Author’s response to reviews

Title: Improved Efficiency and Diagnostic Utility of Inpatient Transthoracic Echocardiography following Implementation of a Sonographer-Initiated Perflutren-based Contrast Administration Protocol

Authors:

Ryan Prentice (ryan.l.prentice.mil@mail.mil)
Homayoun Ahmadian (rezaahmadian@icloud.com)
Dustin Thomas (dustin.m.thomas1@gmail.com)
Jeremy Berger (jeremy.m.berger.mil@mail.mil)
Rosco Gore (rosco.s.gore.mil@mail.mil)

Version: 1 Date: 24 Jun 2020

Author’s response to reviews:

Reviewer #1: The authors investigated whether contrast administration by sonographers results in shorter examination times compared to administration of contrast agent by nurses. The examination times with nurse administered contrast agent were measured during 3 months. Then sonographers were trained to administer contrast agent and the examination times were measured during another period of 3 months. The time to complete the echo recordings was significantly lower when sonographers administered the contrast agent.

The control group (nurse administered contrast) includes 63 patients while 257 patients received the contrast agent from the nurse. The authors need to explain this difference.
A table listing the age, sex weight, height, BSA would be helpful to demonstrate that the groups are comparable.
-Unfortunately we did not collect age and sex data, there was not different in indications, BMI or BSA. BSA data was added to results.

Only the times to perform the echo studies were reported. However, there are other concerns of sonographers administering contrast agents:
Is the quality of the recordings different when the sonographer has to inject the contrast agent and adjust the controls for optimal recordings?
-We did not look at this directly. We use a bolus method to administer contrast and have pre-sets on the machine so they have some time between administration and when image acquisition starts to adjust from preset values.

Did the total dosage of contrast agent differ between nurses and sonographers?
-Yes the sonographers used less optison, about .4ml less, added to manuscript
Please describe the protocol how the decision was made for contrast injection; how did the sonographer get approval from the reading physician?
-Sonographers did not need to obtain permission to administer UCA. Used standing orders based on ACC guidelines, tried to clarify in text.

There have been previous publications on sonographer administered contrast (for example Tang A, Chiew SK, Rashkovetsky R, Becher H, Choy JB. Can J Cardiol. 2013 Mar;29(3):391-5) I suggest the authors refer to these previous publications.
–add to manuscript

The references 7 and 12 are the same publications. I suggest to remove these publications. Refer to the recent ASE recommendations for contrast echocardiography - Porter T et al 2018.
-added, thank you

Reviewer #2: In this original research by Prentice et al, a sonographer led/administered contrast TTE protocol was compared to usual institutional practice (RN administration). 320 patients/scan were included in the analysis. The time taken to obtain a contrast enhanced TTE was not significant between the two groups (p =0.67). However, the time taken to complete each TTE (time from first echocardiogram image to the last contrast enhanced echocardiogram image) was significant between the two groups, with about 12 minutes saved in the newer protocol.

The authors should be commended for seeking ways to optimise the use/uptake of contrast enhanced TTE, as this is clearly an area that needs attention & improvement. This is an interesting and novel topic plus is a useful clinical study. However, the manuscript is written very poorly, lacks organisation and missing required detail.

Some comments

Insufficient detail in methods on how timing was performed.
-added use DICOM header information to page 5

Contrast can be administered as either a bolus or infusion method. No details given other than "administered according to manufacturer recommendations". This is insufficient and further details need to be provided as the method of administration not only has significantly different set up times (hence also impacting on your metric you are interested in) but also on how readily or easily a contrast image may be obtained.
-bolus method was used, added to manuscript.

The exclusion criteria need further explanation-strain and valves are not contrast targets so not sure how they would be excluded from a head to head contrast methods study?
-added text, it would increase the total amount of time to acquire all images so could confound the total imaging time.
Lack of IV cannulation should also be mentioned as a possible barrier to CE-TTE, especially if an out patient.
There should be a comment about incidence of any contrast adverse reactions.

There is no comment about wall motion interpretation in the methods-this is first mentioned in results then conclusion and some graphics. The authors need to outline how and what they did regarding regional wall motion analysis (RWMA).

Was the RWMA finalised by a reporting echocardiologist?
"Health care market" - delivery of healthcare to patients is not a market. This should be rephrased.

Sonographer experience comments need to be in methods not results.
Demographic details required-gender, age, scan location (department, ward, ED, CCU, ICU)

Insufficient references (16)
Four more added
Non-diagnostic TTE are typically quoted as up to 25% not 5-10%. Plenty of refs for this.

Numerous errors of grammar/typology-please get proofread.
"one business day" - business is a redundant & unnecessary word.
"Thru" - should be spelt fully.
"We aimed" is very poor grammar

Definity spelt incorrectly
"independent" twice in a sentence at the end of results-similar for "initiation" in paragraph 1 in the discussion
"enhancer" in figure 1 & 2 is a confusing term and should be replaced.