Editorial

Simulation in Interventional Radiology

Shoban Haridass[1] Shymakumar N. Keshava[1] Sanjeeva P. Kalva[2]

[1] Division of Clinical Radiology, Department of Interventional Radiology, Christian Medical College, Vellore, Tamil Nadu, India
[2] Division of Interventional Radiology, Department of Radiology, Massachusetts General Hospital, Boston, Massachusetts, United States

J Clin Interv Radiol ISVIR 2023;7:1–2.

Training in interventional radiology (IR) has many challenges. Most of the procedures use ionizing radiation and training increases procedural time and thus the radiation exposure to patients as well as the staff. As many procedures are performed under local anesthesia, patients might become anxious listening to the suggestions of the faculty member to the trainees, making patients wonder whether they are in safe hands. The reduced number of diagnostic angiography procedures has impacted the ability of trainees to learn basic catheter skills. In addition, the complexity and wide breadth of IR procedures are not practiced at every institution limiting the trainees' abilities to acquire and master all IR skills during their training. Some of these problems could be overcome by training IR students on simulation models. In addition to the basic training, "custom made" simulations may be useful to practice complex interventional procedures.

The concept of simulation was introduced in 1950s for training pilots. In the medical field, surgeons and anesthetists have been using simulation models for training.[1] Similar to surgery, IR is a skill-based specialty,[2] and it is natural that simulation training in IR is slowly gaining popularity in recent years.

Simulation can help to alleviate the gaps in the current practice of IR training. One can practice the basic and complex procedural steps as many times as one wishes as there is no concern of putting patient safety at risk and there is no radiation exposure. One can also learn on how to handle complications, as training to handle such situations is difficult in real world. Subjective and objective feedback can be obtained to assess competence and identify areas for improvement. Novice trainees may benefit more from simulation training than the experts in the field. Apart from procedural training, nonprocedural skills such as communication, team work, task prioritization, and resource management can also be taught using different simulation models.

There are five types of simulators available currently—computer-based learning modules, phantom models, computer-assisted mannequins, virtual reality, and animal models.[3] Of note, some models do not require any budget for production—for example, a watermelon could be used to simulate a patient's abdomen to learn drainage procedures.

Simulator training is an exciting new way to adopt, but it does come with some limitations. Cost and availability of simulators and trained educators are limited. Standardization of assessment metrics is also essential. Essential components of IR training such as the stents and embolic devices need to be addressed separately. The in vivo transferability of simulation-based skill set needs to be assessed. More evidence is required to support simulation training in the current IR curriculum. It is also important to note that simulation only training might lead to overconfidence and could potentially risk patient safety. Further improvements in the simulation models are required to address current limitations.

Address for correspondence Shyamkumar N. Keshava, DMRD, DNB, FRCR, FRANZCR, Division of Clinical Radiology, Department of Interventional Radiology, Christian Medical College, Ida Scudder Road, Vellore 632004, Tamil Nadu, India (e-mail: shyamkumar.n.keshava@gmail.com).

DOI https://doi.org/10.1055/s-0042-1760441.
ISSN 2457-0214.

Thieme Medical and Scientific Publishers Pvt. Ltd., A-12, 2nd Floor, Sector 2, Noida-201301 UP, India

References

1 Miller ZA, Amin A, Tu J, Echenique A, Winokur RS. Simulation-based training for interventional radiology and opportunities for improving the educational paradigm. Tech Vasc Interv Radiol 2019;22(01):35–40

2 Patel R, Dennick R. Simulation based teaching in interventional radiology training: is it effective? Clin Radiol 2017;72(03):266.e7–266.e14

3 Mirza S, Athreya S. Review of simulation training in interventional radiology. Acad Radiol 2018;25(04):529–539

