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Case Report

Idioventricular Rhythm Following Electrocution: Novel Case Report

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Abstract: Electric shock produces a great variety of injuries to body, ranging from a simple tingling sensation to sudden death. Ventricular fibrillation and sudden death are well-known consequences of electrical injury. In addition ischaemic changes, direct myocardial injury and myocardial infarction have also been reported in the past. Idioventricular rhythm is an unreported complication. Hence we report a case of idioventricular rhythm occurring following a high-tension electrical injury.
Keywords: Idioventricular rhythm, Electrical injury, Electrocution.

INTRODUCTION

Nowadays electrical injuries are much more common. Low voltage alternating current (AC) electrocution is three times more dangerous than DC current at the same voltage.

Several factors such as voltage, tissue resistance, type of current, current pathway, site, and duration of contact determine the severity and distribution of injury [1, 2]. Central nervous system injury is common with electrocution, as is blunt head trauma, which results from being thrown from a high voltage contact [2]. Injuries to solid abdominal organs directly from electrical current have not been reported. Damage to the lungs is rare after electrocution as the air in the lungs is a poor conductor of electricity. Long bone fractures, vertebral compression fractures, and scapular fractures may result from electrical shock, either from the violent muscle contraction or from secondary blunt trauma [2]. The heart in particular is liable to damage by electrical injury [3]. Thus high voltage (direct or alternating current) and lightning can cause sudden death from cardiac arrest, but the low voltage used in household electrical equipment can also cause sudden death, usually from ventricular fibrillation. Ventricular fibrillation and sudden death are well-known consequences of electrical injury [4].

CASE REPORT

The patient, a 32-year-old man, was injured near his farm when he inadvertently touched a non-insulated overhead line. Patient became unconscious instantly following electrocution for around 15-20mins. When reached to emergency department he was conscious and well oriented and had burn mark over index finger of left hand (Entry point) (Fig. 1) and over chest near to right nipple (Exit point) (Fig. 2). Patient complained of chest discomfort on admission, vital signs taken at that time revealed a blood pressure of 130/90, pulse rate of 100 beats/ minute, respiratory rate of 18 per minute. An electrocardiogram was performed which confirmed the diagnosis of idioventricular rhythm (Fig. 3), which was terminated spontaneously after sometime (Fig. 4).

Fig. 1: Burn mark over index finger of left hand (Entry point)

Fig. 2: Burn mark over chest near to right nipple

Sensory and motor examination of all four extremities was normal. In the past there was no history of any type of cardiorespiratory disease. Patient was monitored through serial ECGs for 24 hours due to burn mark on chest and idioventricular rhythm on admission which signifies that the current pathway involved the heart.

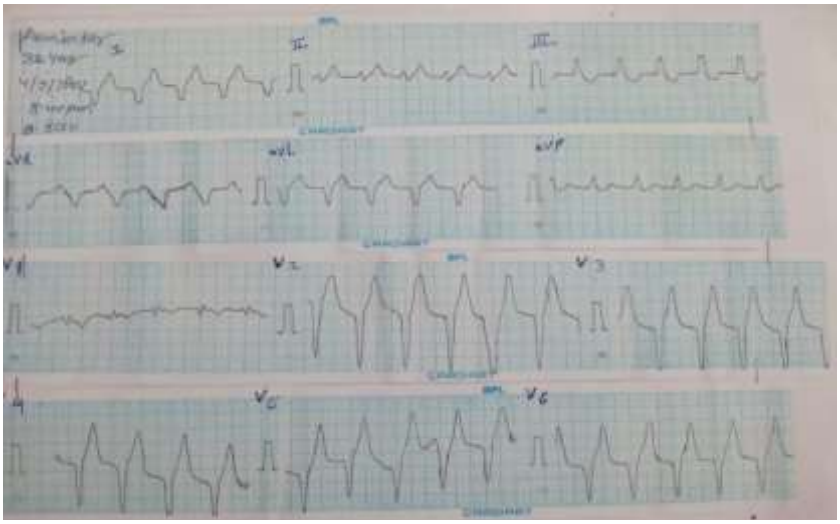

Fig. 3: Electrocardiogram

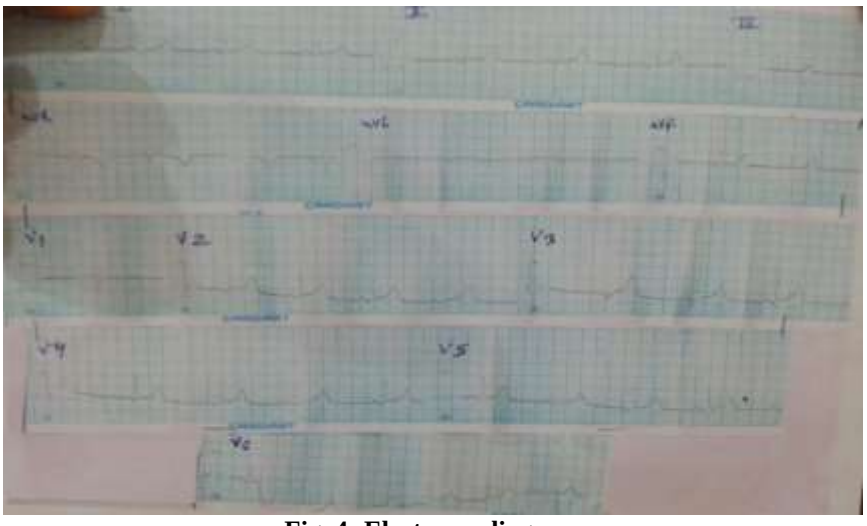

Fig. 4: Electrocardiogram

DISCUSSION

Electrical burns are the most devastating among all types of burn injuries. High voltage electrical injury results in extensive deep tissue damage in comparision to low voltage electric injury [5]. Ventricular fibrillation (VF) is the common cause of immediate death following electrocution [6]. Other arrthymias have also been reported: right bundle branch block and non specific ST and T wave changes occur most commonly; there may be supraventricular tachycardia and occasionally atrial fibrillation [6, 7]. Acute myocardial infarction post electrocution has also been reported [6]. Most arrhythmias occur soon after the electrical shock, but delayed ventricular arrhythmias (up to 12 hours following an incident) may occur [4].

In the present case, Idioventricular rhythm was discovered 4-5 hours later following electric shock which spontaneously reverted to a normal sinus rhythm without any reoccurrence. As mentioned the electrical energy passes through tissues that offer the least resistance; therefore the current commonly passes along the blood vessels [8]. This results in coagulation within the blood vessels which causes ischemia to areas distal of the obstruction [9].

In the case discussed above idioventricular rhythm may be originated due to spontaneous reperfusion of occluded coronary artery. It is worth noting that cardiac markers will be raised, regardless of cardiac damage, so can't use these as an indicator of cardiac damage [7].

CONCLUSION

In the present era routine electrocardiographic monitoring of electrically burned patients for the first 24 hours following injury places a burden on both the patient and the hospital. Hence we conclude that the routine electrocardiographic monitoring during the first 24 hours post-injury needed in patients of:

a) History of loss of consciousness or cardiac arrest at site of electrocution;
b) Patients in those burn mark present on chest;
c) Documentation of cardiac arrhythmia in the field or in the emergency room;
d) Abnormal ECG on admission.

Other patients can be either admitted to non monitored beds or discharged as determined by the size and site of their injury by electric shock.

Our case belongs to the first and second criteria hence been observed for 24hours.

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