

## A CASE STUDY: UTILIZING THE VAPOTHERM 2000I HIGH FLOW NASAL CANNULA SYSTEM TO REWARM A NONINTUBATED HYPOTHERMIC TRAUMA PATIENT

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**Introduction:** The Vapotherm 2000i is a gas delivery device that can deliver up to 40 lpm heated, humidified oxygen through a specially designed nasal cannula at FIO<sub>2</sub>'s ranging from 21-100%. Small studies of post-op patients reported those patients to be effectively rewarmed using the Vapotherm, but no reports have been published in the hypothermic ED setting. We present a case where a nonintubated, hypothermic patient in our Level 1 Trauma ED was effectively rewarmed with the 2000i after traditional methods were falling short.

**Summary:** The patient is a healthy 50-year-old African-American male construction worker with an unremarkable medical history. Our LifeFlight Dispatch Center received a call at 10:30am on Monday, January 5th, 2004 requesting air transport at a construction site outside of Houston. The report received was that the patient was alone at the site and had slipped and fallen into a ditch approximately 20-25 feet in depth, landing on his right side. The bottom of the ditch was covered in several inches of cold water. The exact time of the fall could not be determined, but was approximated to be up to 2 hours before he was discovered. He complained of mid and lower back pain, pain in his right scapula, numbness in his upper extremities, and of being very cold. It was estimated that the temperature of the water he laid in was 40-45° F. His GCS was assessed at 15. A C-collar was applied and Solumedrol was administered as a precaution once IV access was established. Vital signs, including pulse oximetry were stable. He was covered in blankets and transported to our Level 1 Trauma Center, arriving at 12:08pm. Upon arrival, his body temperature was 95° F, via a now in place foley catheter probe. A Bair Hugger warming device was put into place and over the next hour he received warmed fluids via a Level 1 Transfuser. At the end of that hour, his temperature had only risen to 95.8° F. We received a call from Trauma Surgeon Dr. Red Duke, asking if we had anything to offer to help rewarm this patient. We arrived shortly thereafter with the Vapotherm 2000i. The patient was in another part of the ED having CT's done on our arrival. His saturations were stable and he had been on room air since arrival. We immediately prepared the Vapotherm for use. Our plan was to deliver 30 lpm of gas at an FIO<sub>2</sub> of 21%, warmed to 102° F. The patient was placed on the Vapotherm device along with the Bair Hugger upon his return from CT. The Level 1 transfuser was not placed back on the patient. His temperature was 95.8° F at initiation of the therapy. Within 45 minutes, the patients core temperature had risen to 98.1° F. He reported no discomfort from the heated high flow gas through the cannula. All blood test results were unremarkable, and his CXR and all CT scans were negative for injury. The patient remained on the Vapotherm for approximately 2 hours and was sent to the orthopedic floor on room air for observation. He was discharged 3 days later after follow up tests, including a cardiac workup, which was also negative.

**Discussion:** Rewarming of hypothermic patients can be a challenging and frustrating process. The previously mentioned small study of post-op patients had shown promise so we had been looking for an opportunity to explore the nonintubated ED patient with hypothermia. In the face of our success, a formal study in this population of patients in a colder climate than Houston utilizing the Vapotherm device should be undertaken.

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