



## An Unusual Case of Lightning in the Transkei Region of South Africa: A Case Report

Banwari Meel\*

Walter Sisulu University, South Africa

\*Corresponding author: B Meel, Walter Sisulu University, South Africa, Tel: 0027 648798154; E-mail: meelbanwari@yahoo.com

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### Abstract

**Background:** A fern pattern on the skin of a victim of lightning strike is a rare, but pathognomic finding. Forensic pathologists who are not trained in this specialty might attach little medico-legal importance to such a cutaneous lesion as a result of lightning.

**Objective:** To highlight an unusual case of lightning in the Transkei region of South Africa.

**Case history:** ZG, a 25 year old woman, suffered a filigree burn caused by a lightning strike in 2000. She has a permanent superficial rare burn of a feathering variety on the antero-lateral aspect of her right leg. It resembles a 'fern pattern' in appearance. At the time of the lightning strike she was in a rondavel and lucky to escape. She was admitted to Mthatha General Hospital where she was unconscious for two days. She was brought to the hospital by police. She regained consciousness and was discharged after three days. The history of injury, physical findings, mechanism of injury and psychosocial aspects has been described in this report.

**Conclusion:** The problem of lightning deaths where women are implicated as a witch causing the lightning strike is common in the Transkei region of South Africa.

**Keywords:** Lightning; Dermatology; Death

### Introduction

Lightning accidents are responsible for several hundred deaths and thousands of injuries each year in this country. Survivors sustain a variety of cardiac, neurologic, musculoskeletal and dermatological injuries [1]. Feathering skin injuries are pathognomonic of lightning and are known as Lichtenberg's figures or flowers, filigree burns, keraunographic markings, arborescent burns and ferning [2]. Linear burns tend to occur in areas where sweat or water accumulate, such as under the arms or down the chest [3]. These are superficial burns that appear to be caused by steam production from the flashover phenomenon. Punctate burns appear as multiple, small cigarette-like burns, often with a heavier central concentration in a rosette-like pattern [3]. They range from a few millimeters to a centimeter in diameter and seldom require grafting. Feathering burns are not true burns because there is no damage to the skin itself [4].

The origin of superficial lightning burns was studied by Ten Duis et al. [5]; a mathematical model was invoked to identify fern-shaped burns as 'so-called' fractals. On the basis of this model and discharge experiments, we conclude that 'fractal burns' are caused by surface discharges of a positive polarity. The recognition of such burns can help to elucidate the type and mechanism of the lightning strike [5]. These transient lesions are pathognomonic for lightning injury and require no therapy [6].

An electrical current will choose the shortest path between the contact points of the human body and may involve vital structures in its pathway. Almost every organ system can be injured by the electrical

current of lightning [7]. Lightning is a powerful natural electrostatic discharge produced during a thunderstorm. The electric current passing through the discharge channels is direct, with a potential of 1000 million volts or more [8]. Lightning can kill or injure a person by a direct strike, a side-flash, or conduction through another object. Lightning can cause a variety of injuries in the skin and the cardiovascular, neurological and ophthalmic systems. A filigree burn of lightning is a superficial burn and very rare [8]. Thermal burns occur if the clothing is ignited or may be caused by metal that the person is wearing or carrying during the flashover [5]. In a mass tragedy the apparently lifeless victim must receive attention first for resuscitation, as cardiac arrest could be reverted [9].

When misfortune such as lightning occurs, it is believed in the Transkei region that it is caused by elderly women in the community. Elderly women who are identified as witches are therefore at risk of being murdered as a result. However, this belief is mostly dominant in the rural areas of Transkei, where poverty usually leads to strained human relations and where most illness cannot be explained [10]. People have become free politically but poverty in general has not declined since 1994. Poverty is severe in the former Bantustans such as the Transkei region. Seventy-three percent of the rural people in the Eastern Cape were living on less than US \$23/month in 2005/2006, more than half of them on less than US \$16/month [11]. Many victims who survive a lightning strike experience serious psychosocial problems such as forgetfulness, amnesia and emotional outbursts [12]. The purpose of this report is to highlight an unusual case of lightning in the Transkei region of South Africa.

## Case History

ZG, a 25 year old woman, has suffered burns caused by a lightning strike in 2000. She has a big scar on the antero-lateral aspect of her right leg, including the thigh and leg, which resembles a typical fern pattern in appearance. She was in a rondavel at the time of the strike, and lucky to escape. She was burnt superficially. She was unconscious and brought by police to Umtata General Hospital. She was resuscitated and regained consciousness after two days. She was kept in hospital for about three days and then sent home, as she had recovered fully. There is a permanent scar marks on the antero-lateral aspect of her right thigh and leg. It is more distinct on the right leg than the left (Figure 1). There were three of her siblings in the rondavel, who were also exposed to lightning. They all died on the spot. She managed to get out, but she did not know what had happened. She is unmarried and has no children. She was brought to Sinawe Center, as she had been raped by an unknown man as punishment, as she was regarded as a witch in the community. She is distressed by the community's surprise at how she could have survived. The community discriminates against her, as she is considered a bad woman and no one wants to marry her, as she has been branded as a witch.



**Figure 1:** Non-fatal lightning strike of 25 year old woman. A permanent 'fern pattern' on right lateral aspect of right leg.

## Discussion

Various forms of stigma and disbeliefs are attached to lightning. Witchcraft and witch-hunts have been practiced widely almost all over the world. It is known as magic in Europe, maleficium (wrong-doing) in Latin America and superpower in Asia. In Africa those accused of being witches often face execution. A range of accusations are leveled against witches, such as causing impotence, turning milk sour, causing disease and death [13]. ZG was also discriminated against in the community, as she is regarded as a witch. She was fortunate to survive, but now she is feeling discriminated against in her community.

Generally forensic pathologists observe a fern pattern on the victim of lightning strike in a post mortem room; this is observed in 20% to 30% of cases [6]. It is difficult to find in dark-skinned people, but ZG is a relatively light-complexioned woman. It is surprisingly that ZG survived the episode of lightning in view of the large size of the skin burn, leading to disfigurement of her thigh and leg (Figure 1). As not

all lightning victims have external lesions or conspicuous signs of their experience, the risk are that fatalities due to lightning strike may be overlooked in a post mortem examination [14]. A typical fern pattern is found on the skin in the case ZG, which has not vanished and has remained as a permanent mark (Figure 1). Generally, this Lichtenberg figure pales after several hours to days [7]. Jonas et al. [15] reported the case of a couple who was hit by a lightning strike similar to ZG. Both survived the thunderbolt without permanent injury. However, whereas the man was unconscious for only a few minutes, his wife fell into a coma for 24 h. The lightning entered her body behind the left ear and exited at the neck. After recovery, the women had a mark like a tattoo on her neck [15].

ZG only become unconscious soon after lightning struck the rondavel in which she was with three other siblings. Police brought her to hospital after more than two hours' travel from her location. She was successfully resuscitated in hospital and recovered. The other siblings could probably also have been resuscitated. Unfortunately they were diagnosed as dead by a community member without being taken to a qualified medical doctor. The fact is that the resuscitation of lightning strike victims has a good chance of success. It is never too late to resuscitate a victim of lightning strike. Prompt cardiopulmonary resuscitation and supportive treatment for the patient's particular injury in a specialized unit 13 are indicated. Therefore resuscitation has both clinical and legal significance and relevance. Whereas in other mass catastrophes the primary attention should be on injured parties emitting signs of life, the initial aid measures in a group of lightning victims should focus on seemingly lifeless victims with circulatory arrest [9].

ZG wanted to remove this permanent disfigurement on her thigh as it constantly reminded her of that episode and changed her life completely, but she did not know how to get it done. She contacted a witchdoctor in the community, who offered protection from evil and witchcraft. He demanded money, which ZG did not have. ZG also complained of forgetfulness and started crying sometimes, as she was getting very isolated. Behavioral effects have been described in numerous case reports [12]. In-depth research on behavior, however, has been relatively scant and subject to a number of shortcomings [16]. Survivors may thus experience a reduced capacity to function, both occupationally and socially, and may complain of forgetfulness, inefficiency and inability to handle even mildly stressful situations. These new obstacles and sense of loss may contribute to psychologic disorders, which in turn affect cognition [17].

## Limitation

The lack of detail history of lightning strike is lacking in this case report.

## Conclusion

The unusual cutaneous lesions are confirmatory sign of the lightning strike. It is challenge to dermatologist to repair these cutaneous lesions. Rehabilitation and counselling of post-lightning victims is required. There is need for further research to understand fern pattern appearance caused by lightning strike.

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