Reviewer's report

Title: Angiographically borderline left main coronary artery lesions: correlation of transthoracic Doppler echocardiography and intravascular ultrasound

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Reviewer's report:

The study aimed to assess the reliability of TTE Doppler (namely, peak diastolic velocity) in the assessment of borderline LM stenoses. For that purpose, single resting PDV was compared to IVUS-derived parameters. Weak, but significant correlations were found between IVUS MLA and plaque burden and Doppler-derived PDV. The cut-off of 112 cm/sec PDV was shown to have a 92% sensitivity and 62% specificity to identify IVUS-significant (MLA<6 mm2) LM stenosis. The authors concluded that TTDE evaluation can be useful adjunct to other invasive and non-invasive methods in the assessment of borderline LM lesions.

Strengths of the study:

It has been already shown that significant LM stenoses could be detected by TTE with fair sensitivity and specificity (80-85%). However, PDV has never been evaluated before in the assessment of borderline (by QCA) LM lesions.

Weaknesses of the study:

Major Compulsory Revisions

1. Although interesting, the study sample is quite small. The observed correlations (between TTE and IVUS) were significant but weak, and specificity of the proposed cut-off is hardly acceptable (62%) for routine use. It seems that authors are aware of these shortcomings and that is probably why they proposed TTDE as ‘useful adjunct to other invasive and non-invasive methods’. However, this is not what we expect from TTDE in the assessment of borderline LM lesions. Instead of being an adjunct, any new and noninvasive method should aim to replace the existing expensive and invasive methods (IVUS and FFR), widely used in clinical practice.

In the present form, the current study could only be considered as a pilot or feasibility study, which needs to be clearly stated in the study title. Undoubtedly, it would be better to continue this definitely interesting study and present more cases with more reliable data. I would strongly support the latter option.

Here is another example from the present study to support this observation:
All patients underwent exercise test prior to coronary angiography and it was positive in all subjects. Provided that there were no other significant lesions that
could lead to positivity of the test (there is no such data in the manuscript), we could presume that LM stenosis was functionally significant in majority of pts (bearing in mind the specificity and sensitivity of the exercise test, which is approx 70% for both). Indeed, IVUS proved that borderline LM stenoses were significant in 71% of pts. On the other hand, specificity of PDV in the present study was reported to be 62%. Therefore, there is only weak-to-moderate correlation between TTDE and IVUS parameters, whereas the specificity of TTDE is probably inferior (at least not superior) to that of the treadmill test.

2. It would be useful to test the interobserver variability in this type of study. In a similar study of nearly 1500 subjects (Evaluation of left main coronary artery stenosis by transthoracic Echocardiography, Ref No 21), adequate coronary flow assessment was obtained in only 55% of pts, while in the present study it was rather high (88%). This issue must be addressed in the discussion.

3. One of the most important findings should be included in the Abstract:

TTDE measured PDV correlated significantly with IVUS-derived MLA (r= -0.46, p<0.05, figure 2.) and plaque burden (r=0.51, p<0.05, figure 3.).

It should replace the following sentence:

There was a significant, albeit weak inverse correlation between %DS and IVUS-defined MLA (r=-0.48, p<0.05).

4. The aim of the study in the Abstract and Introduction should be rewritten. In fact, the aim of the study was to evaluate the relationship between TTDE PDV and IVUS measurements in the assessment of angiographically borderline LM lesions.

5. Results presented in Table 2 should not be repeated in the section Results.

6. The first sentence in Discussion section should be modified and rewritten. There are no data in the study to support the statement that ~simple resting TTDE is of additional value~.

7. The second sentence in the Conclusion section is redundant and should be deleted.

Minor Essential Revisions:
1. Numerous typing/spelling/grammatical errors should be corrected. Redundant words/phrases should be removed from the text.

**Level of interest:** An article of importance in its field

**Quality of written English:** Needs some language corrections before being published

**Statistical review:** No, the manuscript does not need to be seen by a statistician.
Declaration of competing interests:

I declare that I have no competing interests.