The Importance of Simulation in Vascular Training: A Literature Review

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- There are no disclosures from any of those involved.

Introduction

- Management of vascular pathology that was once relegated to open procedures has now shifted to a field where endovascular options are available.

- Residents have stringent work hour restrictions, heightened scrutiny associated with patient safety, and decreased operative volumes due to COVID-19 related cancellations and shutdowns.

- Simulation has been offered as a possible means to mitigate these limitations and shift the learning curve to competency.

Introduction

- Little is known regarding the efficacy and best practices of incorporating simulation into vascular training.

- The purpose of this study is to review literature pertaining to simulation and how it can be incorporated into vascular surgery training.

Methods

- Literature review of English language articles on the EBSCO database.
- No date restrictions.
- Search terms included: “vascular surgery simulation,” “endovascular surgery simulation,” and “vascular education simulation.”
- Additional studies were found by searching reference lists of relevant articles.

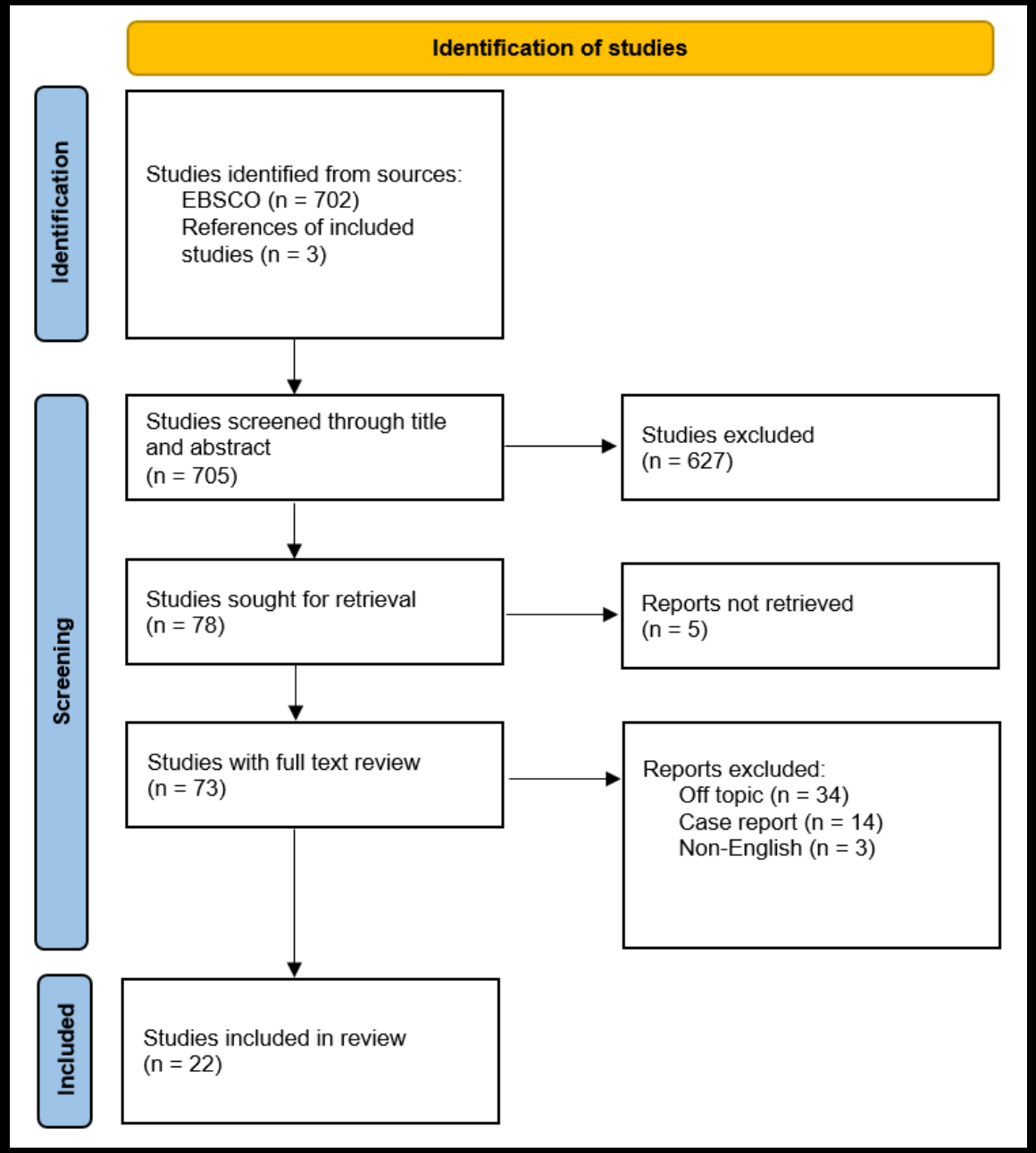
Methods

- Inclusion Criteria: Studies involving open vascular simulation or endovascular simulation
- Variables assessed for all studies: Simulator fidelity, educational efficacy, validity of the simulator, transfer of skill, and cost and time effectiveness were assessed.
- Variables assessed for endovascular studies: Amount of handling error, procedure time, fluoroscopy time, and the amount of contrast used.
- Summary descriptive statistics were performed for each variable.

Results

- 22 articles included

- 16 endovascular
- 5 open
- 1 both



Results

- For all procedures the most important factors in determining efficacy were:
  - Involvement of expert level (attending) proctors
  - Use of high fidelity (cadaver) simulators
  - Use of trainee-specific models
  - Employment of specific learning objectives
- For endovascular procedures, the use of virtual simulators in enhancing trainee competence is supported by better quality data, demonstrating:
  - Decrease in catheter handling errors
  - Reduction in procedure time
  - Reduction in fluoroscopy time
  - Diminished volume of contrast used
  - Consistent operator performance assessment
  - Transfer of skill to patient care

Discussion

- The purpose of this study is to review literature pertaining to simulation and how it can be incorporated into vascular surgery training.
- More studies have been performed on endovascular surgical simulation than open
- High fidelity models and proctor involvement is helpful
- Endovascular simulation demonstrated clear improvement in skill with good transfer to live patient care

Conclusion

- Simulation is an important tool for both assessment and training of vascular residents.
- The use of expert proctors, appropriate simulators, and well-designed curricula are the keys to success.
- Further studies connecting simulation training to patient centered outcomes are still needed to define the true potential of these tools and methods.