Effectiveness of Learning Advanced Laparoscopic Skills in a Brief Intensive Laparoscopy Training Program ☆

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BACKGROUND: Intensive training programs arose from limitations in access to simulation centers. The aim of this study is to evaluate the effect and associated factors involved in an intensive course for learning advanced laparoscopic skills, which include validated teaching techniques.

METHODS: General surgeons and final-year residents were analyzed after completing an intensive 5-session advanced laparoscopy course. Initial (IA) and final assessment (FA) consisted in performing a jejunojejunal anastomosis in a live porcine model, measured using objective structured assessment of technical skill (OSATS) (GRS and SRS, that is, global rating scale and specific rating scale, respectively) and operative time (OT). The 3-session training was structured in a bench model with an ex vivo bowel. For the demographic analysis, 3 groups were defined according to the presentation of relevant changes in OSATS and in OT between IA and FA: group A, no changes; group B, change in 1 variable; and group C, change in both variables.

RESULTS: After the course, all 114 participants presented a significant improvement in OT (37 vs 24.6 min, $p < 0.001$) and in OSATS; global rating scale (10.5 vs 16 points; $p < 0.001$) and Specific Rating Scale (8.5 vs 12.7 points; $p < 0.001$). In the IA, 70 (61%) participants completed the jejunojejunal anastomosis and 105(92%) in the FA ($p < 0.01$). In the FA, 56% of participants presented relevant changes in both variables (group C). This group was significantly younger (34 vs 45 vs 40 y old; $p < 0.001$), had fewer years of surgical experience (2 vs 9 vs 5 y; $p < 0.001$), and had a proportionally higher concentration of residents ($p = 0.01$).

CONCLUSIONS: This intensive course is set out as a viable alternative to teach basic skills in advanced laparoscopy in a short period of time, which is ideal for surgeons with difficult access to training centers. It remains necessary to establish the participant profile for which this type of course is most beneficial. (J Surg 72:648-653. © 2015 Published by Elsevier Inc. on behalf of the Association of Program Directors in Surgery)

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COMPETENCIES: Medical Knowledge, Practice-Based Learning and Improvement, Systems-Based Practice

INTRODUCTION

At present, surgery residents must graduate with competence in basic laparoscopic skills. However, residents have limits regarding working hours, and hospital safety regulations have limited their access to operating rooms.[1,2] Simulation has risen as a viable alternative for learning such skills in a safe, controlled, and standardized environment.[1-4]

Most of the simulated programs of laparoscopic training are focused on teaching basic laparoscopic skills. One of these programs is "Fundamentals of Laparoscopic Surgery," an examination held in the Unites States as a graduation prerequisite for surgery residents.[5,6]

Most of the current residency programs do not guarantee that future surgeons will be able to complete complex laparoscopic procedures, such as a small bowel

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anastomosis.[3] New training programs in advanced laparoscopy have been created to rectify this and have shown transfer of simulator-acquired skill to the operating room.[7-12]

Many types of advanced training programs have been suggested (structured, short, self-regulated courses, etc.), most of them with indicators showing skills acquisition. However, there are various factors related to the training subjects themselves that do not allow all programs to adapt to their requirements, such as innate abilities, availability, and access to simulation centers. These qualities make it difficult to compare different types of programs.[13-15]

Intensive training programs (within the length of a few days) arose as a response to the needs of surgeons and residents with time constraints or with geographic limitations on their access to simulation centers. This type of program could be effective in the initial stages of simulated laparoscopic training in untrained surgeons[16] or for surgeons with little laparoscopic experience.[17,18] The implementation and design of these courses requires a structured confrontation, a valid analysis of effectiveness, and a clear understanding of individual factors associated with the results. This achieves effective instruction of an advanced surgical technique in a short period of time.[6,19]

The aim of our study is to evaluate the effect and factors associated with a 5-session intensive course on advanced laparoscopic skills with validated teaching techniques.

METHODS

The Simulation and Experimental Surgery Centre of Pontificia Universidad Católica de Chile performed a quasi-experimental study of the participants of the course "Basic Techniques of Advanced Laparoscopic Surgery" from the year 2010 to 2014. This course was addressed to surgeons and residents in the final year of general surgery with experience in basic laparoscopic surgery.

Study Design

The 2-week course consisted of daily practical and theoretical sessions with approximately 30 hours of lectures, 2 sessions of laparoscopic videos, and a practical training course of advanced laparoscopy. The practical module included 3 training sessions in a simulation bench model and 2 evaluation sessions in a live porcine model (1 at the beginning of the course and a final assessment [FA] after the 3 training sessions). The Ethics and Animal Welfare Committee of the University approved the work protocol.

All participants completed a survey with demographic data related to their surgical experience.

Study Organization

Initial Assessment

Before the initial assessment (IA), the trainees attended a master class about how to perform a proper jejunojejunal anastomosis (JJO) with a stapler device using a video as an example and a live explanation by an expert instructor (Fig.). Afterward, they were filmed and pre-evaluated when performing the procedure on a live porcine model. A 40-minute time limit was established for each trainee owing to time and space limitations.

Training Sessions

Training was structured based on the following concepts: part-task training, constructivism, and effective feedback. The task to be taught was deconstructed in its key components to facilitate learning. The progression continued for a series of tasks of increasing complexity.[20] Expert tutors gave effective feedback, which consisted in recognizing the strengths and weaknesses of the trainees and instruction on how to increase performance in the succeeding stages.

Participants performed 3 sessions of specific training to learn the necessary skills to perform a JJO with the stapler device in a validated bench model using an ex vivo bovine intestine.[8,21] The sessions were performed in a 2-week

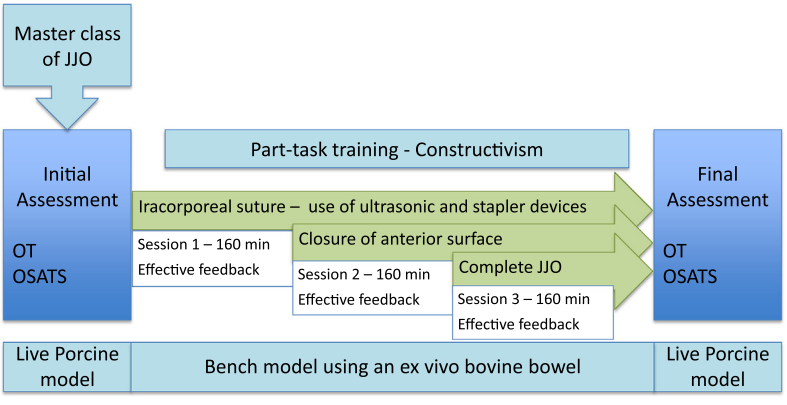

FIGURE. Diagram of diploma course "Basic Techniques of Advanced Laparoscopic Surgery."