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Letter to Editor

A case of diabetes mellitus and rhino-orbital cerebral mucormycosis-cardiopulmonary resuscitation (CPR) in time saves a life

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Dear Editor,

Cardiopulmonary resuscitation (CPR) is the key link in the chain of survival following cardiac arrest. Keeping this in mind, early recognition of arrest, providing high quality CPR and prevention of disease can greatly improve patient outcomes and survival.

Since cardiac arrests can occur anywhere it is important to train healthcare providers as well as the general public in CPR. Medical protocols such as the basic life support (BLS)/ advanced cardiac life support (ACLS) are well-accepted guidelines proven to improve survival rates. The following case report reiterates and highlights the importance of CPR.

A 51-year-old male, diabetic, post-operative case of left orbital exenteration and sino-nasal debridement for rhino-orbital cerebral mucormycosis came for his routine eye dressing when he suddenly lost consciousness in the elevator. He was brought to the closest source of help, the ophthalmic operation theatre.

On assessment by a team of anesthetists present there, he was found to be unresponsive with a central pulse and tachypneic. Immediately oxygen via a simple face mask at 15 liters (L)/minute was initiated. A Glasgow coma scale of E2V2M4, pulse rate of 110 beats per minute (bpm), blood pressure of 134/86 mm Hg, and SpO2 of 100% was present with coarse crepitations in chest on auscultation. A random blood sugar revealed a value of 195 mg/dl and an intravenous (IV) line was secured and fluids started.

Additionally, the patient had an episode of a generalized tonic clonic (GTC) seizure lasting for approximately 30 seconds. A nasopharyngeal airway of size 7 mm internal diameter was inserted. Inj. Midazolam 2mg IV and 100% oxygen was given with a Bain's circuit. Meanwhile, the patient experienced another episode of a GTC seizure lasting for 2 minutes.

A decision to intubate the patient was made to secure a definitive airway. Inj. Propofol 50mg IV was given. Direct laryngoscopy and intubation with an endotracheal tube of 8.0 mmID was done. Simultaneously, a loading dose of Inj. Phenytoin 1000 mg IV was given. At around 30 minutes, the patient had a pulse rate of 92 bpm, a blood pressure of 140/96 mm Hg, an SpO2 of 100% on Bain's circuit and a sinus rhythm on the ECG. An arterial blood gas sample was taken and a 12 lead ECG call was sent. Inj. Calcium gluconate 10% was given as an infusion slowly in 100 ml of normal saline.

Fifty minutes following arrival, the patient's ECG tracing depicted pulseless electrical activity (PEA) with an absent carotid pulse. High quality chest compressions were started immediately according to the ACLS protocol at the rate of 100-120 compressions per minute. The first dose of Inj. Epinephrine 1 mg IV was given. Simultaneously, ventilation was ensured with the Bain's circuit at one breath every 5-6 seconds.

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Return of spontaneous circulation (ROSC) was achieved shortly after one and a half minutes of our resuscitative efforts with a normal sinus rhythm. The NIBP was recorded as 80/40 mm Hg. Infusion Noradrenaline at 6 mcg/min was initiated. The arterial blood gas analysis reported a pH of 6.96, pCO2 of 38, pO2 of 96.3 and a HCO3 of 14. Immediately, 100 mEq of sodium bicarbonate was given IV.

The patient was shifted to the hospital's medicine department for further management with a pulse rate of 120 bpm, blood pressure of 108/70 mm Hg, SpO2 of 100% on a Bain's circuit at 15L/min.

Supportive management in the form of antibiotics and Inj. Phenytoin 100 mg TDS for seizure prophylaxis was given. A non-contrast computed tomography (NCCT)-Head revealed a subacute infarct in the left occipital region.

Subsequently, the patient's level of consciousness improved, the noradrenaline infusion gradually tapered and weaning was initiated. The patient's trachea was extubated nearly 30 hours after cardiac arrest. The patient was hemodynamically stable with an oxygen saturation of 94% on room air and bilateral equal air entry on auscultation.

On discharge, the patient's hematological investigations were within normal limits. He was asked to continue his anti-seizure medication and started on Tablet Aspirin 150 mg OD and Tablet Atorvastatin 40 mg OD. The patient is currently asymptomatic and following up in the ophthalmology out-patient department.

The incidence of diabetes mellitus is increasing substantially worldwide with the total number of people with diabetes proposed to rise from 171 million in 2000 to 366 million in 2030.[1] In India, the overall prevalence of diabetes mellitus is 5.6% of which only less than half the diabetics (41.3%) are regular with their medication.

Mucormycosis is an acute, angio-invasive infection that could be pulmonary, cutaneous, gastrointestinal, rhino cerebral or disseminated usually occurring in immunocompromised patients with a mortality rate of more than 60%.[2]

Diabetes mellitus is the most common underlying condition (40%) and is an independent risk factor for rhino orbital cerebral mucormycosis.[3] The sudden loss of consciousness and GTC seizures could be explained by a cerebrovascular event due to his underlying poor glycemic control and mucormycosis.

Cardiac arrest has a 10% survival rate for out-of-hospital cardiac arrests and roughly 25% for in-hospital cardiac arrests.[4] The cause of cardiac arrest is most often cardiac (50%-60), followed by respiratory insufficiency (15%-40%).[5] Frequently encountered reversible causes are hypoxia, hypovolemia, hydrogen ions (acidosis), hyper/hypokalemia, hypothermia, tension pneumothorax, cardiac tamponade, toxins, thrombosis- coronary (MI) and thrombosis-pulmonary and cardiac.[6] Our patient was found to have PEA, which is a non-shockable rhythm and could have been due to neurological insult and severe acidosis as a result of the cerebrovascular event.

Brain injury can occur after cardiac arrest due to the effects of ischemia and reperfusion. There is generally a better neurological outcome with a shorter duration of CPR in survivors of cardiac arrest.[7] Our patient achieved ROSC in 1.5 minutes thus limiting brain hypoxia that could have otherwise occurred.

The aforementioned case is an example of well-trained medical professionals being able to promptly recognize cardiac arrest and administer appropriate care to ensure patient survival. The basic life support (BLS) which includes early recognition of cardiac arrests and initiation of high quality chest compressions is the training that helps individuals to be equipped in life saving skills. Additionally, in hospital settings, implementation of specialized strategies and medical protocols associated with emergency life support is recommended.

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