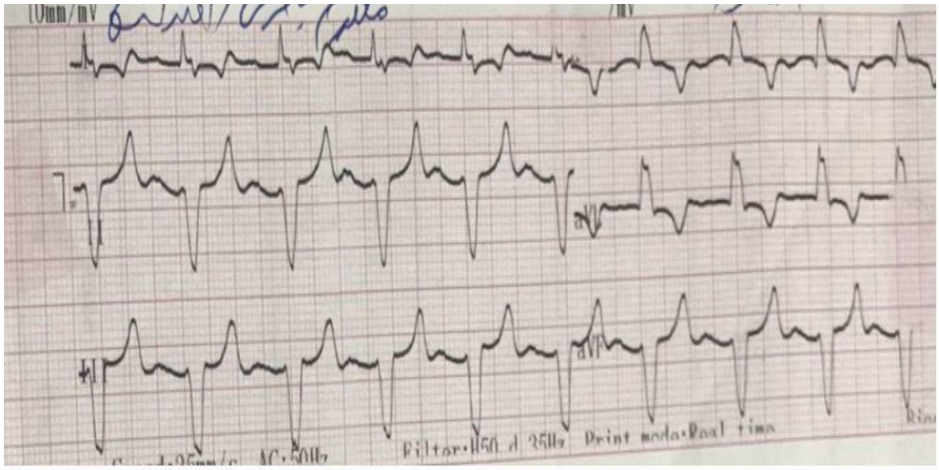
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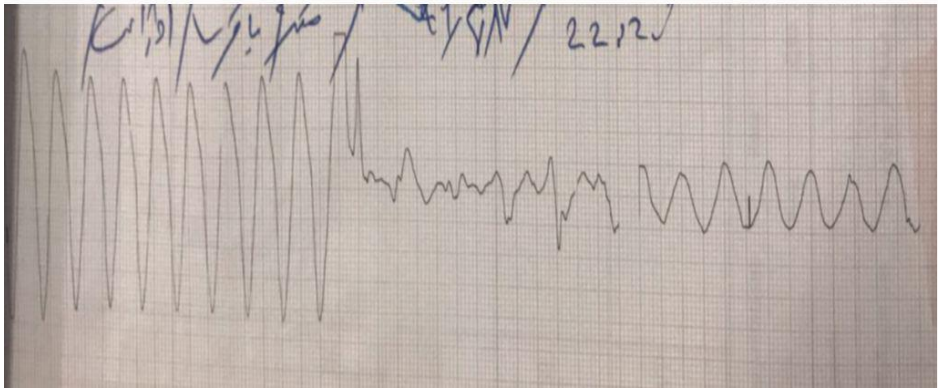
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Table and Charts:

Figure 1. : normal sinus rhythm with the rate of 84 beats/min. widened QRS waves and LBBB pattern are noted (top). Ventricular tachycardia rhythm (buttom)**.**

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