Reviewer’s report

Title: The role of a simulator-based course in coronary angiography on performance in real life cath lab

Version: 3 Date: 7 January 2014

Reviewer: kristin fraser

Reviewer’s report:

General Comments: This manuscript is much improved and warrants publication following a few minor revisions as well as a significant revision to the discussion to focus more specifically on the findings of the study.

Many thanks for allowing me to participate in the review of this manuscript. I think it is an important paper to publish once these issues have been addressed.

Major Compulsory:
1) Discussion: Overall this section is improved in delivering the important messages. However, I think it now can be shortened to focus on the specific findings and related discussion. General discussion about simulation studies was covered in the Introduction; therefore, Paragraph 2 and 3 and most of Para 4 (although keep reference to 23) are largely redundant.

In addition,

2) Detrimental Effect of VR training. I think this should be named “potential detrimental effects of VR training” since this is not an RCT

3) Para 1 Ln 7. “One hypothesis” should be replaced with “a second hypothesis” re confidence.

4) Para 1 Ln 8 Mental imagery of a procedure is not very similar to simulation; importantly the strength of simulation is that it adds the procedural/motor portion that imagery cannot capture? I’m not sure how this point adds to your argument. Perhaps it just needs to be clarified.

5) Para 1 Ln 15 “: your point about unnecessary handling of catheters and why this might be higher in sim-trained people is not clear to me either. The statement, “thereby missing VR and OR up” does not make sense either.

6) Para 1 Ln 18 I think your next argument about how long the course should be goes back to your first hypothesis about proficiency based training and should be discussed there.

7) The summary of these points under “reducing procedural complications “ is well written.
Minor essential revisions:

Background

8) Para 2 “.. and the same is true for endovascular procedures.” I recommend changing to add “some” before endovascular procedures.

9) Second Last Para: “In a recently published review about the future of simulation technologies for complex cardiovascular procedures references were made to several VR validation studies in endovascular procedures using animal models instead of real patients [19].” Consider rewording as follows:

“… In a recently published review about the future of simulation technologies for complex cardiovascular procedures references were made to several VR validation studies in endovascular procedures; however, all of those studies used animal models for validation and [19] … to our knowledge, no study has evaluated the transfer of coronary angiography skills from VR to OR in humans.

Methods

10) First line: Add “in” prior to 2006

11) First para ln 8: omit term “voluntary.” The final sentence makes this clear

12) “Course participants voluntary aiming for certification in CA and in a geographical nearby occupancy enabling repeated solo VR training had an opportunity to extend the training in order to complete a practical exam in the simulator.” This is a difficult sentence to understand: consider revising:

Course participants aiming for certification in CA and living in proximity to the training center had an opportunity to obtain further solo VR experience and to perform a practical examination on the simulator.

13) “Certification was not compulsory for course participation.” I think you mean, A goal of obtaining certification was not compulsory for course participation.

14) Para 2

The VR training aimed for a safe behavior of the procedure completing CA.

15) The goal of VR training was completion of CA…

Simulator

16) “The virtual femoral puncture of the vessel was preformed”. I’m not sure what “preformed” means. Please clarify.

Study Protocol

17) “Study metrics previously described representing proficiency in CA were compared between the groups and presented in learning curves and tables [20].” Consider revising to:
Study metrics representing proficiency in CA have been previously described [20] and these were compared between groups.

18)“Complications during CA is associated to proficiency and during training most often related to the access site with increased risk of bleeding when using the femoral approach”. Consider revision to:
Complications during CA is most often related to the access site with increased risk of bleeding when using the femoral approach.

Results

19) trainees completing the course performed worse regarding fluoroscopy time compared to the controls which in turn demonstrated a typical learning curve, median 360 seconds vs. 289...

- Explain and reference what you mean by “typical learning curve”.
- Also, re write this sentence so that it is clear that 289 secs belongs to the trainees rather than to the “typical curve”.

20) The pattern was the same no matter of experience/time from taking the course to performing the first CA. Consider revising to:
The pattern was the same independent of prior experience or lapsed time between taking the course and performing the first CA

21)“The controls performed better through all the first 80 CAs without a benefit in the early learning curve in the course group (Table 3).”

This is a repeat of the same data discussed at the beginning of the paragraph so I would remove this sentence and reference table 3, at the end of the first sentence.

**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