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Surgical resident technical skill self-evaluation: increased precision with training progression



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ABSTRACT

Background: Surgical resident ability to accurately evaluate one's own skill level is an important part of educational growth. We aimed to determine if differences exist between self and observer technical skill evaluation of surgical residents performing a single procedure.

Materials and methods: We prospectively enrolled 14 categorical general surgery residents (six post-graduate year [PGY] 1-2, three PGY 3, and five PGY 4-5). Over a 6-month period, following each laparoscopic cholecystectomy, residents and seven faculty each completed the Objective Structured Assessment of Technical Skills (OSATS). Spearman's coefficient was calculated for three groups: senior (PGY 4-5), PGY3, and junior (PGY 1-2). Rho (ρ) values greater than 0.8 were considered well correlated.

Results: Of the 125 paired assessments (resident-faculty each evaluating the same case), 58 were completed for senior residents, 54 for PGY3 residents, and 13 for junior residents. Using the mean from all OSATS categories, trainee self-evaluations correlated well to faculty (senior ρ 0.97, PGY3 ρ 0.9, junior ρ 0.9). When specific OSATS categories were analyzed, junior residents exhibited poor correlation in categories of respect for tissue (ρ -0.5), instrument handling (ρ 0.71), operative flow (ρ 0.41), use of assistants (ρ 0.05), procedural knowledge (ρ 0.32), and overall comfort with the procedure (ρ 0.73). PGY3 residents lacked correlation in two OSATS categories, operative flow (ρ 0.7) and procedural knowledge (ρ 0.2). Senior resident self-evaluations exhibited strong correlations to observers in all areas.

Conclusions: Surgical residents improve technical skill self-awareness with progressive training. Less-experienced trainees have a tendency to over-or-underestimate technical skill.

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Introduction

As the functional knowledge of surgical disease continues to expand, residency programs are evolving to produce competent and confident surgeons at the completion of their training. Growing restrictions on the surgical training environment present unique challenges to ensure maintenance of patient safety and effective delivery of quality care that affects educational constructs in both patient management and technical proficiency training.¹⁻³ Furthermore, the social climate continues to change such that overt criticism of operative technique has become taboo.^{4,5} Without the long hours and experience that comes with embodying the true sense of being a “resident” of the hospital, and without open critique of technical skill, precise self-assessment of one’s own technical and procedural competency becomes paramount to advancing surgical training to a level of expertise that is necessary to deliver effective surgical care.

Through accurate self-assessment, trainees identify strengths and weaknesses, develop plans to facilitate improvement, and continually reassess their performances to advance their skills.⁶ Honest self-evaluation is particularly important in surgical training and perhaps even more so following graduation, as trainees enter the realm of independent surgical practice. No longer with the oversight of senior surgeons, recent surgical graduates face significant challenges with each operative endeavor and are at risk of being unaware of their own limitations if they have failed to develop skill in accurately assessing their degree of technical proficiency.

Previous studies of trainee performance have demonstrated a gap in perception between trainees and their mentors.^{7,8} Poor correlation between self and observer assessment has several hypothesized causes, including overconfidence, underconfidence, and lack of knowledge. Year of training has also been implicated as a cause for poor insight, likely secondary to respectively low levels of knowledge experienced by junior trainees.⁹ Further, the unskilled and unaware phenomena may play a role in imprecise self-assessment.¹⁰ Few studies exist specifically comparing surgical resident self-assessment of operative skill to the impressions of faculty observers.⁷⁻⁹

We aimed to determine whether differences exist between resident self-assessment and observer evaluation of technical skill when performing a laparoscopic cholecystectomy. We hypothesized that differences exist between resident and faculty evaluation of operative skill and the precision of self-assessment increases with graduated levels of training.

Materials and methods

Following Institutional Review Board (IRB) approval, we obtained voluntary informed consent from 14 categorical general surgery residents (post-graduate year [PGY] 1-5) and seven faculty members prior to participation in the study. Study results, including both observer and self-evaluations of technical skill, were blinded to the training program and utilized only for research purposes.

Resident surgeons were evaluated following each laparoscopic cholecystectomy in which they performed the operation in its entirety, operating from the patient’s left side. Experienced assistance was performed by the supervising faculty from the patient’s right. Operations that were converted to open procedures, as well as those that necessitated completion by faculty members or more senior residents were excluded. Evaluations were performed via a custom cloud-based electronic data system created specifically for the study. Evaluation questions were derived from the validated Objective Structured Assessment of Technical Skill (OSATS) form for laparoscopic cholecystectomy.^{11,12} Self and observer evaluation questions were identical. Each operation was evaluated both by residents performing self-evaluation and faculty observers, resulting in paired assessments for each case.

Residents did not undergo formalized training or instruction regarding completion of the evaluation forms. Faculty, however, underwent a series of training sessions to achieve concordance between observers and normalization of scoring. Prior to study initiation, we conducted training regarding evaluation of laparoscopic cholecystectomy utilizing previously recorded videos of the procedure. Each faculty observer completed OSATS evaluations of the video recordings. Evaluation outliers were discussed to arrive at agreed-upon standards for each score level in each OSATS global assessment category. This process was repeated until concordance was achieved. Concordance was further ensured with an additional training session midway through the study period. Cohen’s *d* was utilized to determine concordance, and remained >80% (highly concordant, large effect size) throughout the course of the study.^{13,14}

To evaluate the effect of operative case difficulty, we trained faculty observers in case difficulty grading, as determined by the modified Cuschieri scale. Grade 1 was defined as easy, uncomplicated, adhesions <15% of gallbladder, with minimal dissection. Grade 2 was defined as moderate difficulty, adhesions 15%-50% of gallbladder, slight gallbladder enlargement, moderate dissection necessary with structures partially obscured, or mild cholecystitis. Grade 3 was defined as severe difficulty, adhesions >50% of gallbladder, inflamed >50% gallbladder, distended or shrunken, extensive dissection, structures obscured, or severe cholecystitis. Grade 4 was defined as extreme difficulty, adhesions burying the gallbladder, inflamed near 100% of gallbladder with thickened or gangrenous wall, extensive dissection necessary, or >90 minutes prior to clip placement.¹⁵ Access to the grading scale and examples of each difficulty grade were available while faculty completed evaluations to ensure accurate grading of each case.

For the purposes of this study, we focused only on the global assessment categories of the OSATS evaluation. Global assessment evaluations, both by residents and observers, were analyzed utilizing Spearman’s coefficient (Rho [ρ]) to determine differences between Likert scale values entered by evaluators. To aid in meaningful data analysis, the data were separated into three groups: senior residents (PGY4-5), PGY 3 residents, and junior residents (PGY 1-2). Rho values greater than 0.8 were considered well correlated.

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