EASILY ESTABLISHED CARDIAC OUTPUT MONITORING WITHOUT RISK.

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The LiDCO™*plus* Hemodynamic Monitor has been validated for measuring cardiac output (CO) using an indicator (lithium) dilution technique[1]. It also provides continuous CO data using arterial waveform analysis. Systemic arterial and any venous access is all that is required to use this system. Four cases from our Intensive Care Unit (ICU), using LiDCO™*plus*, are described.

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A 21 year-old male underwent drainage of pus from an extensive orofacial infection. He was admitted to ICU, intubated, due to severe airway swelling. Hypotension, acidosis, oliguria and poor perfusion, unresponsive to significant fluid administration, developed. Inflammation extended across the neck and upper chest making central access difficult. The existing radial arterial (RA) and peripheral venous lines were used. LiDCO™*plus* demonstrated hypodynamic septic shock with a poor stroke volume (SV) despite adequate filling. Rationally administered inotropes increased cardiac output and reversed the shocked state with eventual full recovery.

A 17 year old male motorcyclist sustained multiple injuries including head, chest (pneumothorax and contusions), compound humerus and femur fractures. At urgent laparotomy, perforation and tears to stomach and bowel were repaired. Liver lacerations were packed. Blood loss was around 9 litres and a coagulopathy was present. Post-operatively he became increasingly hypotensive and tachycardic with a rising central venous pressure. Determining CO with LiDCO™*plus* guided fluid and vasoactive drugs without additional vascular access. Packs were removed 24 hours later with discharge to High Dependency at 12 days.

A 79 year-old male with chronic respiratory disease and renal impairment was admitted to the ICU with pneumonia causing severe breathlessness and worsening respiratory, renal and circulatory failure. Using existing RA and peripheral venous access the CO was determined using LiDCO™*plus*. Guided by CO and SV trends the haemodynamics were optimised with rapid, appropriate fluid resuscitation. Central line insertion, which would have required this very breathless patient to lie flat, was not required. Urine output returned as the haemodynamic state improved. Respiratory status also improved with non-invasive support.

A 64 year old lady with septic shock from an infected left hydronephrosis (ureteric calculi) was admitted to ICU. She was on warfarin (INR=5) for a recent DVT. She had severe acute respiratory, circulatory and renal failure with a marked metabolic acidosis. LiDCO™*plus* CO monitoring was rapidly established by our nursing staff, using existing access. This directed use of fluid and inotropic support. When optimised she had insertion of a percutaneous nephrostomy tube which permitted draining of pus. Full recovery was achieved with discharge on day 4.

LiDCO™*plus* can measure CO easily and rapidly in a range of clinical situations. In addition to accurate and continuous CO data the LiDCO™*plus* Hemodynamic Monitor gives information on beat-to-beat pressure and volume variation which relate to fluid status[2]. As most patients requiring CO monitoring will already have systemic arterial and venous access, this system avoids additional invasive procedures. Alternative methods of CO measurement requiring central venous, femoral arterial or oesophageal access would have been more difficult in these cases. ICU nursing staff can be educated to set up and maintain this CO monitor. In conclusion the LiDCO™*plus* Hemodynamic Monitor allows critically ill patients to benefit from resuscitation guided by accurate, easily and rapidly established, CO monitoring without exposure to additional risk.

References
1. Linton R, Band D, O'Brien T et al. Critical Care Medicine 1997; 25: 1796 -1800
2. Bendjelid K, Romand J-A. Intensive Care Med 2003; 29: 352-360