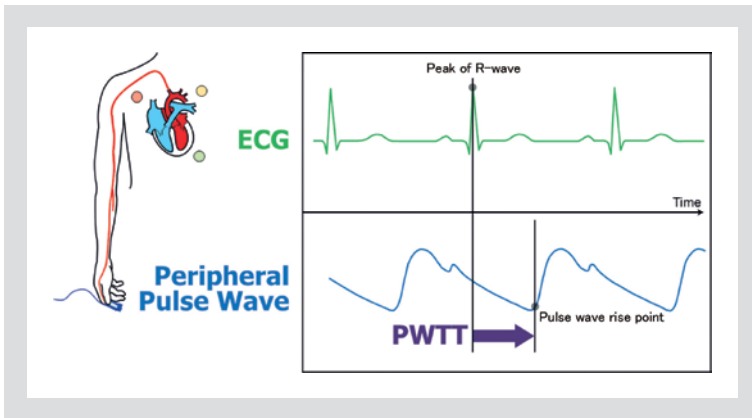


# The Next Generation of Non-Invasive Hemodynamics Monitoring

NIHON KOHDEN is redefining Quality of Care with new non-invasive technologies like PWTT (pulse wave transit time) and esCCO (estimated continuous cardiac output) by introducing volumetric information to all care levels.

Since the invention of pulse oximetry by

Nihon Kohden researcher Takuo Aoyagi in 1974, the pulse wave has become the most commonly used vital signal in clinical practice. The pulse wave can provide time-related information such as intravascular pressure transmission as well as information about arterial blood volume change.



A high correlation between PWTT and stroke volume has been demonstrated in animal studies<sup>1)</sup>. Ishihara et al. also reported that continuous cardiac output estimated with PWTT and heart rate is highly correlated with cardiac output determined by thermodilution technique<sup>2)</sup>. In 2009, a multi-center study at seven facilities verified the effectiveness of esCCO as a practical application<sup>3)</sup>.



esCCO is available on following NIHON KOHDEN patient monitors



Vismo



Life Scope TR



Life Scope G9

## Redefining Quality of Care with **es<sup>timated</sup>CCO**



**NIHON KOHDEN is one of Japan's leading players in medical technology development and manufacturing, and has subsidiaries and representative offices worldwide.**

**"Fighting Disease with Electronics" – our corporate philosophy – reflects the high standards we have set ourselves in combating disease by developing medical systems, contributing to higher quality of life for patients. Our product range focuses on patient monitoring, cardiology (ECG equipment and defibrillators) as well as neurology (EEG, EMG and EP).**

### References

- 1) Sugo Y, Ukawa T, Takeda S, Ishihara H, Kazama T, Takeda Z. A Novel Continuous Cardiac Output Monitor Based on Pulse Wave Transit Time. Conf Proc IEEE Eng Med Biol Soc. 2010; 2010; 2853-6
- 2) Ishihara et al, A new non-invasive continuous cardiac output trend solely utilizing routine cardiovascular monitors. J Clin Monit, 2004 Dec; 18, 313-320
- 3) T. Yamada, Y. Sugo, J. Takeda, esCCO ResearchTeam. Verification of a non-invasive continuous cardiac output measurement method based on the pulse-contour analysis combined with pulse wave transit time. Eur J Anaesthesiol 2010; 27 (Suppl 47): 3AP5-9

### Emergency medicine

The dynamic parameters of cardiac function and the vascular system are important in the evaluation of patients with systemic inflammatory condition who present to the emergency department. Patients are evaluated for admission to the standard care unit, continuous monitoring unit or ICU, based on their clinical condition such as inflammatory, sepsis, and shock. esCCO non-invasively provides hemodynamic information that is useful in this patient evaluation process. The display of esCCO can assist ER staff to see a patient's condition more effectively, and assist physicians to recognize earlier if the patient has a serious condition such as myocarditis.

### ICU and recovery room

esCCO can be useful as a monitoring tool to follow up patients with unstable



or compromised hemodynamic status in the ICU and recovery room. With this non-invasive cardiovascular monitoring, hemodynamic and cardiovascular trends will be available on standard monitors. esCCO can be also used as criteria to determine if the patient can be discharged from post-operative care and continuous monitoring unit. Monitoring of cardiac and vascular function by using this non-invasive method may assist physicians to see if the patient is recovered sufficiently to be discharged from special care unit to general ward.

### Operation room

esCCO can be extremely useful for anesthesia management for patient with cardiac disease during surgery. Monitors equipped with esCCO provide usable information continuously and non-invasively and might bring a dynamic change to the conventional anesthesia procedure. Non-invasive circulatory monitoring using esCCO could become a new standard for patient monitoring in anesthesia management during various surgeries, including cardiac, circulatory and thoracic surgery.

