

Clinical applicability of echocardiographic strict negative criteria for suspected infective endocarditis

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Introduction: Infective endocarditis (IE) is an uncommon but potentially lethal disease that requires a timely diagnosis. Echocardiography has a pivotal role in IE diagnosis, but this may lead to an overuse of this technology in clinical daily practice, and it is unclear which patients can benefit from a follow-up study if the initial transthoracic echocardiogram (TTE) shows no signs of IE. The strict negative criteria (good ultrasound quality and no high-risk features such as significant valvular regurgitations or stenosis, pericardial effusion or intracardiac devices) have been recently proposed to avoid unnecessary follow-up echocardiograms.

Purpose: The objective of this study is to review the contemporary, real-world use of echocardiography in patients with suspected IE and analyze the potential applicability of the strict negative criteria.

Methods: We retrieved all the echocardiograms that were performed in our center for suspected or confirmed IE between January 2014 and December 2018. We defined different groups according to the strict negative criteria and reviewed the electronic clinical history to check if a definitive diagnosis of IE was established or not.

Results: We included a total of 905 TTEs. 451 (49.8%) of them fulfilled the strict negativity criteria (Group 1). In this group, IE was seldom diagnosed (n=4, 0.9%). In 338 (37.4%) patients no signs of IE were evi-

dent but they didn't fulfill the strict negative criteria (Group 2). A follow-up echocardiogram and definitive diagnosis of IE were more frequent (n=48, 14.2% and n=20, 5.9%). Finally, in 116 (12.8%) patients the initial TEE showed typical or suggestive signs of IE, in whom the diagnosis was confirmed in 48 (41.4%). The independent predictors of follow-up echocardiography were the previous history of valvular heart disease (HR 2.38 [1.39–3.89], p=0.001) or cancer (HR 0.47 [0.27–0.84], p=0.01), positive blood cultures for *Enterococcus* (HR 5.01 [2.34–10.73], p<0.001), methicillin-sensitive *Staphylococcus aureus* (HR 2.8 [1.27–6.17], p=0.011) or *Streptococcus* (HR 2.36 [1.12–5], p=0.024), and the presence of typical or suggestive signs of infective endocarditis on initial TTE (HR 13.77 [8.6–22.05], p<0.001). A definitive diagnosis of IE was confirmed in a minority of the study population (n=72, 8%). Only one readmission for underdiagnosis of IE during index hospitalization was noted on Group 2.

Conclusions: In a real-life, observational setting only a minority of patients in whom IE was suspected had a definite diagnosis. An initial TTE for suspected IE fulfilling the strict negative criteria predicts both a low probability of requesting a follow-up study and of a definitive diagnosis of IE. Further research should be performed to rationalize echocardiogram requests for suspected IE.