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Haemodynamic evaluation: a key tool for heart failure management.

Ultrasounds forever!

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Conflict of interest:

none

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The recommendations for the echocardiographic assessment of diastolic function and/or filling pressure have been largely investigated, criticized, and more recently tested against the invasive measurements(1-4). It is possible to get a correct estimation of left ventricular (LV) end-diastolic pressure but unresolved issues remain. Interestingly, the invasive gold standard is not consistent across the studies and could be questioned(5-7).

It remains unclear what is the main clinical objective of all these studies about diastolic function and filling pressure that are always treated all together (misleading objective probably)(7). Trying to predict left ventricular end-diastolic or the pulmonary capillary wedge pressure or central venous pressure does not lead to the same clinical objective(8-10). Probably the ultrasound techniques should be integrated into the clinical evaluation as an extension of it and not be used independently. Can part of the deception that some have with echocardiography for the evaluation of filling pressure come from incompletely defined objectives?

Back to the clinical ground, the point is not to test ultrasound against the invasive assessment of diastolic function, but to test the efficacy of ultrasounds against either clinical evaluation or biomarkers in the management of patients with heart failure.. If we believe that cardiac imagers have a key role in the state-of-the-art patient management, it is certainly not because images are pretty but because images are the key to solve clinical challenges. Still, there is an unquestionable lack of evidence for promoting the use of ultrasound for best managing heart failure patients. There are randomized studies but not enough consistent evidence with a definite impact on the guidelines(11-13).

Echocardiography has been demonstrated useful in many studies in the field of cardiology but even more in intensive care or emergency grounds. Perhaps non cardiologists have admitted the value of ultrasound more than cardiologists despite the background we have as cardiologists and despite the tricky haemodynamic situation we are frequently facing(14-16). In the present manuscript, Pellicori et al provide a highly comprehensive use of the echocardiography for guiding the treatment of our heart failure patients(17). It is a clear and impressive step forward through a global haemodynamic assessment of our complex

patients. Charge for us to implement these non-invasive tools in our daily practice and charge for us to demonstrate the key role of ultrasound use for providing to our patients a safer introduction of the new treatments to best treat them. The cardiorenal syndrome, the excessive use of diuretics could, probably, be prevented better if we accept to switch our stethoscope to hand-held-ultrasound-device (HHUD)(18, 19).

The approach proposed by Pellicori et al is simple and rapid(17). As already suggested earlier, the flowchart should be convincingly used in randomized studies. For now, we can just be enthusiast and eager to get more results. The manuscript is very attractive and should push forward the heart failure specialists to use more the ultrasounds for solving their issues about the management of heart failure patients. This manuscript should be provided to all the fellows and senior-doctors who are managing patients in our heart failure units!

Cardiologists, heart failure specialists are not familiar enough with the great value of echocardiography for optimizing, daily, the treatment of heart failure patients.

Ultrasound imaging of congestion is readily feasible in an HF-unit, intensive care unit and emergency department as an extension to physical examination for diagnosis, rapid fluid management and for defining the need for invasive central venous pressure monitoring. In that regard, congestion imaging likely fits in the point of care and FoCUS (Focused Cardiac Ultrasound) approaches(18, 19). Relatively easy to learn, this approach is also attractive and beneficial for non-cardiologists such as intensivists, anesthesiologists, emergency department physicians and even heart failure nurses. Congestion imaging could be even more expanded with the advancement of HHUD(18, 19). The degree of conclusiveness of HUS for congestion imaging compared to standard echocardiography needs to be explored

before entering in the FOCUS practice. Obviously, this would be a great opportunity to reduce the time for treatment delivery (figure).

Another question that comes out of the reading of Pellicori et al manuscript is the following(17): should we teach also general practitioners and nurse practitioners? They could up titrate the medical treatments after hospitalization to prevent recurrent decompensations potentially better if they could get this non-invasive assessment of the haemodynamic condition of each patient. That seems appealing. A next step could aim to implement this approach outside the hospital. In that perspective, feasibility, robustness and repeatability will have to be confirmed by non-experts. Also, akin to telemedicine, the diagnostic value has to be associated with a therapeutic impact. Accordingly, the authors should explain how they manage abnormal venous renal pressure and if it does impact the prognosis. They should explain what they do when superior vena cava is enlarged and what is the prognostic value of that. Should one consider sacubitril-valsartan instead of ACE-inhibitors based on the hemodynamic findings of the ultrasound study? Could we phenotype better our patients with this approach? And again, if we could do so, would that change the prognosis? (figure)

To summarize, this review gives important clues to expand the use of point of care ultrasound and to potentially optimize rapidly the diagnosis and treatment of heart failure.

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Figure : ultrasound for individualized and optimized treatment of heart failure?

Management of a heart failure patient

① Up-titration of treatment based on clinical exam, expert believes and expertise and guidelines



Risk of mis-interpretation of signs and symptoms that could be overcome by ultrasounds?

② Up-titration of treatment based on clinical exam, biomarkers and guidelines



Risk related to factors including co-morbidities that could be overcome by ultrasounds?

③ Up-titration of treatment based on clinical exam, **ultrasound haemodynamic assessment** and guidelines for a **more individualized** and precise optimisation of every single patient ???



The winner has to be the patient