Reviewer's report

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

Version: 2 Date: 17 May 2013

Reviewer: kristin fraser

Reviewer's report:

This is a retrospective comparison of patient outcomes between a 2 groups of novel operators in coronary angiography: one group attended a simulation based course prior to entering practice and one did not. The course learners appeared to be similar to another group of beginners AFTER they completed the course but no data is available on their performance at baseline (before the course) compared with similar level of learners. The outcome data is from a large database and therefore, is limited (as acknowledged by the authors) in several ways. Nonetheless, results are clear that course participants ultimately use more flouroscopy time than those that did not take the course and have more complications related to the puncture site. One important outcome that is not discussed is procedure accuracy and completeness, which could certainly be related to longer procedure time. In summary, These results suggest that a simulation course might have had a negative impact on future performance (involving real patients): this is important but only hypothesis generating, given the retrospective and incomplete nature of available data.

- Major Compulsory Revisions

1) Title and elsewhere: This is not a case-control but rather a retrospective cohort with comparison.

2) Background: Please define what you mean by simulation. Some of the "simulation" literature you quote is referring to a much larger literature than just procedural skills and not all of it includes VR. It would help to specify what each study meant by “simulation”. The readership of this journal might consider “simulation “ to mean team-based training or “diagnosing” skills rather than specifically procedural skills

3) Reference #12 is incorrect citation

4) Methods: Course: Can you elaborate on how much time and how exactly the simulator was used to instruct in femoral catheterization. The increased
complication rate is one of your main findings so any details about this training would be useful and could be discussed later in terms of how to optimize use of simulators for CA

5) Study Subjects: Of the 12 course participants who formed this study intervention cohort, how many of those had the additional training mentioned? Figure 1 is unclear on which of these course participants were the “cohort” of 12 that you ultimately studied for outcomes.

6) Do you have any information about the 46 “controls”? For example, how were they trained in CA? Could they have been trained on a simulator in a different course at a different institution? (the reference provided does not give this information and it is important to see if these groups are similar in other ways apart from the intervention )

7) Results: Course Assessment: Do you have any pre and post data on the actual course participants. Comparing one final test from your study group to a pre-and post of another unpublished group does not prove that your course resulted in learning. (IT does however show that the VIST group improved across 5 simulations suggesting that the simulator is usually effective for training on these parameters )

8) Discussion; the negative results are interesting. I understand that flouro time has been used to construct expert learning curves in past but it takes up to 150 caths to see leveling off of the curve to an “expert level”. Do you think it is a good surrogate maeasure for the first 80 caths in which your previous work has suggested supervision is still required? Interestingly, your participants did use more flouro at baseline than the VIST participants (although not significant) Any ideas why some learners use more flouro time; specifically, are there any good reasons to use more flouro time that could have been instilled by the course ( ie detail/completeness/ accuracy of assessment ) ? How could you test that in your next study?

9) The most compelling finding is the complication rate and your discussion around this is good. Again, some suggestions on how such a course might remedy this problem would be useful.

- Minor Essential Revisions

1)Abstract Background and others: Consider using term “accelerate the learning curve” rather than “reduce” which is not as clear. Same applies to results and discussion sections.

2) Background para2 2nd last sentence is confusing to me. Transfer to “real world but not patients”; if not patients then to what?

3)Methods para 1 last sentence: this description of the which participants got further training and why is not clear.
4) Discussion: Please provide a reference for discussion re: “simulator effect” of over confidence

5) Discussion: Can you make recommendations for how to design the RCT to solve this issue? I.e. mastery training, measure total cath time, appropriate training of femoral catheterization?

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

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

**Statistical review:** Yes, but I do not feel adequately qualified to assess the statistics.

**Declaration of competing interests:**

I declare that I have no competing interests.