

Heart Failure – Noninvasive Hemodynamic Monitoring on the Rise

Heart Failure (HF) is a major and public health problem as it affects at least 26 million people worldwide and will dramatically increase with an ageing population. Currently 5.7 million people suffer from HF in the US with an expected 46% increase in prevalence by 2030.^[1] This is an alarming number especially when accounting for increasing health care cost. In the US around \$31 billion, (10% of the total healthcare expenditure for cardiovascular diseases) is related to HF treatment and therapy and is expected to increase 127% by 2030.^[1]

The risk factors for Heart Failure are multifactorial and complex^[1] and therefore a significant prognosis is essential for an efficient treatment or medication. Hypertension is reported to be the most prevalent HF risk in the developed world and the ESC guidelines recommend monitoring of continuous blood pressure and heart rate as standard for this patient group.^[2,3] Further, decreased cardiac output has been documented as a central problem in HF patients, followed by an increased preload and lower systolic blood pressure.^[4]

Standard assessment of heart failure patients is invasive in most cases and the measurement of right ventricular, right atrial, and pulmonary artery pressures and cardiac output determination remains an invasive gold standard in hemodynamic assessment of severe systolic HF during right heart catheterization.^[5] Since technological advances have enabled reliable noninvasive and continuous hemodynamic monitoring devices to become available on the market, the assessment of HF risk factors to support an efficient prognosis has become much easier and less risky.

A study by Fernandes Serôdio et al. with the noninvasive Task Force® Monitor investigated the role of baroreceptor sensitivity (BRS) in HF patients and concluded that baroreflex function is also an independent marker for heart failure prognosis. HF patients show depressed arterial baroreflex function, which correlates closely with other clinical HF parameters.^[6]

Related to the medication of the patients, they reported significant evidence that noninvasive methods provide similar results to those obtained through the phenylephrine technique and might even avoid the use of vasoactive drugs.^[6]

There are also composite parameters, which are based on



noninvasive readings and which “may provide equally accurate prognosis as the invasive examination”^[5], as reported by Gilewski et al.

Nygaard et al. confirm “that a set of non-invasively determined parameters provides similar accuracy of prognosis as in the case of invasive parameters”^[7]

The assessment of noninvasive hemodynamic parameters in critically ill heart failure, stroke and sepsis patients in the Emergency Department might even help to distinguish one disease state from another.^[8]

Another study by Wagner et al. shows that apart from being a helpful tool for diagnostics, noninvasive and continuous BP and CO monitoring is also a benefit for HF patients in the challenging perioperative field.^[9]

Noninvasive hemodynamic assessment contributes to decreased cost as well as risk by providing enhanced diagnosis, and enables the development of early and individualized treatment strategies for HF patients in order to avoid heart transplants as the very last consequence.

“If given optimal therapy guided by HD monitoring it might be possible to drive down hospital length of stay and 30-day readmission rates (25%) in this patient population.”^[8] ■

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REFERENCES

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