Contrast echocardiography, tumors and thrombus: A new episode in a 50-year history

L’échocardiographie de contraste : un nouvel épisode dans une histoire longue de 50 ans

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Contrast echocardiography has been associated with the development of echocardiography for almost 50 years. During the 1960s, early work on M-mode echocardiography involved contrast, in order to identify intraventricular structures and the endocardium [1]: injections of indocyanine green brought microbubble opacification of the left ventricle. During the 1970s, the principles supporting the detection of right-to-left shunts with the use of agitated saline were established [2]. During the early 1980s, attempts were made to compare velocity derived from M-mode contrast traces and Doppler [3]. Towards the end of this decade, long-term research finally resulted in multicentre trials dedicated to transpulmonary contrast agents [4]. Three years later, the contribution of this technology to a better delineation of the endocardium was documented [5]. At that time, harmonic imaging was patented initially for studying contrast; its remarkable capabilities without contrast gave the impression that it could cover most clinical needs. The value of a combination of contrast and harmonic imaging was finally clearly established, in particular by Lafitte et al. [6]. The next major step was the assessment of myocardial perfusion by contrast as proposed at the end of the 1990s [7]. This approach has been supported by new signal processing, allowing sensitive detection with low mechanical index and low bubble destruction. During the past 10 years,
we have seen a succession of good and bad news regarding the registration and reimbursement of transpulmonary contrast agents. A few post-marketing side-effects have created concerns and led to the modification of recommendations, but analyses from databases have, again, documented the satisfactory safety profile of contrast echocardiography [8]. Nevertheless, the indication for perfusion analysis has not yet been approved.

In this less than enthusiastic context, the work reported by Mansencal et al. [9] offers positive and useful data that may have an impact on clinical practice. The report is based on a series of heart tumours and thrombi that were imaged by contrast echocardiography in conditions that were in agreement with the present recommendations: left cavity opacification for better delineation of structures. Indeed, current settings with low mechanical index provide simultaneously the best imaging of the cavity and some information on perfusion. The authors suggest adding to the analysis of the cavity a careful reading of the contrast enhancement of mass (absent, partial or total). Their results show good differentiation between thrombus and metastasis in patients with a known extracardiac primary tumour, as well as an improved wall motion analysis (and, thus, diagnosis accuracy), in post-infarct patients. These new data confirm their previous work on thrombus [10]. With regard to the differential diagnosis between tumour and thrombus, these data agree with an older but smaller series that relied on a type of diagnosis between tumour and thrombus, these data agree with an older but smaller series that relied on a type of quantification instead of visual reading [11]. More recently reported cases further reinforce the message [12,13].

For the future, two additional dimensions may provide additional benefits. On the one hand, the work has been conducted in masses seen on the initial echocardiogram and does not address the question of the sensitivity of this tomographic method: could this sensitivity be improved by a combination of three-dimensional echocardiography with contrast? On the other hand, since computed tomography and magnetic resonance imaging are becoming more widely available, the question of a multimodality approach might be discussed, potentially leaving the door open for a multicentre registry study.

References