INTRODUCTION

Lightening strike is one of the most frequent causes of death due to natural phenomena. In such cases, cardiac injury is the main cause of death, with type of lesion varying by type of impact.

We report the case of a 29-year-old woman who was struck indirectly by lightning. Upon hospital admission, she showed both the echocardiographic disturbances characteristic of direct impact and electrocardiographic disturbances. Both types of change resolved spontaneously. After describing the case, we briefly review the literature on echo and electrocardiographic disturbances after lightning strike.

Key words: Lightning strike. Electrocardiography. Echocardiography. Diagnosis.

INTRODUCTION

Lightening strike is one of the most frequent causes of death by natural phenomena. It is estimated that a third of lightning strike cases are mortal, and of those patients who survive 70% have permanent sequelae. Disturbances of cardiac conduction are the principal cause of death. The cardiac effects in patients who survive, in addition to conduction disturbances, are electrocardiographic (ECG) changes, elevation of the creatinkinase MB fraction (CK-MB), contractility defects, and involvement of the pericardium.

There are 3 types of lightening strike: direct, indirect via air, and indirect via ground. The cardiac changes caused by lightening strike vary according to the impact. We present the case of a 29-year-old woman with cardiac changes secondary to an indirect lightening strike.

CLINICAL CASE

In the summer of 1999, during a storm, a married couple was struck by lightening while walking back to their home. The man died immediately, and the woman, 29 years old, was taken to the nearest hospital.

The patient had no significant medical history. Upon admission she presented with posttraumatic amnesia and agitation. She was found to be hemodynamically stable, with arterial pressures of 110/70 mm Hg and a heart rate of 100 beats/minute. Examination revealed serpiginous burns that extended from the ribs to the left iliac bone.

An ECG was performed which revealed inversion of T-waves in the anterior surface that over the course of hours extended to the inferior surface (Figure 1). The CK number was 561 U/L with an MB fraction of 9 U/L. Twenty-four hours later the CK was 253 U/L and the MB fraction was 23 U/L. An echocardiogram was performed and revealed the existence of apical...
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Fig. 1. In the upper part of the figure is the electrocardiogram on admission. The T-wave inversion on the anterolateral and inferior surfaces can be seen. In the lower part is the electrocardiogram on hospital discharge, in which the T-wave of the anterolateral surface has become biphasic, with the negative T-wave persisting on the inferior surface.

DISCUSSION

The case we present causes doubts as to the ischemic myocardial effects of lightening strike.

Our patient suffered a typical indirect lightening strike.

Of note, in the study published by Lichtenberg, only those subjects who suffered direct lightening strikes had echocardiography anomalies. These changes took the form of pericardial hemorrhage and severe overall dysfunction of cardiac motility. In some subjects, these lesions were reversible, although this was not always the case. None of the study patients who suffered an indirect lightening strike had detectable echocardiography changes. In the case presented, the motility changes were not as severe as in the direct impact cases, and as occurred in some of them, the changes resolved spontaneously.

The ECG changes following lightening strike may appear in the absence of a significant decrease in motility and may not occur in the case of structural damage. They may translate into a banal occurrence or correspond to a potentially life-and-death situation.

The changes most frequently described were sinus tachycardia and nonspecific ST segment and T-wave changes that generally resolved spontaneously in a matter of hours or days. Lengthening of the QT interval was also observed, but was more specifically seen with direct lightening strikes.

The early appearance of inverted T-waves on the anterior and inferior surfaces, together with changes in cardiac motility lead to the suspicion of a non-ischemic myocardial lesion secondary to lightening strike. Said changes appear to be due more to autonomous instability than to a myocardial lesion.

In our patient, there was no CK-MB elevation, but even if this had been the case, its interpretation would be difficult, as there is not always a correlation with clinical signs or ECG changes, and there is not a particular, uniform moment for its appearance. The initial elevation of the CK-MB fraction seems to have a more musculoskeletal origin than a cardiac origin.
REFERENCES


CONCLUSION

In indirect lightening strikes, echocardiography changes may be observed. These may be transitory and resolve spontaneously. Careful evaluation of the patient’s course is indispensable for a correct diagnosis.