CASE REPORT

LIGHTNING STRIKE IN GOLF PRACTICE

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SUMMARY. The case is presented of a golfer who was struck by lightning while playing golf during a thunderstorm. The patient was found lying unconscious on wet grass with his clothes scorched and his spiked golf shoes torn. He had suffered dermal burns affecting the neck, thorax, abdomen, and upper and lower limbs (10% total body surface area), without any cardiovascular or respiratory disturbances. It may be hypothesized that the lightning current went over the outside of the patient, causing ignition of his clothes. Treatment included monitoring, adequate fluid management, debridement, and topical treatment (silver sulphadiazine). Complete healing of the wounds was achieved in two weeks. After three years' follow-up, the patient had no sequelae.

Introduction

Lightning accounts for a minimal number of burn injuries (fewer than 1%, according to some researchers) but it can have deadly effects.[1] The victims are mostly young people who are struck during various outdoor activities in summer. Golf is considered a risky sport, as regards lightning, in certain situations.[2] Numerous factors can coexist on a golf course: an open field, metal poles, electric golf buggies, damp grass, and stormy weather. Metal instruments attract electric current in an open field. The current in a lightning bolt is as high as 30,000 amperes and 1,000,000 volts.[3] These factors (voltage, amperage), in addition to body resistance, contact time, pathway, and type of current, are the determining elements causing tissue damage.[4]

Resistance depends on water in the tissues, which is a good conductor, and consequently wet skin, clothes, and shoes are less resistant than dry surfaces.

Tissue damage due to an electric discharge can be caused by local generation of heat with the passage of current, injury to the endothelial membrane in deep tissues (progressive necrosis), and flash phenomena.

Lightning strike in golf can be avoided. We consider the commonest mistakes that players make and their consequences, and describe the treatment in this particular case.

Case report

A 34-yr-old male was found unconscious with his clothes and shoes burned in wet grass on a golf course. It was starting to rain one afternoon during a thunderstorm. A course attendant saw the accident some distance away from the clubhouse and sent for help. The patient was rapidly cared for by the medical service. No cardiac or breathing arrest was detected, and the patient recovered consciousness spontaneously within a few minutes. He was admitted to our burns centre within one hour of the accident. The patient had sustained scattered second-degree burns in 10% total body surface area in the neck, thorax, abdomen, and upper and lower limbs (*Figs. 1, 2*). Distally, on both legs and feet, there were arborescent skin marks that did not look like typical full-thickness burn exit points (*Figs. 3, 4*); no entry point was recognized either.

The neurological examination did not show any alterations, except for the patient's amnesia regarding the incident. He remembered being advised to seek shelter when the sky turned cloudy, when he went to the ninth hole. He was wearing sports clothes of mixed cotton and acrylic fibre.

The patient was carefully monitored, with Ringer's lactate being administered to maintain a urine output of at least 50 ml/h. No systemic or local complications appeared. The burns were debrided and treated topically with silver sulphadiazine for two weeks, achieving total healing. The subsequent three-year follow-up revealed no sequelae.

Discussion

Lightning strikes represent a special type of injury that can produce a varying amount of damage.[5] Immediate death occurs in 10% of cases of direct lightning strike,[6] primarily caused by cardiopulmonary arrest.[3]

Asystole, heart stoppage, and various rhythm abnor-

Fig. 1 - Second-degree burns in the neck, thorax, and upper limbs.

Fig. 2 - Burns by flame; no entry point.

Fig. 3 - Scattered burns in abdomen, thighs, and distally lower limbs.

Fig. 4 - Arborescent second-degree burn on foot; no exit point.

malities are common in direct lightning strikes, as also paralysis of the respiratory centre. The pathogenesis of these alterations can be due to the passage of very high direct electric discharge through the heart or central nervous system.

Electric current travelling through the body can cause many other lesions, such as severe muscular damage, massive perilesional oedema with compartment syndromes, thrombosis, progressive devascularization, kidney failure, disseminated intravasal coagulation, fractures by muscular spasm, and direct destruction of bones.[7,8] The signals visible in the skin include entry and exit points, which design the current's pathway. Tissues adjacent to these points may conceal grave muscular lesions. Other skin lesions are due to ignition of clothing subsequent to the flash. In such cases full-thickness or dermal-thickness burns are suffered.[1-4]

The golfer in our case was injured by flame - there were no signs of conduction. He was very lucky, but he made many mistakes.[9] He ignored a recommendation to leave the golf course, he was wearing inadequate clothes, and he had his golf cart too close to him.

Some general safety rules should be applied by golf players in thunderstorm conditions:

- golfers should seek safe shelter before the storm arrives and not return prematurely to the golf course;
- safe shelter can be found in the club house or in a closed vehicle;
- golfers should avoid isolated trees, open fields, metal poles, electric or metal golf carts in the immediate vicinity, wet ground, lakes and ponds, metal umbrellas, and metal objects carried openly on their person;
- proper clothing, including golf shoes, should be worn (cotton and rubber spiked soles);
- avoid using the phone.

Information about the risk of lightning while playing golf is an important subject. Such accidents can be avoided by appropriate prevention measures.

RÉSUMÉ. Les Auteurs présentent le cas d'un joueur de golf foudroyé pendant qu'il jouait un jour de tempête. Le patient a été trouvé inconscient, étendu sur l'herbe humide avec ses vêtements brûlés et ses chaussures de golf déchirées. Il souffrait de brûlures cutanées au cou, au thorax, à l'abdomen et aux extrémités supérieures et inférieures, sans lésions cardiovasculaires et respiratoires. On pense que l'électricité courante de la foudre a parcouru superficiellement son corps, brûlant ses vêtements. Le traitement consistait en monitorisation, fluidothérapie, débridement et l'application de sulfadiazine argentique entraînant la cicatrisation totale des lésions en deux semaines. Après trois années de suivi le patient n'a plus de séquelles.

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This paper was received on 10 May 2005.

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The MBC, in the context of the activities laid down in its Statute and intended to promote burn prevention campaigns, has produced the following videotapes:

The Prevention of Burns in Children

The Prevention of Electrical Burns in Everyday Life

The Prevention of Electrical Burns at Work

The Prevention of Industrial Disasters

How to Defend ourselves from Fire

How to Defend ourselves from Forest Fire

The tapes have been dubbed in English, French, Arabic, Italian, Spanish, Greek and Turkish and come in two versions, U-MATIC and VHS.

All the tapes are available entirely free of charge to MBC Members who apply in writing to receive them explaining their reasons and undertaking to use them exclusively to promote a burn prevention campaign in their respective countries.

For non-members of MBC the tapes are available at a cost of US$ 25 each, including postal charge.

Please address requests to: Annals of Burns and Fire Disasters, Divisione di Chirurgia Plastica e Terapia delle Ustioni, Ospedale Civico, Via C. Lazzaro, 90127 Palermo, Italy, Tel.: +39 091 6663631 - Fax: +39 091 596404.