



Letter to the Editor

Cardiology training in times of COVID-19: Beyond the present



They know enough who know how to learn

Henry Adams

The COVID-19 has uprooted people's lives in many ways. In India, a strict and prolonged lockdown has made healthcare access difficult during this time. Little has been discussed about the impact of COVID-19 on training of cardiologists.

The residents are faced with many challenges of personal protection and safety, delivering of efficient health services and to fulfil the requirements of research and procedural training.¹ As fellows advance through the hierarchy the education shifts from learning to doing, Several regulatory bodies have issued minimum training requirements to be met before residents can be certified as specialists.² However, the recent disruptions caused by COVID-19 created a need to revamp the existing training structure.

We here present an approach for physician training in these times and the ways to improve training efficiency.

1. Impact of COVID-19 on cardiology education*1.1. Training disruption in the current scenario*

Since the COVID-19 pandemic has spread all the major hospitals in COVID hotspots have been converted into COVID hospitals and cardiology wards and coronary care units (CCU) have been restructured into COVID wards and COVID ICUs respectively. In the powers under the Epidemic act 1897, the government can draft specialist in its fight against an epidemic in times of need.³ Cardiology residents have been redeployed in care of COVID patients which is very different from the expected training. Among the many advantages of working in a pandemic, a refresher on the emergency care, experience of working during a pandemic, research into the cardiac manifestation of a new illness, the trade-off however occurs in form of missed cardiology training (Fig. 1).

One recent web based survey from a COVID hotspot has reported redeployment of interventional cardiology fellows to COVID duties. More than two-third believed moderate to severe impact on

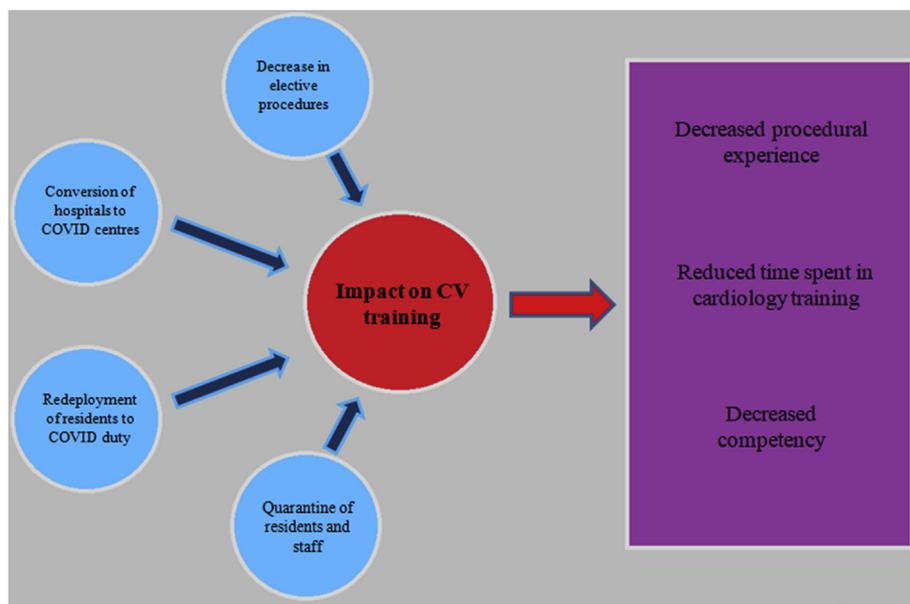


Fig. 1. Various factors affecting the cardiovascular training and the impact on trainees.

fellowship training. More than ninety-five percent fellows believe COVID to have a moderate to severe impact on their training.⁴

1.2. Impact on cath lab procedures

Elective procedures have been deferred (rightfully) in most tertiary care centres. Emergency procedures have been allowed but there is significant decrease in emergency procedures due to apprehension in seeking emergent care, delayed presentations, thrombolysis in preference to primary PCI and a preference for conservative management.

One EAPCI survey showed reduced cath lab personnel availability, either due to quarantine or deployment to emergency care. More than half reported a complete discontinuation of elective procedures. 89% survey participants reported a reduction in ACS hospitalisation. There was a delay in reperfusion, increased use of fibrinolytics and increased cardiogenic shock and mechanical complications.⁵

1.3. Procedural experience

In India there limited specialised interventional of fellowship training opportunities, so majority of training occurs during the 3 year DM core cardiology training. In most Indian centres residents sequentially rotates though various units, interventional cardiology cath lab, electrophysiology lab, echo lab and non invasive cardiology. Also, in several institutes residents are admitted every 6 months. So this pandemic has disproportional impact on training of residents, and it needs a strategic and preferential approach to future deployment.

2. Strategies for better resident training

2.1. Personalized and strategic deployment

Training of all residents is not equally affected due to COVID-19. There should be a personal and departmental assessment on the

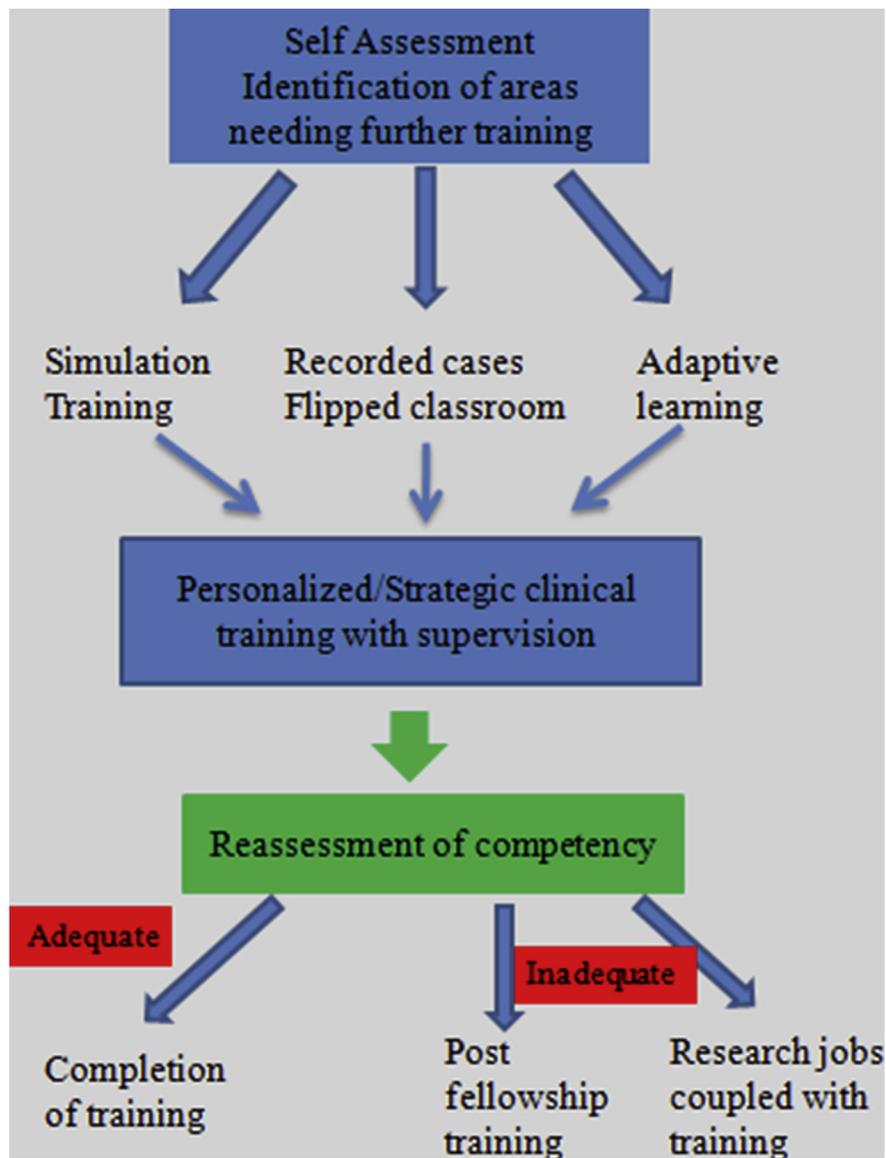


Fig. 2. A solution to limited training and learning framework in the times of COVID-19.

training received and the need for further training to gain competency. Residents who have missed their procedural training should be preferentially allowed more procedures to gain equity (Fig. 2).

2.2. Simulation based training

Simulation training has existed for some time; it can be a very effective mode of procedure learning in these times. After assessment of specific need of training, it can be used to enhance existing skills or to learn new ones. To achieve dexterity in procedures repeated hands on is required. For TEE various simulation programmes are present and simulation training have been shown to improve real life skills.^{6,7} Simulation based training for coronary angiography has been shown to reduced procedure time and improvement in technical ability in real life procedures.^{8,9}

In simulation based training for PCI, Voelker et al randomized fellows to either simulation based training (SBT) or recorded lectures. Fellows were tested on a simulator after their training and those who received SBT showed better skills as compared to lecture based training.¹⁰

SBT can be most effective in the earlier stages of a resident training or learning a new procedure when there is a high propensity for complications. Advantages are adjustment to one's own pace in a stress free environment and immediate feedback, improved manual dexterity and insulating patients from the risks during learning phase.¹¹

2.3. Adaptive learning

Customized learning using computerized algorithm can be used to compare and assess individual decision making with real life decision making by experts in the field.¹¹ A form of self teaching and active learning, the fields where the subject does well are deemphasized and more emphasis is placed on fields where a subject performs poorly. Small case based sessions moderated by faculty can also be used. Various decisions made by the examiner can result in different outcomes and the lessons can be taught emphasizing on the adverse outcomes resulting from the decision making.

One study of transoesophageal echocardiography (TOE) among anaesthesia residents showed adaptive learning module resulted in improved accuracy and fluency in diagnosing a cardiac abnormality on TOE.¹²

2.4. Flipped classroom

Studies have shown the use of instructional materials (videos, discussion cases, recorded cases) before a class can be very helpful in learning. Same can be used to gain procedural competence. Reading articles, case discussion and watching a recorded case before performing a real life case has the ability to better engage trainees and helpful in better anticipation of difficulties encountered and avoidance of complications. One study showed better change in quality improvements in residents who underwent a flipped classroom curriculum.¹³ Video based coaching has been shown to be successful in training surgeons.¹⁴ Similar coaching has used with the help of recorded cases of cardiology procedures (coronary intervention, transcatheter valve procedures).

One study showed that viewing online videos and engaging in a group discussion is more preferable to traditional didactic classrooms. It has showed better collaboration with colleagues and

better ability for problem solving.¹⁵ The advances in technology can be used to better deliver contents. Use of webinars and zoom classrooms can be helpful in discussions and content delivery from expert faculty worldwide.

3. Conclusion

COVID-19 has challenged the current training programmes in several ways and there is a need to find solutions to the current problem. It has provided us with opportunity to re-evaluate the existing approaches to training. The widespread digital access has certainly reduced the cost to implement these programmes. The suggested approaches can be helpful for any stage at the career of a cardiologist and a means for life-long learning.

Disclosures

None

Declaration of competing interest

The authors declare that they have no conflict of interest.

References

- DeFilippis EM, Stefanescu Schmidt AC, Reza N. Adapting the educational environment for cardiovascular fellows-in-training during the COVID-19 pandemic. *J Am Coll Cardiol*. 2020;75(20):2630–2634. <https://doi.org/10.1016/j.jacc.2020.04.013>.
- Halperin JL, Williams ES, Fuster V, et al. ACC 2015 core cardiovascular training statement (COCATS 4) (revision of COCATS 3). *J Am Coll Cardiol*. 2015;65:1721–1723.
- [Internet]. Indiacode.nic.in. 2020 [cited 22 June 2020]. Available from: https://www.indiacode.nic.in/bitstream/123456789/10469/1/the_epidemic_diseases_act%2C_1897.pdf.
- Gupta T, Nazif TM, Vahl TP, Ahmad Hasan, Bortnick Anna E, Feit Frederick, et al. Impact of the COVID-19 pandemic on interventional cardiology fellowship training in the New York metropolitan area: a perspective from the United States epicenter. *Cathet Cardiovasc Interv*. 2020;1–5. <https://doi.org/10.1002/ccd.28977>.
- Roffi M, Capodanno D, Windecker S, Baumbach A, Dudek D. Impact of the COVID-19 pandemic on interventional cardiology practice: results of the EAPCI survey. *EuroIntervention*. 2020 Jun 3. <https://doi.org/10.4244/EIJ-D-20-00528>. EIJ-D-20-00528. [Epub ahead of print].
- Damp J, Anthony R, Davidson MA, Mendes L. Effects of transesophageal echocardiography simulator training on learning and performance in cardiovascular medicine fellows. *J Am Soc Echocardiogr*. 2013 Dec;26(12):1450–1456. e2.
- Ferrero NA, Bortsov AV, Arora H, et al. Simulator training enhances resident performance in transesophageal echocardiography. *Anesthesiology*. 2014 Jan;120(1):149–159.
- Schimmel DR, Sweis R, Cohen ER, Davidson C, Wayne DB. Targeting clinical outcomes: endovascular simulation improves diagnostic coronary angiography skills. *Cathet Cardiovasc Interv*. 2015;388(July 2015):383–388.
- Bagai A, O'Brien S, Al Lawati H, et al. Mentored simulation training improves procedural skills in cardiac catheterization: a randomized, controlled pilot study. *Circ Cardiovasc Interv*. 2012;5(5):672–679.
- Voelker W, Petri N, Tonissen C, et al. Does simulation-based training improve procedural skills of beginners in interventional cardiology?—A stratified randomized study. *J Intervent Cardiol*. 2015;29(1):75–82.
- Narang A, Velagapudi P, Rajagopalan B, et al. A new educational framework to improve lifelong learning for cardiologists. *J Am Coll Cardiol*. 2018 Jan 30;71(4):454–462. <https://doi.org/10.1016/j.jacc.2017.11.045>.
- Romito BT, Krasne S, Kellman PJ, Dhillon A. The impact of a perceptual and adaptive learning module on transesophageal echocardiography interpretation by anaesthesiology residents. *Br J Anaesth*. 2016 Oct;117(4):477–481. <https://doi.org/10.1093/bja/aew295>.
- Bonnes SL, Ratelle JT, Halvorsen AJ, et al. Flipping the quality improvement classroom in residency education. *Acad Med*. 2017 Jan;92(1):101–107. <https://doi.org/10.1097/ACM.0000000000001412>.

14. Hu YY, Mazer LM, Yule SJ, et al. Complementing operating room teaching with video-based coaching. *JAMA Surg.* 2017;152:318–325.
15. Musunuru K, Haspel RL, For the Innovative Approaches to Education Working Group of the Inter-Society Coordinating Committee for Practitioner Education in Genomics. Improving genomic literacy among cardiovascular practitioners via a flipped-classroom workshop at a national meeting. *Circ Cardiovasc Genet.* 2016;9:287–290.

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