Abstract

Sepsis is the leading cause of death in non-cardiac ICUs, and the 10th leading cause of death in the United States overall (Mayr, Yende, & Angus, 2014; Xu, Kochanek, Murphy, & Tejada-Vera, 2010). If not timely recognized and appropriately managed, it can rapidly advance to septic shock. Hence, early recognition and appropriate management of this condition is imperative to improve patient outcomes and survival. In particular, being able to assess intravascular volume and fluid responsiveness in the septic patient is crucial to guide resuscitation efforts (Marik, Monnet, & Teboul, 2011).

The goal of fluid resuscitation is to improve oxygen delivery and organ perfusion (Marik, Monnet, & Teboul, 2011). Since volume administration does not always improve hemodynamic status and has the potential to cause harm (i.e. respiratory and cardiac failure), monitoring of parameters capable of predicting fluid responsiveness is necessary (Marik, Monnet, & Teboul, 2011). Invasive and minimally invasive hemodynamic monitoring technologies provide invaluable information to guide fluid resuscitation, but they expose patients to iatrogenic risk (i.e. infection, bleeding) and can cause treatment delays (cannot be initiated until vascular access is established). Novel innovations that are noninvasive and easy to implement have been developed and studied (Squarra et al., 2007, & Waldron et al, 2014). One such technology is the NICOM hemodynamic and cardiac output monitor (Cheetah Medical, Portland, OR). The device uses bioreactance technology to deliver non-invasive, continuous, and precise cardiac output (CO) and other important hemodynamic parameters to guide fluid administration and titration of medications.

The health care reform and HITECH act will have an overwhelming impact on health care providers, including decreases in reimbursement, monetary incentives, and penalizations for poor outcomes (Rufo, 2011). Health care providers are now faced with the challenge of creating fresh approaches to healthcare to improve quality and efficiency as well as meet the technological and cost effective demands of the reform. These conditions warrant investigations of the diffusion of information technology (IT) (Escobar-Rodriguez & Romero-Alonso, 2014). Reflecting on the diffusion of innovations theory, the NICOM technology presents certain qualities that are significant in the adoption of a new technology (Robinson, 2009): It provides advantages over and is comparable with existing practices, it can be tried through pilot testing before making a purchase commitment, research studies have demonstrated its accuracy against well-established systems (Squarra et al., 2007, & Waldron et al, 2014), and because of its ease of use it should be well accepted by the end users.

Furthermore, integration of this technology with the already existing telehealth initiatives in our ICU has the potential to bring forth improved patient outcomes and lowered costs in the management of sepsis. Not only will this method of hemodynamic monitoring eliminate the cost and risks of invasive monitoring, but it will also provide the benefits of telemedicine (i.e. improved monitoring and patient outcomes) (Rufo, 2011).

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