Successful Anesthetic Management of a Patient with Multiple Trauma and Severe Hypothermia: A Case Report

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Abstract

Severe hypothermia with a temperature under 28°C is rarely compatible with life, and there are only a few cases reported in literature where patients have survived such low temperatures. We present the successful anesthetic management of a 30 year old male who was found with a body temperature of 26.6°C, unresponsive, and intoxicated with deep facial and neck lacerations in the field, when the outside temperature was -15.6°C. Through proper body rewarming and anesthetic care, we were able to save our patient's life.

Introduction

Untreated hypothermia may cause increase in mortality due to cardiac depression, myocardial infarction, arrhythmias, decreased response to catecholamines, increased blood viscosity, and peripheral vasoconstriction [1,2]. It can also increase the risk of metabolic acidosis, which is secondary to decreased end organ perfusion from myocardial depression, and coagulopathy due to decrease in the kinetics of coagulation cascade and suppression of platelet function [1-4]. We report a case of successful anesthetic management of a patient with severe hypothermia and multiple trauma.

Case Presentation

A 30-year-old male was found unresponsive and intoxicated with deep facial and neck lacerations in the field during the middle of March of 2015 when the outside temperature was 4°F (-15.6°C). On the field, he was intubated and two 18G intravenous lines were started. His vital signs were HR 50, BP 45/24, T 80.1°F/26.6°C, and pulse oximetry could not be measured. The patient was connected to an H-1000

blood warmer and then immediately brought to the OR without radiographic imaging. He was brought to the OR with c-spine precautions for neck exploration, repair of bilateral facial lacerations, and VII cranial nerve repair. The patient had standard ASA monitoring placed and an index finger digital block was applied for pulse oximetry monitoring, along with a right femoral arterial line. Lower body hot air body warmer was applied, and the operating room temperature was increased to 77°F/25°C. The patient received a total of 4 units of PRBC's, 5 ampules of sodium bicarbonate, and 7.1 L of warm crystalloid fluid. Perioperative vital signs and arterial blood gas values are in Table 1. The patient tolerated all the operating procedures well and was brought to PACU intubated, hemodynamically stable. He was found to have rhabdomyolysis and acute kidney injury which resolved over several days. Non-operative depressed skull fracture was also found. The patient became normothermic within 24 hours and was extubated eight days later. The rest of the post-operative recovery was uneventful, and the patient was discharged to a traumatic brain injury rehabilitation centre twelve days later. Written informed consent was obtained for publication of this manuscript.

Time	B l o o d Pressure	Heart Rate	Temp F/C	pH	PCO ₂	PAO ₂	HCO ₃
0845	125/65	49	79/26.6				
0919	110/55	55	80.2/26.6	6.92	37	466	6.1
0943	116/44	75	81/27.2	7.03	49	524	11.4
1043	116/44	75	86.7/30	7.07	46	365	12.4

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1126	118/49	90	89/31.6	7.16	44	149	15.4
1203	116/58	100	93/33.8	7.15	47	163	15.7
1246	110/55	102	94.5	7.26	41	178	18.6
1743				7.34	40	201	21.9

Table 1: Patient's perioperative vital signs and arterial blood gas values**Discussion**

Severe hypothermia with a temperature under 28°C is rarely compatible with life, with only a few cases reporting patients that have survived such low temperatures [5]. Severe accidental hypothermia mainly afflicts individuals of outdoor accidents who suffer prolonged exposure to cold environments or are immersed/submersed in cold water. Untreated hypothermia may result in circulatory depression, coagulopathy, impaired immune function, neurological deficits, and potentially cardiac arrest [5-7]. During hypothermia, the oxygen consumption decreases without affecting oxygen supply, so the cells are protected from anoxia. Treatment of hypothermia includes active external rewarming such as convective warming (hot air blanket), heated humidified gases, radiant warmers, and warmed IV fluids and active internal warming such as veno-venous hemofiltration, body cavity lavages, cardiopulmonary bypass, and continuous arteriovenous rewarming [1,2,7]. In our patient, aggressive and proper treatment of this patient helped save his life.

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Conflicts of Interest

The authors declare that there are no conflicts of interest.

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