

Case Report

Atrial Fibrillation Following Low Tension Electric Shock - A Case Report

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ABSTRACT

Electrical shock occurs when the human body such as skin, hair or muscle comes in contact with a source of electricity. The seriousness of the shock can be just a tingling sensation to that of sudden death. This depends on the voltage of current, duration of contact and the path it takes through the body. Fibrillations are lethal conditions seen in high tension electrical shocks where the cardiac muscle cells function independently and hamper blood circulation. We report a case of a 65 year male patient who had atrial fibrillation after contact electrical shock and reverted to sinus rhythm within six hours of admission.

KEYWORDS: Atrial fibrillation, Electrical shock, Low tension current

INTRODUCTION

Heart is an organ most affected by electrical injury. Electric shocks of a high voltage are known to cause direct necrosis of cardiac muscle. Conduction disorders, arrhythmias and ventricular fibrillations are other serious complications of shock.^[1] Ventricular fibrillations are documented to occur in high tension electrical injuries causing sudden death.^[1,2] Supraventricular tachyarrhythmia such as atrial fibrillation due to low tension electric injury are rare.^[3] We report one such case.

CASE REPORT

A 65 years old patient was admitted to our accident and emergency department with history of electrical injury over the right side of abdomen, which he had sustained with an accidental contact with a live wire, which was an extension of the light connection for a tube light (230V), while cleaning the floor in the rice mill. He presented to us within one hour after the injury. He complained of burns and pain at the site of contact. He had no history of syncope, palpitation or chest pain. There was no previous history of cardiovascular disease, thyroid disorders, hypertension or diabetes.

On examination there was 2x1 cm entry wound over the right hypochondrium with superficial burns and exit wound of 0.5x1 cm in the left foot between the 4th and 5th toes. His blood pressure was 110/70mm Hg, pulse rate was 120 - 130 beats per minute, irregularly irregular. Surgical first aid was given. Auscultation

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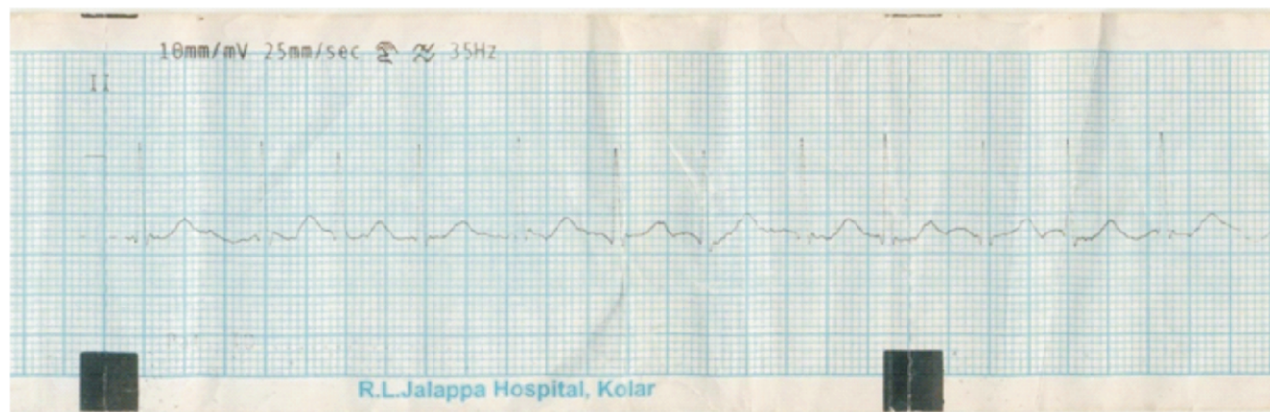


Fig. 1: ECG taken at the time of admission (10am), showing atrial fibrillation (120-130 beats/min)



Fig. 2: ECG taken 2 hrs after admission (12pm) showing atrial fibrillation (120 beats/min)

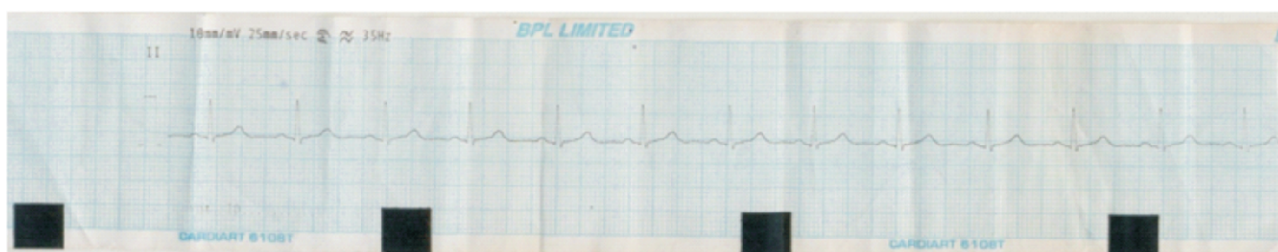


Fig. 3: ECG taken at 6hrs (4pm) following treatment showing reversion to sinus rhythm.

revealed tachyarrhythmia with variable intensity of heart sounds with no murmurs. Lung fields were clear.

A bed side ECG on admission at 10am showed atrial fibrillation (Fig. 1). Patient was admitted and further evaluated. 2-D echo, cardiac enzymes, thyroid function tests, serum electrolytes and other blood investigations were within normal limits. Patient was administered oral metoprolol 12.5 mg once daily with continuous cardiac monitoring. A repeat ECG at 12 pm showed persisting atrial fibrillation (Fig 2). Six hours following treatment a repeat ECG was taken (4pm). It showed sinus rhythm confirming spontaneous reversion to normal sinus rhythm (Fig 3). He was discharged 4 days later and continues to be on regular follow up till date with normal ECG findings.

DISCUSSION

Atrial fibrillation is not usually seen in low tension electrical injuries. The pathophysiology of electrical shock induced atrial fibrillation is unclear, however differences in electrical resistance and conduction of current along blood vessels and nerves makes heart susceptible to injury.^[4] Cardiac arrhythmia may occur immediately after shock or within 24 hours after electrical injury.^[5] Other mechanisms may include arrhythmogenic foci due to myocardial

necrosis, alteration in Na^+ , K^+ , adenosine triphosphatase concentration and changes in myocyte membrane permeability.^[4,5]

CONCLUSION

Electrical shocks from low voltage current can cause atrial fibrillation and therefore prompt cardiac monitoring is recommended. Atrial fibrillations are self-limiting or benign and revert back spontaneously. Other causes of Atrial fibrillations should be ruled out.

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