Reviewer's report

**Title:** Automated quantification of left atrial size using three-beat averaging real-time three dimensional echocardiography in patients with atrial fibrillation

**Version:** 1  
**Date:** 4 July 2015

**Reviewer:** Jaroslaw Kasprzak

**Reviewer's report:**

This is an original report comparing a novel automated method for 3DE based left atrial volume (LAV) quantification (Siemens SC2000 implemented) with standard 2D methods.

The study concerns, interestingly, patients with atrial fibrillation (AF) group of rather limited count (31 subjects).

The main finding of the study is that novel 3D LAV quantification showed significant correlations with but demonstrated a significant degree of underestimation of LA volume compared to 2DE based measurements. Good-quality of 3D images contributed to better correlation which is rather expected.

Unfortunately there are critical methodologic aspects which reduce the validity of findings.

Heart rate differences between 2D, 3D and CT play an important role - how were heart rates calculated? Over a minute or by cycle durations from 3 beats selected for study? (then this is NOT beats per minute count in AF). No info is given for 2D and 3D echo study heart rate and even though 10 bpm difference echo/CT is formally statistically nonsignificant (small study group!), it carries a physiological meaning. HOW were the specific three beats for echo selected from irregular rhythm (with regard to RR selection)?

Moreover, CT protocol included beta-blockade - what dose? How often? This is not irrelevant for LAV!

Second, the dataset quality and effective temporal resolution play a pivotal role for volume quantification of highly dynamic structure such as LA. No info is provided with this regard and this clearly constitutes a source of variability.

Finally, 3DE quality. I do not know if the figure represents echo quality judged as fair or good, but by general standards it is mediocre. Moreover, the graphics shows an acquisition clearly not optimized for 3DE. An easy structure such as LA should be centered in the narrowest possible dataset, thus optimizing dataset resolution which is not the case in the example shown, with severely pixelized far field data which must impact on the quality.

No details of tracking convention for specific modalities, or rate of use of manual correction vs fully automated tracking are provided.
References are too many.

**Level of interest:** An article whose findings are important to those with closely related research interests

**Quality of written English:** Acceptable

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

**Declaration of competing interests:**

No conflict