

AMEE Abstract 2024

Title

“Follow it up until you come to the nose of the thing!” Ambiguous verbal instruction in robotic surgery

Authors

Emily Huang, Sandeep Yanamala, Carsen Steele, Daniel Bacon, Andrew McKenzie, Gary Sutkin

Background

Rapid assimilation of the robot into modern surgical practice has made optimizing robotic teaching a topic of urgency. The configurational relationship in robotic surgery eliminates face-to-face interaction and co-manipulation of the surgical field, leaving teachers almost entirely dependent on verbal communication. We examined semantics in robotic surgery instruction through the lens of two linguistic phenomena: directional frame of reference (DFR) and deixis (“pointing”).

Methods

Robotic inguinal hernia repair (rIHR) procedures at a teaching institution were video and audio-recorded, capturing both endoscopic view and a view of the dual operating consoles to observe trainer/trainee interactions. Audio was transcribed and deidentified, then instances of linguistic and physical phenomena counted. The synchronized video was analyzed using a thematic analysis approach, to identify linguistic and physical themes in instruction and communication.

Results

In four recorded rIHR dissections (98 min), we counted 525 instances of DFR, 475 anaphora, 376 definite description, and 941 verbal / 316 physical deixis. Physical deixis was mainly used by trainers while operating (178 instances) or during console handover (48 instances). Themes that emerged in qualitative analysis included thin / colloquialized verbal representations of complex phenomena and anatomic relationships (e.g., “just burn down,” to describe cautery dissection motions); instructional ambiguity requiring tacit knowledge for interpretation (e.g., knowing what hernia sac edge looks like); 2D terms describing movement in 3D spaces; and use of pointers, demonstrative exposures, camera repositioning, and console takeover for physical deixis.

Discussion

In our study, ambiguous linguistic phenomena (DFR, anaphora, verbal deixis) significantly outnumbered definite verbalizations during rIHR instruction, and most verbal deixis (e.g. “right

there”) was unaccompanied by physical pointing. Ambiguous verbal instruction required varying degrees of tacit knowledge about case conduct, anatomy, and instrumentation for interpretation. Physical deixis was more challenging for trainers when not controlling the console, resulting in console takeovers. Further work delineating robust shared vocabulary for intraoperative surgical phenomena and spatial anatomy could improve teaching, safety, and trainee autonomy.

Take-home messages

Minimizing instructional ambiguity is important for effective and safe robotic surgery teaching. In an environment of limited physical communication, effective surgical teachers should consider trainee tacit knowledge, utilize explicit language, and accompany verbal teaching with physical deixis.