

Brief Report

A rare complication of radiofrequency ablation: skin burn

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Abstract Radiofrequency ablation is the first-line treatment for arrhythmias with high success and low complication rates. Skin burns have been reported rarely after electrophysiological procedures, especially procedures in which higher-power energy is used and multiple ablations are performed. Here, we report a case of skin burn that developed after radiofrequency ablation for ventricular tachycardia originating from the right ventricular outflow tract.

Keywords: Skin burn; radiofrequency ablation; electrode pad

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RADIOFREQUENCY ABLATION HAS BEEN INTRODUCED as the treatment of choice for a variety of arrhythmias in children and adults. The procedure has high success rate and low incidence of complications. The common complications reported are as follows: varying degrees of atrioventricular block, perforation, pericardial effusion and thromboembolism, brachial plexus injury, and pneumothorax.^{1,2} Skin burns have been reported in 3% of the cases after treatment for hepatic tumors in which high-power energy settings were used, and burns after electrophysiological procedures were observed rarely. It is especially seen after procedures in which higher-power energy is used and multiple ablations are performed, such as ablation of atrial flutter, atrial fibrillation, and ventricular tachycardia.³ Here, we report a case of skin burn that developed after radiofrequency ablation for the ventricular tachycardia originating from the right ventricular outflow tract.

Case

A 10-year-old girl underwent catheter radiofrequency ablation for ventricular tachycardia originating from the right ventricular outflow tract. The procedure was

performed under sedation with midazolam and ketamine, under the guidance of a non-fluoroscopic catheter-based CARTO electroanatomic mapping system. Radiofrequency energy was delivered using a 3.5-mm tip NavistarR Thermocool[®] saline-irrigated catheter with Coolflow irrigation pump. The Ataker[®] (Medtronic) generator was used. Delivered temperature and power were 35–40°C and 30 W, respectively. Disposable gel pads were placed in direct contact with the skin on the lumbar region. The right ventricular outflow tract ablation line was created and acute success was achieved. The duration of the procedure was 3 hours. The patient complained of lower back pain at the site of the electrode pad, and on examination four third-degree burns, measuring ~7 × 5 and 3 × 2 cm, were observed (Fig 1). The burns healed without requiring any surgical intervention.

Discussion

Skin burns are observed rarely after radiofrequency ablation of cardiac arrhythmias. We present a paediatric case of skin burn at the site of the electrode pad after radiofrequency catheter ablation. This is the first complication of the kind observed in our electrophysiology laboratory and the first reported paediatric case in the literature. Skin burns develop due to the high current used, powerful systems, and

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Figure 1.
Skin burn at the site of the electrode pad.

long duration of the procedure. The energy delivered to the tip of the electrode deposited and the skin pad complete the electromagnetic circuit. A large surface area and good skin contact are necessary to disperse the large energy loads.⁴ Skin burns after ablation of atrial flutter may be as high as 2% if the delivered energy is 100 W, and can be prevented by using dual dispersive pads. As we performed the procedure using 30-W energy, loss of skin contact or the long duration of the procedure may have led to the development of thermal injury in our case. There have been various strategies to prevent skin burns, including the use of larger electrodes and/or multiple electrodes, as well as monitoring the temperature at the electrode pad site, which are good alternatives to prevent such kind of complications. Burns often occur when the electrode is improperly applied or falls off during the procedure and only a small portion of the electrode remains in contact with the skin.⁵

In our patient's case, burns observed at the lateral edge of the adhesive electrode pad developed when the medial edge of the electrode was not fully attached to the skin surface.

Skin burns are rare but serious complications of radiofrequency ablation of tachycardia, which develop due to long-duration high-energy applications and loss of electrode pad and skin contact. There are no established methods to prevent development of such complications, but they can be prevented by establishing good skin contact and preventing delivery of high-energy currents.

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Conflicts of Interest

None.

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