Remote Telepresence Versus In-Person Case Observations for Robotic Surgery Training Pathways

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Introduction

"See One; Do One; Teach One" is a traditional paradigm for surgical training; robotic surgical training pathways incorporate case observations as a key step. The recent pandemic limited access to observing cases in-person, but telepresence technologies enabled remote case observations (Figure 1).

The effectiveness of remote versus in-person case observations in supporting transition to practice is not known. We hypothesized that remote case observations were not inferior to in-person with respect to robotic surgery adoption.



Figure 1. Intraoperative Remote Case Observation

Methods

This study compared robotic surgery adoption metrics in newly trained US robotic surgeons who did their first case observations remotely or in-person from 01/01/2017 to 03/31/2023. Surgeons who undertook both remote and in-person case observations were excluded. Surgeons in the remote cohort were matched with surgeons observing in person with the same surgical specialty, year of training, and geographic region. Given that in-person greatly outnumbered remote case observations, the matching process randomly selected in-person surgeons from available exact matches.

Remote and in-person groups were compared using the Wilcoxon signed rank test with median values for days to first and 10th cases, 90-day procedure volume post training, and 90-day procedure volume one year after training. Outcome variable calculations used business days to exclude holidays and weekends.

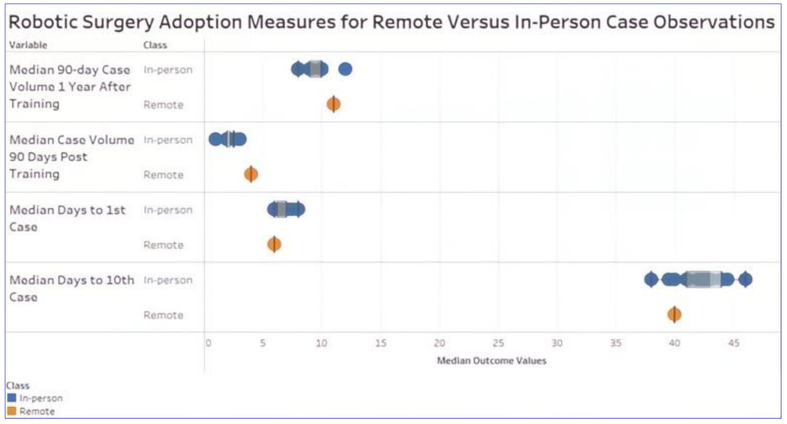


Figure 2. In-person and Remote Group Boxplot Comparison

Results

During the study period, 3492 surgeons participated in their first case observations, 364 remotely and 3128 in person. The initial matching process yielded 364 remote/in-person surgeon pairs, and 2764 unmatched surgeons. Both in-person and remote groups included 41 bariatric (11%), 33 colorectal (9%), 179 general (49%), 83 gynecologic (23%), and 28 thoracic (8%) surgeons.

Median days to first procedure were 6.0 for remote and 7.0 for in-person surgeons; median days to 10th procedure were 40.0 for remote and 45.0 for in-person; median 90-day procedure volumes were 4.0 cases for remote, 2.0 cases for in-person; median cases in 90 days one year after training were 11.0 for remote, 9.5 for in person.

Variances in case progression and volumes were large, so differences were not statistically significant. To enable fair representation of the larger in-person cohort, median outcome variables from 20 different randomly generated in-person groups are shown in boxplots in comparison with the remote group in Figure 2.

Conclusions

Surgeons who participated in case observations remotely had similar or increased measures of robotic surgery adoption compared with surgeons who did case observations in-person.

Telepresence technologies can expand access to case observations for robotic surgery training.