# Cardiac interstitial edema in intensive care unit: echocardiographic assessment of a novel entity in systemic diseases

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### Introduction

In ICU shock is often the manifestation of a systemic disease where the increase in microvascular permeability causes fluid accumulation in the cardiac interstitium. This is a well known feature in fulminant myocarditis, but cardiac interstitial edema (CIE) develops also in sepsis-induced (SiC) cardiomyopathy and Clarkson's disease flares (Wu et al, Journal of critical care, 2020). CIE may act as a trigger for myocardial fibrosis: early diagnosis is necessary for a prompt treatment. The study aims to evaluate the feasibility of an early echocardiographic assessment of CIE in ICU systemic disease.

Between may 2018 and may 2019, in 15 patients admitted for shock in L.Sacco hospital ICU, CIE was studied. Wall thickness, myocardial texture, diastolic (e/e1, IVRT, telediastolic left ventricle volume) and systolic (left ventricle ejection fraction-LVEF) parameters were analyzed on line, speckle tracking echocardiography acquired off line. CIE was defined as wall thickness above 10 mm in men, 9 in women.

### Results

CIE was present in all 5 cases of autoimmune myocarditis, in one of 3 SiC and in 7 of 8 Clarkson's disease. Myocardial texture was enhanced in CIE, but in myocarditis with heterogeneous pattern, in SiC and Clarkson's disease with homogeneous pattern. Diastolic disfunction resulted as grade I in 3 patients, grade II in 10 and grade III in 3, LVEF<30% in myocarditis, >30% in Clarkson's disease and SiC, global longitudinal strain was early reduced.



## **Discussion and Conclusion**

CIE jeopardizes myocardial function leading to low cardiac output and shock in the acute phase, while prolonged myocardial edema may act as a trigger for interstitial cardiac fibrosis (Desai et al., Am J Physiol Heart Circ Physiol, 2008). Targeting these patients early for the intervention may improves outcome. Echocardiography is a sensitive method to search CIE, to monitor its resolution and to assess myocardial impairment.

