Data Article

Multivariate physiological recordings in an experimental hemorrhage model

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ABSTRACT

In this paper we describe a data set of multivariate physiological measurements recorded from conscious sheep ($N = 8$; 37.4 $\pm$ 1.1 kg) during hemorrhage. Hemorrhage was experimentally induced in each animal by withdrawing blood from a femoral artery at two different rates (fast: 1.25 mL/kg/min; and slow: 0.25 mL/kg/min). Data, including physiological waveforms and continuous/intermittent measurements, were transformed to digital file formats (European Data Format [EDF] for waveforms and Comma-Separated Values [CSV] for continuous and intermittent measurements) as a comprehensive data set and stored and publicly shared here (Appendix A). The data set comprises experimental information (e.g., hemorrhage rate, animal weight, event times), physiological waveforms (arterial and central venous blood pressure, electrocardiogram), time-series records of non-invasive physiological measurements (SpO_2, tissue oximetry), intermittent arterial and venous blood gas analyses (e.g., hemoglobin, lactate, SaO_2, SvO_2) and intermittent thermodilution car-

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diac output measurements. A detailed explanation of the hemo-
dynamic and pulmonary changes during hemorrhage is available
in a previous publication (Scully et al., 2016) [1].

Specifications table

Subject area	*Physiology*
More specific subject area	*Multivariate physiological monitoring: hemodynamic, cardiovascular and pulmonary variables*
	Critical care monitoring
Type of data	*Digitized times series in European Data Format (EDF) and CSV*
How data was acquired	*Continuous waveforms and variables were recorded using a data acquisition system through invasive transducers or noninvasive electrode sensors. Intermittent measurements from laboratory blood gas analyses were also recorded by technicians and transformed to digital formats. All data were synchronized and consolidated into a zip file with a specific time stamp for each time series entry.*
Data format	*Raw synchronized and combined into EDF and CSV formats*
Experimental factors	*Data were continuously recorded in consecutive phases throughout the course of the experiment: baseline, hemorrhage, post-hemorrhage, transfusion and post-transfusion. Interventions were applied during hemorrhage and transfusion phases in which blood has been drawn or re-injected back to the animal, respectively. Each animal underwent two hemorrhages separated by at least 3 days at two different hemorrhage rates (1.25 ml/kg$_{BW}$/min or 0.25 ml/kg$_{BW}$/min).*
Experimental features	*Data recorded from large animals during experimental hemorrhages at two different rates. A wide range of continuous and intermittent measurements has been acquired from each animal to reflect physiological changes and variabilities with response to hemorrhage.*
Data source location	*Data was originally recorded at Department of Anesthesiology, University of Texas Medical Branch, Galveston, Texas, USA.*
Data accessibility	*Data is shared to be publicly available for users in this article (Appendix A).*

Value of the data

- To investigate the effects of hemorrhage rate on various physiological system responses in an animal model.
- To evaluate the performance of physiological measurements estimated from waveform analysis algorithms in continuous monitoring of patient status during acute hemorrhage.
- To develop novel biomarkers and smart monitoring indices of hemorrhage using continuous measurements and machine learning algorithms compared to standard clinical measurements such as blood gas analysis.
- To develop analytical algorithms for physiological waveform feature detection or signal quality assessment under stable and unstable physiological conditions.

1. Data

This data set includes physiological waveforms, continuous variables and intermittent laboratory measurements of blood samples and cardiac output estimations acquired during experimental