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Cardiac involvement in Systemic lupus erythematosus: can we do better?

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Introduction

Cardiovascular heart disease is a leading cause of morbidity and mortality in patients with systemic lupus erythematosus (SLE). (1)

Recent data from patients with connective tissue disease suggests that myocardial dysfunction is more frequent than in the general population and is associated with poor survival. (2) Moreover cardiovascular involvement is often under recognised and leads to increased morbidity. (3) Cardiologists must therefore have a heightened awareness in patients with SLE. Thanks to the innovative imaging we can identify early cardiac involvement and improve outcomes for our patients. (4)

Why is it important to do better?

As the SLE is a heterogeneous disease which can involve almost all organs system, the cardiovascular involvement is a major cause of morbidity and mortality. According to the literature, the myocardial involvement could occur from 8% to 15% in the SLE patients. (5) The dysfunction has multiple etiologies including diffuse small vessel vasculature, microcirculation damage or epicardial coronary damage. (6) Inflammation is the cause of these processes and it potentiates the effects of the “traditional” cardiovascular risk factors leading to accelerated development of atherosclerosis which results in a higher incidence of cardiovascular disease in this population. (7)

Development of significantly impaired LVEF occurs in the late stages, and early identification of myocardial involvement helps to tailor treatment in order to prevent the high rates of cardiovascular morbidity and premature mortality in this population.

Rapid assessment leading to early intervention.

Innovative imaging techniques help to identify subtle changes before an overt impairment of EF occurs and is crucial for timely intervention. Myocardial work (MW) is a recent tool developed in the last decade. Initially proposed by Russell and his team. (8), this imaging technique using the speckle tracking in echocardiography reflects the myocardial oxygen consumption. The evaluation of the myocardial work using non-invasive pressure-strain curves avoids the risks associated with invasive myocardial work assessment and renders this modality accessible to daily clinical practice. Myocardial work can allow the early detection of myocardial dysfunction in SLE patients by detecting subtle changes in myocardial function, which may not be apparent on routine echocardiography. In this work done by He *et al.*, the LVEF remained normal but others parameters (as the MW) was associated to a poorer prognosis. (9)

The measurement of the MW is simple and the only additional step to standard echographical acquisition is the systolic blood pressure, the valvular timings are automatically computed by the machine after the global longitudinal strain (GLS) has been performed. (10) It takes only one minute and can be done offline to help to identify patients at risk that may otherwise be misclassified as normal.

Innovative imaging resulting in enhanced risk profiling.

Clinicians should consider incorporating myocardial work into their routine evaluation of lupus patients to improve the detection of early myocardial dysfunction and to reduce the burden of cardiovascular disease in this group of patients.

Global longitudinal strain has already shown its enhanced prognostic ability in SLE patients in work by Gegenava *et al.* (11)

He *et al.* demonstrate that the Global Work Efficiency (GWE) is decreased according to the increase of the Global Wasted Work (GWW). The more active the disease (according to the SLEDAI score), the lower the GWE. This work also showed that male sex and diabetes were independent factors predicting impaired MW. By combining the afterload parameters and obtaining the myocardial work, it may further enhance our ability to recognize patients with early myocardial involvement and intervene in a timely fashion.

Conclusion

In conclusion, the implementation of myocardial work in transthoracic echocardiography may help us to recognize abnormalities earlier allowing earlier cardioprotection and optimal control of cardiovascular risk factors. We recommend performing GLS for all patients. In case of doubt or abnormal value, myocardial work analysis seems to be a promising tool for the detection of myocardial damage.

623 words

Title: 10 words

N° of references: 11

Figure: 1

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FIGURE:

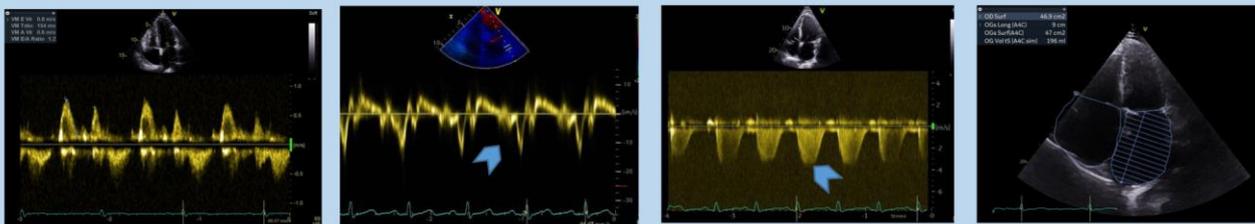
Proposition for a comprehensive transthoracic echocardiography in systemic lupus erythematosus

1) Measurement of the regular parameters with attention to the pericardium and valves



and others ...

2) Have a particular attention on diastology



E/A

$e' - E/e'$

TR Vmax – sPAP

LAI volume

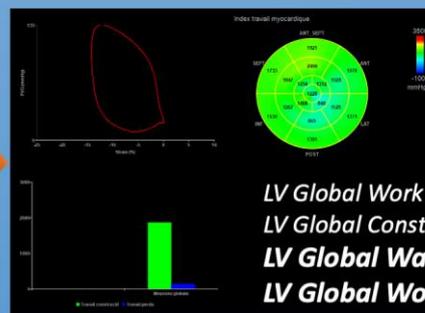
3) Important role of global longitudinal strain (GLS)



4) Promising role of myocardial work (MW)



GLS + Blood-pressure



LV Global Work Index (mmHg%)
LV Global Constructive Work (mmHg%)
LV Global Wasted Work (mmHg%)
LV Global Work Efficiency (%)

Central illustration: Proposition of flow chart for a comprehensive TTE in SLE patients

TR Vmax: Tricuspid Regurgitation Vmax, LAi volume: Left Atrial indexed volume, GLS: Global Longitudinal Strain, MW: Myocardial Work

Central illustration: Proposition of flow chart for a comprehensive TTE in SLE patients

Author Agreement Form – International Journal of Cardiology

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This statement is to certify that all authors have seen and approved the manuscript being submitted, have contributed significantly to the work, attest to the validity and legitimacy of the data and its interpretation, and agree to its submission to the *International Journal of Cardiology*.

We attest that the article is the Authors' original work, has not received prior publication and is not under consideration for publication elsewhere. We adhere to the statement of ethical publishing as appears in the International of Cardiology (citable as: Shewan LG, Rosano GMC, Henein MY, Coats AJS. A statement on ethical standards in publishing scientific articles in the International Journal of Cardiology family of journals. *Int. J. Cardiol.* 170 (2014) 253-254 DOI:10.1016/j.ijcard.2013.11).

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All authors are requested to disclose any actual or potential conflict of interest including any financial, personal or other relationships with other people or organizations within three years of beginning the submitted work that could inappropriately influence, or be perceived to influence, their work. If there are no conflicts of interest, the COI should read: "The authors report no relationships that could be construed as a conflict of interest".