

Spirit-induced cautery burns: An unusual iatrogenic injury

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Abstract

Electrocautery is routinely used in all operative procedures for achieving hemostasis. At the same time, use of alcohol-based antiseptics like spirit is strongly recommended these days for skin preparation before surgery. However, there is a potential risk of igniting a flame with the use of electrocautery in a field smeared with spirit leading to iatrogenic burn injuries. This brief report mentions one such case and is meant to create awareness among the surgeons and theatre staff regarding the potential risk of iatrogenic burn injury due to electrocautery. It also briefly describes the possible mechanism and preventive measures for such injury.

CASE REPORT

An eighteen-year-old female underwent laparotomy for peritonitis due to burst appendix. On operation table, once general anaesthesia was given, the abdomen was cleaned twice with povidone iodine followed by spirit as per hospital routine. Sterile drapes and cotton wound towels were applied. The skin was incised with a knife. Thereafter, the subcutaneous tissue was divided using monopolar blend cautery. As soon as the cautery was used, the cotton wound towels applied on the two sides of the incision caught fire due to a flame arising from the undersurface of the towel. It was extinguished using another sponge but not before producing deep dermal burns on two sides of the skin incision. The cautery was checked and found to be correctly installed. On careful examination, it was observed that the skin was still wet with the last coating of spirit which was not dried up properly. The residual spirit film on the skin caught fire from the spark of the cautery leading to burns involving the lower part of the anterior abdominal wall (Fig. 1). The operative and post-operative period of the patient remained uneventful except that it took three weeks for the deep dermal burns to heal with residual scarring.

Figure 1

Fig 1: Iatrogenic skin burns due to spirit during laparotomy.



DISCUSSION

The concept of achieving hemostasis with heat goes back to hundreds of years. Electrocautery has been in use since the late 1920s for control of bleeding¹. Over the years, electrocautery has become an invaluable facility being

widely used in operation theatres. Its applications are rapidly expanding to obtain a bloodless operative field during surgical procedures. Even skin incision is being made with electrocautery due to its quickness, less pain, hemostasis and reported minimal scarring². However, the use of electrocautery is accompanied with certain hazards to the patient, operating surgeon and theatre staff. These hazards include burn injury, electrocution, operating room fire, inhalation of diathermy smoke and gene mutation^{3,4}.

Burn injury due to electrocautery can occur in one of the following ways³:

- i) Breach in insulation of electric circuit leading to burn injury at the site of skin contact during activation of the electrode.
- ii) An inadvertent activation of the circuit while doing something else so that the active electrode resting on the patient's skin results in a burn injury.
- iii) Burn injury sustained by the surgeon or the operating staff due to accidental direct contact with the active electrode, e.g., punctures in the surgical gloves.
- iv) Burns on the skin or cavities (e.g. umbilicus, vagina) may occur from the use of inflammable antiseptic solutions such as spirit especially if diathermy is used before the antiseptic dries out.

In daily practice, electrocautery and spirit-based preparations are both used routinely in almost all operation theatres. The widespread use of alcohol-based agents for skin antisepsis as well as hand cleaning has significantly increased the risk of operating room fire and burn injuries to the theatre personnel due to excessive use of cautery. It has been observed that hot wire cautery generates enough heat to ignite all alcohol-based antiseptics even if these contain as little as 20 percent alcohol⁵. Surgical fires and the consequent burns in a surgical patient, though rare, are devastating complications

of surgical procedures. Apart from significant patient risk, there can be legal ramifications for both the treating surgeon and the hospital in such event. Although the risk of iatrogenic burn injury is very high during routine working of operation theatres, there are only occasional case reports of severe burns resulting from the use of alcohol-based antiseptics^{6,7}. In the present case as well, residual spirit solution left after cleaning and draping the patient was responsible for igniting the cotton sponge due to a spark generated from the monopolar cautery. It led to severe burns eventually causing permanent scarring of the anterior abdominal wall in a young female patient.

In order to reduce the risk of such iatrogenic injury, it is recommended that whenever cautery is used near the surface of the body, either use of spirit solution should be discontinued or it should be carefully dried off. Special precaution should be taken to mop up any pool of spirit in the umbilicus before proceeding with the use of cautery. Other recommended measures can be use of fire retardant surgical drapes and installing over-current protection devices on electrical equipment.

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