Can a high-fidelity robotic surgery curriculum enhance resident operative autonomy?

Dariya Hardisky MD, Lori Welsh MEd, Phoenix Chen PhD, Lisa Cunningham MD, Emily Huang MD MEd

The Ohio State University
Wexner Medical Center

Background

The field of robotic surgery has grown exponentially in the last decade.

Trainees are learning surgical principles and tools simultaneously.

Most institutions only include basic simulation modules as part of robotic surgery training which does not allow for demonstration of proficiency.

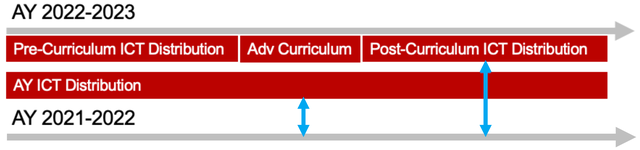
Dual robotic consoles allow for guided and graduated trainee entrustment of operative autonomy. Independent console time (ICT), a measure provided by Intuitive has been shown to be a valid surrogate for trainee autonomy[1].

Methods

We created an advanced interdisciplinary wet-lab based task-specific curriculum for senior residents and fellows to practice foundational robotic surgery techniques.

We analyzed the recordings of each practice session using the validated GEARS[2] (Global Evaluative Assessment of Robotic Skills) scale and correlated it to ICT using Pearson's test. We also provided skill-specific written feedback.

We then compared trainee ICT before and after completion of the curriculum as well as with a training-level matched cohort who did not complete the advanced curriculum using the Mann-Whitney test.



Results

In AY 2022-23, 13 PGY 4-5 general surgery residents, PGY 5 urology residents, urogynecology fellows, and colorectal surgery fellows completed the curriculum and recorded a total of 21 skill videos.

GEARS scores ranged between 13-29 (max 30).

GEARS score moderately correlated to ICT pre- and post-curriculum (r=0.58, r=0.40).

Post-curriculum ICT was significantly higher for the AY 2023 cohort.

ICT was not significantly different between cohorts for the entire year or last 4 months of the year.

Pre-curriculum ICT	Post-curriculum ICT	p-value
40.1%	45.2%	0.001

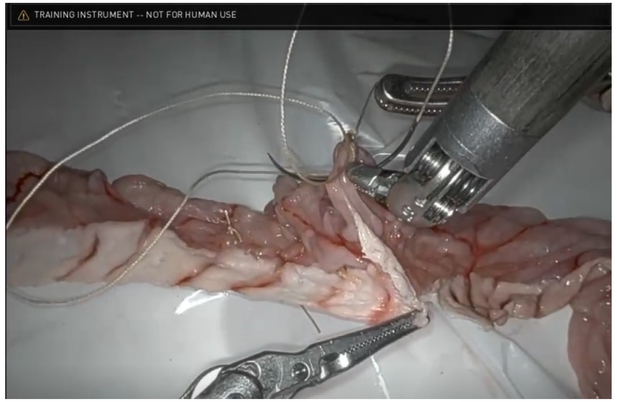
Advanced curriculum cohort ICT - year	Matched cohort ICT - year	p-value
42.6%	40.6%	0.14

Advanced curriculum cohort ICT – last 4 months	Matched cohort ICT – last 4 months	p-value
44.1%	43.3%	0.64

Conclusions

A high-fidelity curriculum allowing practice of composite skills may be beneficial across surgical specialties (general surgery, urology, gynecology).

A simulated robotic surgery curriculum can allow surgical trainees to practice robotic skills safely and independently and may enhance operative autonomy.



References

[1] Wang TN, Woelfel IA, Pieper H, Haisley KR, Meara MP, Chen X (Phoenix). Is Robotic Console Time a Surrogate for Resident Operative Autonomy? Journal of Surgical Education. 2023 Nov 1;80(11):1711–6.

[2] Sánchez, R., Rodríguez, O., Rosciano, J. et al. Robotic surgery training: construct validity of Global Evaluative Assessment of Robotic Skills (GEARS). J Robotic Surg 10, 227–231 (2016).