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"Reflection-*Before*-Practice" Improves Self-Assessment and End-Performance in Laparoscopic Surgical Skills Training

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OBJECTIVE: To establish whether a systematized approach to self-assessment in a laparoscopic surgical skills course improves accordance between expert- and self-assessment.

DESIGN: A systematic training course in self-assessment using Competency Assessment Tool was introduced into the normal course of evaluation within a Laparoscopic Surgical Skills training course for the test group ($n = 30$). Differences between these and a control group ($n = 30$) who did not receive the additional training were assessed.

SETTING: Catharina Hospital, Eindhoven, The Netherlands ($n = 27$), and GSL Medical College, Rajahmundry, India ($n = 33$).

PARTICIPANTS: Sixty postgraduate year 2 and 3 surgical residents who attended the 2-day Laparoscopic Surgical Skills grade 1 level 1 curriculum were invited to participate.

RESULTS: The test group ($n = 30$) showed better accordance between expert- and self-assessment (difference of 1.5, standard deviation [SD] = 0.2 versus 3.83, SD = 0.6, p = 0.009) as well as half the number (7 versus 14) of cases of overreporting. Furthermore, the test group also showed higher overall mean performance (mean = 38.1, SD = 0.7 versus mean = 31.8, SD = 1.0, $p < 0.001$) than the control group ($n = 30$). The systematic approach to self-assessment can be viewed as responsible for this and can be seen as "reflection-*before*-practice" within the framework of reflective practice as defined by Donald Schon.

CONCLUSION: Our results suggest that "reflection-*before*-practice" in implementing self-assessment is an important step in the development of surgical skills, yielding both better understanding of one's strengths and weaknesses and also improving overall performance. (J Surg Ed ▮:▮▮▮-▮▮▮. © 2017 Association of Program Directors in Surgery

KEY WORDS: self-assessment, expert assessment, training, evaluation, laparoscopic cholecystectomy, laparoscopic skills

COMPETENCIES: Patient Care, Medical Knowledge, Practice Based Learning and Improvement, Systems Based Practice, Professionalism, Interpersonal Skills and Communication

INTRODUCTION

The development of technical skills is crucial for surgical residents and surgeons. Simulation-based training is a very important tool to enhance this competence. Besides supervised teaching by expert, trained surgeons, self-assessment and self-directed learning are key elements in surgical training.[1,2] Several studies have shown that integration of self-assessment is beneficial for the development of a surgeon's career.[3,4]

There is disagreement in terms of the desirable role of self-assessment, between the literature on self-assessment theories and that concerning its real-world implementation in surgical practice. The theoretical literature tends to focus on the use of self-assessment as a means of improving reflective practice and thereby improving the individual's

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overall professional competence and skills.[5,6] Evaluation of real-world self-assessment in surgical practice often focuses on trying to achieve accordance between expert and self-assessment and a reduction in overestimation of performance.[7]

Although self-assessment has been considered a vital component for professional self-regulation and development for a long time, many studies debate the effectiveness and efficacy of self-assessment in skills training and state that there is room for improvement.[5,8-10] Recently, several authors, such as Ward et al,[11] propose that resolving weaknesses in the methodologies used to evaluate self-assessment would yield a more positive evaluation of self-assessment's efficacy. Because of these improved methodologies, it has been shown that trainees or surgical residents are in fact able to self-assess their weaknesses and strengths similarly to expert assessment.[7,12,13]

Regardless of the field using self-assessment, the ideal is to improve the ability of individual candidates to accurately assess their own ability with the aim to improve their overall performance; to this end, many tools and methodologies have been suggested for the improvement of self-assessment itself.[6,14,15] One of the most important conclusions is that surgical residents assess their own procedural performance more accurately after watching benchmark videos of expert performances and their own performances.[8,16] Stewart et al indicated a concentrated, intense course in procedural skills before evaluation for self-assessment to be more accurate, namely greater accordance between expert- and self-assessment.[17]

This study aimed to determine whether implementing a self-assessment training tool in a validated laparoscopic surgical skills course will improve the accordance between self- and expert assessment.

MATERIALS AND METHODS

Participants

Sixty surgical residents who attended the 2-day Laparoscopic Surgical Skills (LSS) grade 1 level 1 curriculum were invited to participate in 2 centers: Catharina Hospital, Eindhoven, The Netherlands ($n = 27$), and GSL Medical College, Rajahmundry, India ($n = 33$). Their expertise level ranged from postgraduate year 2 to 3. All participants voluntarily enrolled in the study and signed an informed consent before the start of the curriculum. All participants had completed and passed an online examination on the basics of laparoscopic surgery to be eligible for participation in the program. Each participant completed a questionnaire with questions pertaining to demographics, experience in laparoscopic surgery, and time spent preparing for the curriculum.

Assessment tool

The Competency Assessment Tool (CAT) used in this study is an operation-specific assessment tool that was adapted and validated for the laparoscopic cholecystectomy (LC) procedure for use within the LSS curriculum.[18] In this study, it was used as a tool for self- and expert assessment. The CAT evaluation criteria are spread across 3 procedural tasks: (1) exposure of both the cystic artery and cystic duct, (2) cystic pedicle dissection, and (3) resection of the gallbladder from the liver bed. Within these tasks, performance is rated on a five-point, task-specific scale based on the efficient usage of instruments, the handling of tissue with the nondominant hand, errors within each task, and the end-product of each task. A maximum of 48 points can be scored on the CAT assessment, and a total score of 30 or more was considered a pass for the LC course.

Four expert surgeons, 2 from each of the respective locations conducting the curriculum, were invited to participate as expert assessors for both the test and control groups. They all had previous experience in using the CAT form for evaluation. Their laparoscopic surgical experience ranged from 5 to 25 years, each with more than 200 laparoscopic procedures performed as main surgeon. The surgeons were not aware whether the candidates they were assessing had the additional training or not when conducting their assessment.

Protocol

All participants completed the standard training and instructions of the LSS grade 1 level 1 curriculum. During the course, they received an interactive discursive training with experts on the basics of laparoscopic surgery, LC, virtual reality simulators, and box trainers. The participants were divided in 2 groups based on the days they attended courses; into a test group ($n = 30$) and a control group ($n = 30$).

The participants of both groups were instructed by the expert surgeons on the procedural tasks of the LC. Immediately before they performed the procedure, the test group received an additional training session on self-assessment (Fig. 1).

This session totaled 30 minutes in duration and started with the instructor introducing the theoretical meaning and professional benefits observed in the literature of self-assessment. The group was then given the CAT form and instructed to read it. Each criterion was explained in detail by the instructor. The relation between the word-based definitions on the CAT form and their score-based equivalents was explained. The instructor then held a question and answer session to resolve any of the participant's concerns. Where possible, the criteria were accompanied