Successful defibrillation/ resuscitation in accidental profound hypothermia

Sir,

We report a case of successful defibrillation/ resuscitation in a severely hypothermic patient with a core body temperature of 25.9°C as measured nasopharyngeally. Ventricular fibrillation is typically the fatal arrhythmia seen in severe hypothermia. Though the traditional thought that VF is refractory to treatment at temperatures less than 28°C, we were able to successfully resuscitate our patient from a VF cardiac arrest at a body temperature of 26°C. It is therefore reasonable to attempt defibrillation at temperature below 30°C in accidental severe hypothermia.[1]

A 60-year-old male patient, a case of chronic pancreatitis for the past 1 year, was planned for Peustou’s procedure (pancreatico-jejunostomy and choledochoduodenostomy). He was a known hypertensive and diabetic, reformed chronic smoker and alcoholic. Pre-operative investigations and examination were within normal limits. ECG showed incomplete RBBB with occasional VPCs. He was on T. nifedipine and T. enalapril for hypertension since 10 years and was diabetic for 10 years, now treated with short acting insulin. Vitals recorded were heart rate 110/min, blood pressure around 130/80 mmHg, SpO₂ 100%. Temperature was not recorded due to non-availability of temperature probe in that particular monitor.

General anaesthesia supplemented with epidural analgesia was the anaesthetic plan. The patient was induced with inj. glycopyrolate 0.2 mg, inj. fentanyl citrate 100 mcg, inj. thiopentone sodium 200 mg, inj. scoline 100 mg. Translaryngeal intubation was done successfully with an 8.0 mm ID cuffed clear endotracheal tube, anaesthesia was maintained with sevoflurane 0.6% to 1%, vecuronium bromide and intermittent aliquots of 0.25% bupivacaine in an epidural catheter. Ringer lactate and normal saline with starch was used intra-operatively. The ambient temperature was low around 18°C, and the patient was covered with warmed sheets, and IV fluids were warmed by immersing the bottles in warm water.

At the end of the procedure, the patient regained consciousness, and had spontaneous respiratory attempts and was reversed with 0.4 mg glycopyrollate and neostigmine 2.5 mg, later extubated. Few minutes after extubation, the patient became apnoeic. An ECG monitor revealed ventricular fibrillation. ACLS was commenced immediately. The patient was defibrillated with 200 joules. As the patient failed responding, second defibrillation was attempted. The patient successfully reverted with sinus rhythm. His core temperature recorded nasopharyngeally was 25.9°C. The ambient temperature was recorded as 16°C. All measures of rewarming, both active and passive methods, were attempted immediately to rewarm the patient. Warming measures were continued and the core temperature rose to normal in 4 h. The patient regained consciousness fully and extubated after 24 h.

Severe accidental hypothermia (core temperature <28°C)[1] is associated with a high mortality rate ranging from 30% to 80%.[2] Our patient was old, malnourished and was exposed to cold ambient temperature for more than 5 h. The peritoneal cavity too was exposed for >4 h and the irrigating fluids...
were not adequately warmed. The routine precautions taken such as covering the extremities with a sheet and warming the IV fluids were obviously inadequate. Severe hypothermia along with the extubation stress would have precipitated VF in our case.

It is recognized that defibrillation of severely cold myocardium is difficult. The hypothermic heart may also be unresponsive to cardio-active drugs and electrical pacing, but 55% of the case reports do however report successful defibrillation at a temperature less than 30°C.[3,4] The most effective re-warming strategies include administration of warm humidified oxygen, warm IV fluids, warming mattress, peritoneal/pleural lavage with warm saline, extra-corporeal blood warming and CPB. The factors that lead to a good outcome in our case are witnessed arrest, immediate CPR, continued CPR during the whole arrest time, brain-protecting effects of hypothermia and simultaneous effective re-warming therapy.[5]

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