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Case report

Electrical burns in sports fishing: A case report

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ABSTRACT

Electrical burns are among the most devastating types of burns, with wide-ranging injuries. They can sometimes occur in the context of fishing, usually involving high voltages.

The authors present the case of a 59-year-old-man who suffered a sports accident during a fishing competition, with the formation of an electrical arc due to proximity of the fishing rod and high voltage cables. He presented burns affecting 3% of TBSA, third degree deep burns on trunk and left hand; no signs of cardiac injury. He was admitted to our Burn Unit for monitoring, care dressing and surgical treatment; complete wound healing was achieved after 24 days.

Due to its relatively small share among burns, published data on electrical injuries and fishing remain scarce, and differ in patient collectives due to infrastructural or environmental differences. The authors are not aware of published specific reports on electrical burns in sports fishing practice, like the case here presented.

The authors want to alert for potential medical, social and economic consequences of this type of sports accidents that could be entirely avoidable with some preventive measures.

1. Introduction

Electrical burns are among the most devastating types of burns, with wide-ranging injuries [1,2]. They are classified as either high voltage (>1000 V) or low voltage (<1000 V). The typical injury with a high voltage electrical contact is the one where subcutaneous fat, muscles, and even bones can be injured. Lower voltages may have lesser lesions [3].

They can sometimes occur in the context of fishing, due to various reasons. Firstly, the fishing rods that normally are made of carbon fiber and graphite rods have superconductor qualities and low resistance (0.9–10.5 kΩ), which increases the risks of electrical injuries [4,5]. Secondly, the braided fishing lines and metal hooks put the fishermen at higher risk [6]. Finally, poaching using electrical current to stun fish can also contribute for this type of injuries [5].

Electrical injuries related to fishing usually involve high voltages, (>25,000 V), depending on the voltage carried by the source, usually overhead tension lines near the fishing spot. However, sometimes, mainly in illegal activities, low voltage injuries occur when using, for example, portable electric generators [7].

The electrical current has the potential to injure via three mechanisms: direct, when the fishing rods of braided lines or metal hooks come in direct contact with overhead tension lines; arc, as the current passes from source to an object, when the fisherman throws his line or moves from one fishing spot

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to another one, with the fishing rod extended; no direct contact is necessary to trigger an electrical arc at 25,000 V and, once an electrical arc is formed, it may extend over several meters; and finally, flame/flash injury caused by ignition of clothing or from an electrical flash on uncovered parts of the body.

These injuries could be challenging to treat, as they can be associated to other injuries like trauma, when the patient falls (approximately 15% of electrical burn patients) [3] or drowns, and have some potentially fatal complications, being the cardiac ones the most feared [3,5,8].

2. Case report

A 59-year-old-man, Caucasian, with no relevant past history, suffered a sports accident on June 2013, during a fishing competition over the river. In the competition he was using a carbon fiber fishing grod and the spot where he was located was near high voltage tension lines. In that day, weather conditions can also have potentiated the incident (low clouds, high humidity levels). Due to the proximity of the fishing rod and high voltage cables, a spontaneous electric arc was established, with consequent high voltage electrical injuries. There were no reports of associated trauma.

On admission in the ER, the patient was conscious and oriented; spontaneously breathing; no thoracic pain, palpitations, nausea, vomiting or neurological deficits were seen. He presented burns affecting 3% of TBSA (total burn surface area); third degree deep burns on trunk (thoracoabdominal right region and thoracic left region – Figs. 1 and 2) and left hand (Fig. 3), with signs of electrical conduction input on thenar eminence of the left hand and possible output on the anterior aspect of the right thoracoabdominal region. The patient was monitored, blood tests were performed and showed increased serum myoglobin (1408 ng/ml) and creatine phosphokinase (300 Ul), with no increase of myocardial necrosis markers; no signs of organ dysfunction (liver, kidney) were documented. electrocardiogram: sinus tachycardia, 105 bpm heart rate, left anterior fascicular block without significant changes in repolarization. No signs of inhalation injury. The patient was given aggressive fluid resuscitation and monitoring vital signs and urine output. He was admitted to our Burn Unit for monitoring and surveillance. During hospitalization, he had no major complications namely cardiac ones. He underwent daily care dressing with silver sulfadiazine and then submitted to three surgical procedures: two-staged procedure (debridement and split skin grafting of left hand) (Fig. 4) and one-staged procedure of right thoracoabdominal region grafting (Fig. 5), with complete healing; grafting of left thoracic region with consequent wound dehiscence that was closed in another operative time with local advancement flaps (Fig. 6A and B); complete wound healing was then achieved (Fig. 7A and B). The patient was discharged on 24th day, oriented to Plastic Surgery ambulatory.

Fig. 2 – Third degree deep burn of right thoracoabdominal region.

3. Discussion

Since 1990, when Clarke and Moss [9] reported a case of electrical burn correlated to fishing rods conductive properties that electrical burns had been associated to fishing practice. Other reports were then published, some relating to work fishing activities (fishermen) [10], like in the Asian population [4] or even in illegal fishing practices [7]. Some retrospective studies have also been published on the subject [8,11], but

Fig. 1 – Third degree deep burn of left hand.

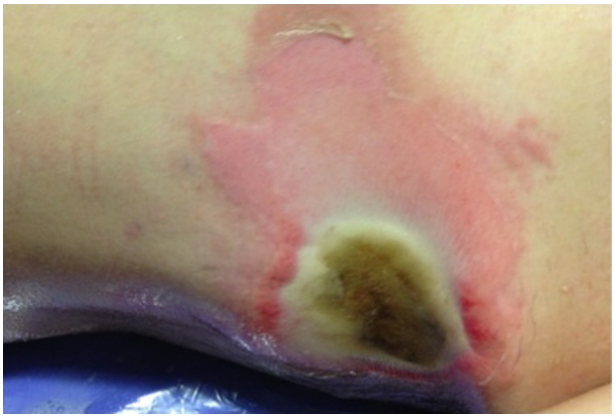

Fig. 3 – Third degree deep burn of left thoracic region.