Simulation training for the cardiology trainee

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INTRODUCTION

Simulation has been defined as an 'artificial representation of a real-world process to achieve educational goals through experiential learning' and is becoming more commonplace in medical education, in both undergraduate and postgraduate studies.[1]

RATIONALE FOR SIMULATION TRAINING IN CARDIOLOGY

One of the biggest attractants to the specialty of cardiology is its procedural nature, a virtue which lends itself to simulation-based training. In the recent past, there has been a shift from the old adage of 'see one, do one, teach one' towards patient safety and reduction in preventable morbidity and mortality. At the same time, working time directives have restricted doctors' working hours, reducing time spent training. Compounding this, the number and complexity of procedures offered by cardiologists has increased, as have clinical department workloads, rendering training time a precious commodity.

Procedural risk is known to be reduced with operator experience,[2] and this fact, combined with the factors discussed previously, are driving the routine integration of simulation training into cardiology training curricula.

EVIDENCE FOR SIMULATION TRAINING

Although there are no studies that document a positive effect on patient outcomes,[3] simulation is well established in medical training,[4] providing a welcome adjunct to enhance clinical opportunities, with no impact on patient risk or busy service-provision schedules. One large meta-analysis of simulation training for pooled medical procedures reported improved knowledge and skills in studies with objectively measured outcomes.[5]

Specific to interventional cardiology, study results have been conflicting; two small single-centre studies in Toronto[6] and Chicago[7] reported significant improvement in technical ability for trainees in the simulator arm for performing diagnostic coronary angiography. By contrast, trainees who enrolled in a simulator course appeared to perform less well than those who had not in a retrospective cohort study from Stockholm.[8]

TYPES OF SIMULATION TRAINING

'Fidelity' or realism is a fundamental principle of simulation-based training, known to be important for participant engagement, learning and success of the simulation.[1]

Types of simulators can be classified according to fidelity, as per the example in figure 1.

Generally, low-fidelity/moderate-fidelity simulators are used in 'part-task training simulation', which breaks down complex procedures into their constituent parts. This type of simulation may prove helpful in early registrar training when discrete aspects of procedures, such as vascular access, can be rehearsed prior to or alongside clinical training to facilitate timely and safe acquisition of fundamental skills.

It has been suggested, however, that the real benefits of simulation may lie in the more complex human factors training[3] with the concept of crisis resource management (CRM) training having been shown to improve patient outcomes.[9] CRM is a well-established aspect of advanced life support training,[10] which not only focuses on technical aspects of cardiac arrest management but also on the development of teamwork, leadership, communication and decision-making in high-fidelity, safe, simulated environments with facilitated opportunity for timely reflection and learning immediately after. This type of training is readily translatable to a cath lab environment and is being increasingly adopted, both for trainees and to improve the performance of established teams.[3]

FUTURE WORK

There is a growing clinical interest in simulation-based training with research supporting its use and wider implementation alongside clinical training for the acquisition of a multitude of technical and non-technical skills. It is likely that as simulation technology advances, the training on offer will diversify to include all aspects of practical cardiology, facilitating trainees' acquisition of necessary skills in a safe, efficient and trainee-centred manner.

As yet, simulation training is not mandated as part of the national curriculum for cardiology training, although guidance from the General Medical Council and Health Education England recommends offering newly appointed trainees simulation training in the interests of patient safety with both the British Cardiovascular Society and the Specialist Advisory Committee in cardiology

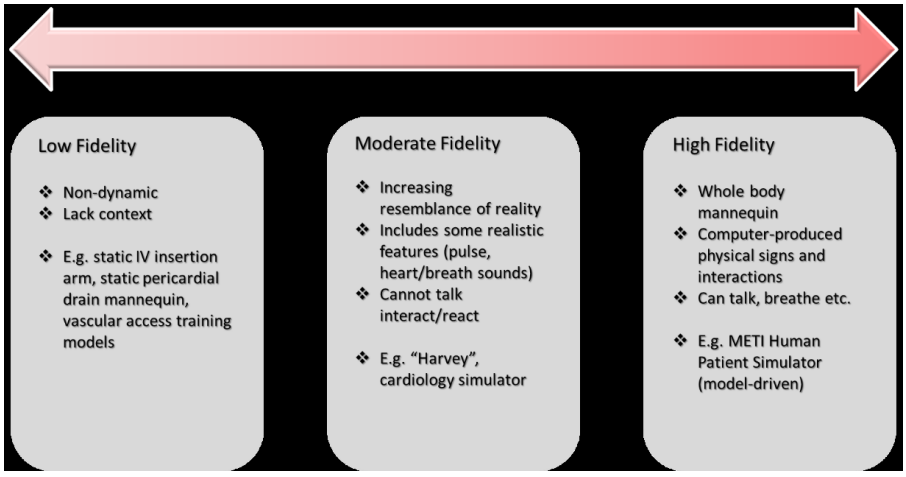

Figure 1 Simulator types classed by fidelity. IV, intravenous; METI, Medical Education Technologies Inc.

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strongly recommending its uptake for the reasons outlined previously.[11]

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