Prehospital point of care testing of blood gases and electrolytes — an evaluation of IRMA

ABSTRACT

We concluded that knowledge of the patients' pH, pCO2 and pO2 in life threatening situations yields more objective information about oxygenation, carbon dioxide and acid-base regulation than pulse oximetry and/or capnometry alone. Additionally, it enables physicians to correct severe hypokalemia or hypocalcemia in cases of cardiac failure or malignant arrhythmia.

INTRODUCTION

Introduction Oxygenation and ventilation are important factors in the treatment of emergency patients. A number of studies have shown that the severity of hypoxemia is frequently underestimated, even by experienced emergency physicians. With noninvasive methods such as pulse oximetry and capnometry, the ability to obtain reliable measurements assessing oxygenation and ventilation can be limited by abnormal physiologic states commonly seen in emergency patients. In emergency situations (eg shock, bleeding, during cardiac massage, etc) an abnormal ventilation/perfusion (V/Q) relationship affects end tidal CO2 (EtCO2) measurements, and the absence of an adequate pulse signal can result in the failure of pulse oximetry to measure arterial hemoglobin saturation (SpO2). In addition, optimization of the electrolyte status, specifically potassium (K) and ionized calcium (Ca2+), is important in the treatment of a developing or manifested cardiac failure. The purpose of this study was to describe our first experiences with the IRMA Blood Analysis System (DIAMETRICS, ChemoMedica-Austria, Vienna, Austria), a portable, battery-powered blood analyzer which has been available since April 1996 as part of a prehospital emergency physician system.

CONCLUSION

Conclusions There are several indications for the use of prehospital blood analysis in emergency situations. In cases of critically ill or severely traumatized patients the widely used monitoring techniques like pulse oximetry and capnometry are limited and not acceptable alternatives to blood gas analysis. The IRMA transportable blood analyzer, which has been available since April 1996, can deliver these valuable blood gas measurements. The system has been found to be very useful; it is easily transportable and after some corrections performs reliably. We believe that in the future prehospital blood analysis will become an important part of a well organized emergency system.