We recruited 16 subjects during one bronchiolitis season (1/14 – 2/26/2010) from the Medical Intensive Care Unit (N=5), the Intermediate Care Program (N=6) and Medical Inpatient Units (N=5). Our subject characteristics are consistent with those of other infants studied in the literature with acute, moderate-to-severe bronchiolitis. The majority of these infants had respiratory syncytial virus (RSV).

INTRODUCTION

Hemodynamic monitoring, including measurement of cardiac output (CO), is important in pediatric critical care medicine. However, measuring CO traditionally requires invasive techniques that are difficult in many patients, especially non-sedated infants. New non-invasive physiologic monitors may be able to detect hemodynamic changes including CO in awake infants. If so, non-invasive CO monitoring could facilitate hemodynamic profiling and guide medical interventions in these patients.

METHODS

This is a sub-study within a larger ongoing prospective study of hemodynamic changes in hospitalized patients as characterized by non-invasive CO monitoring. The Anespol CO monitor (Cardiosonic Inc.; La Jolla CA) calculates surrogate measures of CO by electrical velocimetry (EV), a subtype of bio-impedance monitoring. The device has been validated in sedated children with congenital heart disease but has not been assessed in non-sedated infants.

Patients were eligible for the study if they were previously healthy and required hospitalization for acute illness. After obtaining informed consent, we obtained daily five-minute recordings for each patient with the CO monitor from admission to discharge. In addition to the CO, stroke volume (SV) and heart rate (HR) measures from the monitor, we compiled routine data from the patient charts including vital signs, diagnostic tests and clinical interventions. We analyzed hemodynamic changes within the subset of patients who had a primary diagnosis of bronchiolitis.

RESULTS

We detected a significant decrease in cardiac output during the hospital course of 16 infants with acute bronchiolitis, as measured by a non-invasive CO monitor.

CONCLUSION

- We detected a significant decrease in cardiac output during the hospital course of 16 infants with acute bronchiolitis, as measured by a non-invasive CO monitor.
- The change in CO was largely attributed to a decrease in stroke volume, though this latter measure did not reach statistical significance (p=0.06).
- Our observations in this study build confidence that the non-invasive CO monitor is sufficiently sensitive to detect hemodynamic changes in this age group.
- Non-invasive CO monitors may provide a practical alternative to invasive CO measurements for directing treatment of pediatric diseases.

REFERENCES


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