Letter to the Editor

Comment on: Diagnostic accuracy of 320-slice computed tomography angiography for detection of coronary artery stenosis: meta-analysis (Int J Cardiol 2013, http://dx.doi.org/10.1016/j.ijcard.2013.03.023)

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Dear Editor,

We read with great interest the article "Diagnostic accuracy of 320-slice computed tomography angiography for detection of coronary artery stenosis: meta-analysis" by Li et al [1]. Authors performed a meta-analysis of diagnostic accuracy of 320-slice coronary CT angiography (CCTA) in the diagnosis of coronary artery disease (CAD) based on an analysis of 10 studies available in the current literature. They concluded that 320-slice CCTA has similar diagnostic value to 64- and post-64 slice CT in the detection of significant CAD.

320-slice CT represents the recent technological developments in multislice CT scanners, as it allows for extended longitudinal coverage of up to 16 cm in a single heartbeat. This represents the superior advantage of 320-slice over previous generations of multislice CT scanners. However, there are two main points that bear discussion in this commentary, as these could be misleading to the reader.

Firstly, the statement of "320-slice CTA has the highest temporal and spatial resolution when compared to the former generations" is misleading, as 320-slice CT has moderate temporal resolution of 175 ms, which is inferior to that of 64-slice (150 ms) and dual-source CT (DSCT) (75-83 ms) [2]. Higher temporal resolution could be achieved with 320-slice scanner using multi-segment or multi-cycle image reconstruction over two or more heartbeats, but at the cost of high radiation dose [3]. It has been reported that the temporal resolution of 320-slice CT is increased from 175 to 87 ms with use of multi-cycle reconstruction from two heartbeats compared with half cycle reconstruction using a single heartbeat [4]. In order to overcome the limitations of 16-slice CT, multi-segment reconstruction was also used to improve the temporal resolution to 93 ms compared to the 185 ms acquired with the standard half-scan reconstruction. The highest temporal resolution could be increased to 37.5 and 44 ms in 128-slice CT scanners, but again at the expense of high radiation exposure resulting

from a lower pitch [2, 5]. Thus, multi-segment reconstruction is not recommended due to additional radiation exposure.

Secondly, we would like to clarify the statement that image quality acquired with 320-slice CCTA is not affected by heart rate and heart rate variability. Heart rate control to less than 65 bpm (beats per minute) is still necessary and it comprises an essential step even in 320-slice CCTA to guarantee acquisition of diagnostic images. Of 10 studies included in Li's meta-analysis, 4 of them reported the use of beta-blockers in patients with heart rate >65 bpm to slow down the heart rate prior to CT scanning. This limitation has been overcome with the introduction of DSCT as the temporal resolution was increased from 165 ms to 75 ms, thus image quality and diagnostic value of CCTA was less dependent on heart rates. Salavati et al in their meta-analysis reported that only 8% of the total number of patients undergoing DSCT coronary angiography received beta-blocker, and this is significantly lower than the 41%-76% of patients that received beta-blocker undergoing 64-slice CCTA [6]. In patients with atrial fibrillation, 320-slice CT demonstrates advantages of benefiting patients with irregular heart rates, and it was reported to visualise 96% of all coronary segments with sufficient image quality to enable a diagnosis, however, the effective dose was significantly higher in the multiple heartbeat acquisition than those with single heartbeat acquisition (17-19 mSv vs 6.5 mSv) [7, 8]. Therefore, further studies are needed to reduce radiation dose in this group of patients while achieving diagnostic images.

Coronary CT angiography represents the most rapidly developed imaging modality in cardiac imaging over the last decade, with satisfactory results having been achieved. The technological advances in multislice CT scanners have gradually overcome the technical and diagnostic challenges, thus, these advances have led to a dramatic impact on its accuracy in the diagnosis of CAD. We hope that the above-mentioned comments help to clarify some

specific points related to coronary CT angiography with use of the latest CT scanners. Thus, coronary CT angiography can be appropriately utilized to lead to the greatest benefit to patients.

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The author of this manuscript has certified that they have complied with the Principles of Ethical Publishing in the *International Journal of Cardiology* [9].

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