



## Editor's choice to the October 2023 issue

Johan H. C. Reiber<sup>1</sup>

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1. Mitral valve regurgitation assessed by intraventricular CMR 4Dflow: a systematic review on the technological aspects and potential clinical applications.
2. Imaging modalitydependent carotid stenosis severity variations against intravascular ultrasound as a reference: Carotid Artery intravascular Ultrasound Study (CARUS).

Dear Reader,

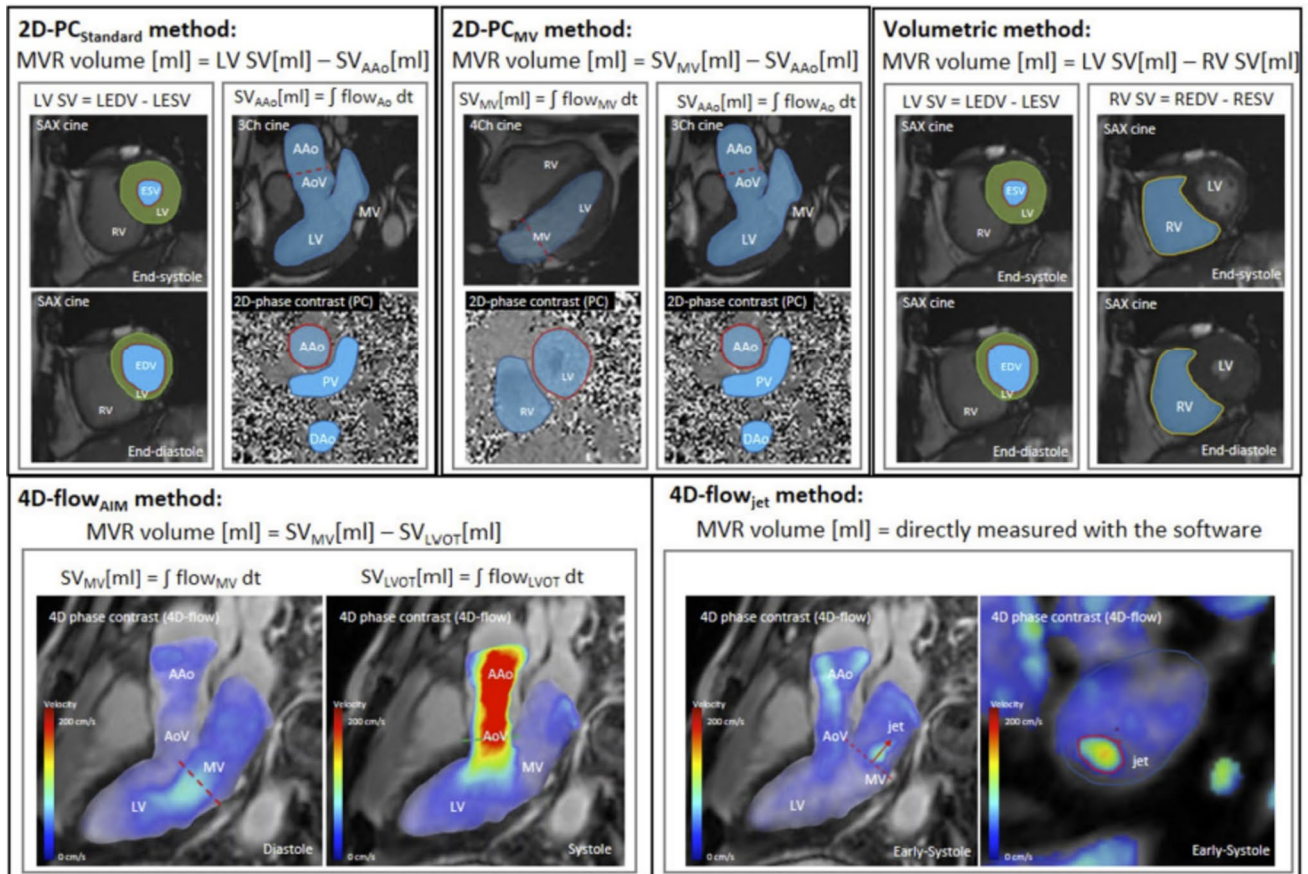
For this October 2023 issue, I have selected two papers, first a Systematic Review paper on the application of intravascular CMR 4D-Flow for the assessment of mitral valve regurgitation (MVR), and secondly a paper that compares the stenosis degree in carotid artery narrowings with different imaging modalities.

The first one is a paper written by Dr Y Safarkhanlo and team from the Inselspital in Bern, Switzerland plus co-authorship by Dr RY Kwong from the Brigham and Women's hospital in Boston, USA, all under the leadership of Dr C Gräni [1]. In this paper they intended to describe the clinical role of intraventricular 4D-Flow in Cardiac Magnetic Resonance (CMR) and assessed therefore a total of 18 published studies. They differentiated 4 different approaches (Fig. 1) and found that the correlations between the four methods were heterogeneous, although in general a good to excellent intra- and inter-reader reproducibility for each of the individual methods exists. They concluded that future longitudinal outcome studies are needed to assess the clinical value of 4D-flow in the clinical setting of MVR due to the absence of a gold standard and unknown accuracies.

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✉ Johan H. C. Reiber  
J.H.C.Reiber@lumc.nl

<sup>1</sup> Leiden University Medical Center, Leiden, The Netherlands

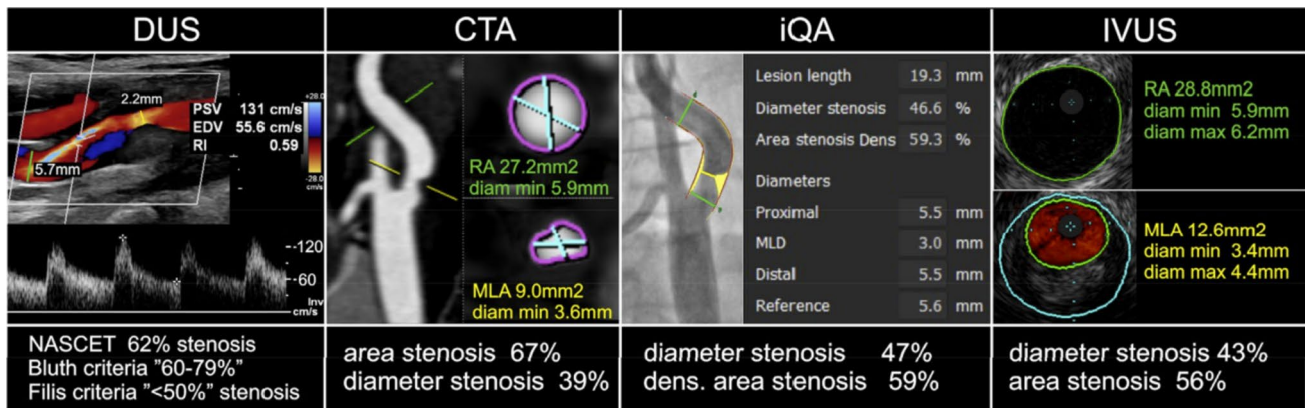


**Fig. 1** Illustration of MVR quantification methods. 2D-PC<sub>standard</sub>: CMR flow gold standard (Left Ventricle Stroke Volume [LV SV]—Stroke Volume derived from Aortic Forward Flow [SV<sub>AAo</sub>]); 2D-PC<sub>MV</sub>, directly quantifying flow through Mitral Valve (Stroke Volume derived from Mitral Valve Flow [SV<sub>MV</sub>])—Stroke Volume derived from Aortic Forward Flow [SV<sub>AAo</sub>]; Volumetric (Left Ven-

tricle Stroke Volume [LV SV]—Right Ventricle Stroke Volume [RV SV]); 4D-flow<sub>AIM</sub> (Stroke Volume derived from Mitral Valve Forward Flow [SV<sub>MV</sub>])—Stroke Volume derived from Aortic Forward Flow [SV<sub>AAo</sub>], or [SV<sub>LVOT</sub>]); 4D-flow<sub>jet</sub>: AoPC aortic forward flow, EDV left ventricle end diastolic volume, ESV left ventricle end systolic volume

The second paper is written by Dr L Tekieli and many co-authors from various hospitals in Poland with Dr P Musialek from the Jagiellonian University Medical College, Krakow, Poland as senior author [2]. This is a single center, prospective study including a total of 300 consecutive patients with carotid artery stenosis  $\geq 50\%$  referred for potential

revascularization, who underwent (i) duplex ultrasound (DUS), (ii) computed tomography angiography (CTA), (iii) intraarterial quantitative angiography (iQA) and (iv), and (iv) IVUS; the gold standard was intravascular ultrasound (IVUS). A pictorial overview of the various imaging modalities is given in Fig. 2 for sn individual patient.



**Fig. 2** Multimodality imaging in a 68-year-old asymptomatic man referred for potential carotid revascularization and enrolled in the CARUS Study

The authors found, that invasive angiography correlated best with IVUS imaging. For non-invasive techniques, CTA was the only independent diagnostic modality against IVUS on multivariate model. They concluded that IVUS validation shows significant imaging modality-dependent variations in carotid stenosis severity determination.

These two papers are both very exciting and should provoke further debates; the readers should definitely refer to the original publications for further details.

Of course, in this October 2023 issue of the International Journal of Cardiovascular Imaging, there are many very interesting papers in addition to these selected two papers. Enjoy reading!

### References

1. Safarkhanlo Y, Jung B, Bernhard B et al (2023) Mitral valve regurgitation assessed by intraventricular CMR 4D-flow: a systematic review on the technological aspects and potential clinical applications. *Int J Cardiovasc Imaging*. <https://doi.org/10.1007/s10554-023-02893-z>
2. Tekieli L, Kablak-Ziembicka A, Dabrowski W et al (2023) Imaging modality-dependent carotid stenosis severity variations against intravascular ultrasound as a reference: carotid artery intravascular ultrasound study (CARUS). *Int J Cardiovasc Imaging*. <https://doi.org/10.1007/s10554-023-02875-1>

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