Reviewer’s report

Title: Rapid evaluation by lung-cardiac-inferior vena cava (LCI) integrated ultrasound for differentiating heart failure from ulmonary disease as the cause of acute dyspnea in the emergency setting

Version: 1 Date: 13 September 2012

Reviewer: Luna Gargani

Reviewer’s report:

This is an interesting, well-written paper on the usefulness of a rapid ultrasound approach for the differential diagnosis of acute dyspnea. The authors confirm the very good sensitivity and negative predictive value of lung ultrasound and propose an integrated lung-cardiac-inferior vena cava evaluation, which shows a very good accuracy.

Major Compulsory Revisions


2) The definition of positivity for lung ultrasound (LUS) is questionable. Previous literature and the above mentioned Recommendation Paper suggest that a positive LUS exam for pulmonary interstitial syndrome consists of two or more positive regions bilaterally. A positive region is defined by the presence of three or more B-lines. Your definition of positivity as three or more zones bilaterally may have lowered the sensitivity of LUS. I would suggest to recalculate accuracy, taking into account this more established cut-off.

3) The definition of positivity for cardiac examination is also questionable. I’m personally not convinced that a dyspnoic subject with a normal systolic function and a moderate tricuspid regurgitation must have a cardiogenic origin of the dyspnea. On the contrary, this is often the description of the echocardiogram of a patient with pulmonary disease. If the tricuspid regurgitation was not linked to any left-side alterations (unfortunately you cannot evaluate diastolic function, as you correctly state in the limitations), that regurgitation is more probably due to a pulmonary condition, if any. I would restrict cardiac positivity to left ventricular systolic dysfunction and at least moderate mitral regurgitation.

4) You state that it is impossible to differentiate AHFS from pulmonary fibrosis, ALI/ARDS or bilateral pneumonia by LUS. It is undoubtedly very difficult and often not possible, but sometimes there are some clear LUS signs that can significantly help (especially in ALI/ARDS, see Copetti et al. Cardiovascular Ultrasound 2008 Apr 29;6:16). I would replace the sentence “It is impossible” with “it can be very challenging”.

5) You do not mention any other LUS sings other than B-lines. Did any of your patients have pleural effusion? Did you look for subpleural alterations or consolidations?

6) You report in the Methods section that one cardiologist and one pulmonologist determined the final diagnosis. Was their agreement 100%? What happened in case of disagreement?

7) It is rather unusual that in a consecutive population of 90 patients, nobody had an etiology of the dyspnea other than due to cardiac or pulmonary disease. It seems that you considered a dyspnea due to non-cardiac, non-pulmonary conditions as an exclusion criterium. This should be better clarified.

8) I suggest to include in the discussion a brief comparison with a previously published similar work (Kimura et al. Am J Cardiol. 2011 Aug 15;108(4):586-90).

9) Figure 1 is not clear, since you do not suggest a real algorithm. Please reshape this scheme indicating what to do in case you find a positive or negative evaluation. When you mention cardiac ultrasound, why don’t you include systolic dysfunction? Moreover, I suggest to specify “multiple bilateral” B-lines and not only “B-lines”.

10) It would be interesting to expand a bit on discordant cases, especially LUS/BNP discordant cases. Also LUS false negative cases (which are rare and I believe should decrease with the suggested different positivity definition) should be individually described. Previous literature report indeed a sensitivity of LUS close to 100%. Please, adress.

11) When you combine different approaches (i.e. LUS and BNP) the accuracy should not decrease if you consider positive, a test where even only one of the two components is positive. In your results, sensitivity decreases when you add BNP to LUS, suggesting that you need both positive tests to define positivity. Please, clarify this issue.

Minor Essential Revisions

1) page 4: in the sentence “Recently, it was reported that detection of pulmonary interstitial edema (B-lines) by lung ultrasound“ should be changed in “Recently, it was reported that detection of pulmonary interstitial edema, by lung ultrasound evaluation of B-lines…”

2) pag. 6: the sentence “The investigators attempted to detect a comet tail artifact” should be “The investigators attempted to detect comet tail artifacts” since AHFS is characterized by multiple B-lines.

3) When you refer to the collapsibility index, I suggest to cite the ASE/EAE Guidelines for the Echocardiographic Assessment of the Right Heart in Adults (Rudski LG et al. J Am Soc Echocardiogr. 2010 Jul;23(7):685-713). Did you measure IVC at end-expiration?
4) pag. 11: when you list the ultrasound approaches (also shown in table 2) you do not include LV dysfunction. Is there a reason for that? In Table 2 “collapsibility” is misspelled.

5) The employment of LUS for the evaluation of EVLW is also included in the EAE Position Paper on the use of pocket-size imaging devices. I suggest to mention it.

6) I suggest to add a few pictures of the US findings from your study population.

**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.