

Short Communication

Training in Laparoscopic Surgery

Edmundo Dediós Orozco¹, Carlos Dediós La Madrid²

¹ CEPCEA President, Chief of the Surgery Department Jorge Reategui Delgado Hospital II –EsSalud, Piura – Peru. Chief of the Surgery Course – Cesar Vallejo University, Peru

² Chief of the Laparoscopic Surgery Laboratory CEPCEA Piura, Peru

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Summary

Introduction: The training of Residents and Surgeons in Laparoscopic Surgery in Latin America is performed with OR in the patient, which predisposes to the risk of many complications, both during learning as during the daily performance of this intervention.

Objective: To evaluate the efficiency of the basic training program in Laparoscopic surgery in the development of cognitive and motor dexterities and skills.

Methodology: CEPCEA has developed a 5-day teaching system, based on the PBL (Problem-Based Learning), development of tests in manual skills on inanimate objects, biological and human tissue, and permanent creation of TIPS; we combine the best of each continent: the American FLS, the European-originated Endotrainer, and the Japanese KAIZEN. We took a pre-test and a practical post-test to the total cohort of trained surgeons during the period January-December 2016, tests which were based on time and on 20 theoretical questions with a value of 1 point per each correct answer.

Results: The population tested consisted of 55 trainees from different Latin-American countries who attended in groups of 4 to 6 participants of general surgery (32), gynecology (11), urology (3), surgery oncology (3), pediatric surgery (1), and others (5) who, on admission, had a mean of peg transfer time of 189.6 seconds, which at the end of their practical training of 4 days was of 68.4 seconds; while the results of the pretest and theoretical posttest showed an average of 5.2 And 15.4 points respectively.

Conclusions: The CEPCEA teaching system is an efficient and necessary method for the development of manual and theoretical skills and dexterities in laparoscopic surgery in the various surgical specialties.

Key words: *Training in Laparoscopy, Laparoscopy laboratory, Evaluation in Laparoscopy.*

Introduction

Facing the rapid growth of laparoscopic surgical technology, adequate laboratory training is required, prior to acting in the Operating Room. The Learning Curve should take place in the laboratory, not in the patient's abdomen [1,2,3].

It is considered relevant to make an objective measurement of the trained student's acquisition of skills and dexterities, after the implementation of a new training program with simulators with inanimate, virtual and animal models, prior to contact with the patients [3].

Likewise, in his research, Enciso [5] aims to evaluate the development of skills taking place in rookie surgeons through the implementation of the training program in basic laparoscopic surgery, as well as obtaining a subjective assessment of it.

The learning of Laparoscopic Surgery is not fully standardized, nor is easily accessible. Laparoscopic Surgery learning programs are still incomplete and do not encompass simultaneous cognitive and psychomotor skills. Furthermore, adequate dexterities are not developed prior to entering the Operating Room, and the minimum skills needed to be developed in Laparoscopic Surgery have not yet been standardized [2-6,8-10,12].

Not all surgeons practice laparoscopy, quite many of them are reluctant to learn it in the laboratory, and we are still used to the traditional method of surgery-learning: teacher-apprentice, even though over 60% of surgeries are minimally invasive [7].

It still exists a predominance of conventional surgical treatment

for acute abdomen, although acute abdomen through conventional surgery reports more postoperative discomfort. Plus, there are no uniform definitions of protocols and modes of treatment in acute surgical abdomen, and we have not yet formed the necessary human resources to apply Laparoscopic Surgery 24/7 [11,12].

There are many complications in Laparoscopic Surgery due to lack of expertise, and there is no consensus or uniform criteria to determine a conversion to Laparoscopic Surgery, and neither there exists consensus on the complication factors in acute-abdomen Laparoscopic Surgery [12-14].

As stated by Camacho et al. [14], the development of new surgical techniques and their swift application in minimally invasive surgery generates the need for optimal, effective and comprehensive learning from the first phase of teaching, which is the training process.

General Objective

To ascertain the efficiency of the *Basic Training Program in Laparoscopic Surgery* in the development of cognitive and motor skills at the Center for Studies on Prevention and Correction of Abdominal Diseases – CEPCEA- in Piura, Peru.

***Corresponding author:** Edmundo Dediós Orozco, CEPCEA President, Chief of the Surgery Department Jorge Reategui Delgado Hospital II –EsSalud, Piura – Peru. Chief of the Surgery Course – Cesar Vallejo University, Peru, Tel: 073-285214; Fax: 073-285210; E-mail: ed_dedios@hotmail.com

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Methodology

We took the population of 55 trainees from different Latin-American countries (Peru, Ecuador, Colombia, Bolivia, El Salvador, Antilles, Guatemala) who went to the CEPCEA. Training Center in the city of Piura – Peru from January 1st to December 31st, 2016; group coming from the specialties of general surgery, gynecology, urology, oncology surgery, pediatric surgery, even general practitioners and, in a single case, a nurse who was a student of the last year of Medicine.

CEPCEA's Training Program lasts 5 days in which the trainee acquires, develops and shows both manual and cognitive skills, which are graded by means of pre- and post- tests which are applied according to the variables to be assessed; for example, the exercises in the FLS training box variables are measured on a time basis, while the skills for the chicken endo-trainer are evaluated according to perfection and cleanliness of the processes to be performed. The cognitive part is evaluated by means of a 20-question exam where 20 is the top score and each point corresponds to a correct answer.

The methodology of the course is based on the PBL system (Problem-Based Learning) which has shown great comprehension by the trainee and which is divided into 4 modules: in inanimate objects, biological tissue, dead and live animal and finally –as assistant- in humans, where the best of each Continent is combined: part of the SAGES' American FLS (Fundamentals of Laparoscopic Surgery) CEPCEA-modified program, the European originated endotrainer for practice on dead chickens, and the KAIZEN, the Japanese system of continuous quality and improvement, which consists of 5 very strict stages: Order, Classification, Cleaning, Discipline and Standardization.

Each module consists of the following

Module 1 or Dry Mode: Knowledge of endoscopic tweezers and intra-abdominal aggregated utility, object transfer, rotor use, coordination of both hands, visual field expansion, pattern cutting, traction and contraction, theory of knots, TIPS for simple intracorporeal knots and according to utility by specialty, perfect realization of the Roeder

knot: progressive tips, ergonomics correction, theory of monitors, cameras, laparoscopes and fiberglass cables.

Module 2 or Wet Mode: Tips for use of tweezers, centering of the camera with 30° and 45° laparoscope, horizons and third dimension exercises, objective change and adequate panning, advantages of laparoscopes of 30° and 45° over laparoscope of 0°. Kehr (T tube) dominance with both hands (Third dimension) and chamber of 30° and 45° (In pairs), practice in Endotrainer in chicken neck: vertical cut and transversal of 90°, how to calculate measurements, dissection of the SCT (subcutaneous cellular tissue), use of both hands, focus on monitor, horizon control, cut trachea at 12 hours, partially dissect esophagus, cutting of esophagus and Kehr placement with 45° optics, calculation of distance between points (0.3-0.5 cm). Theory of energy sources: monopolar and bipolar, irrigation and suction in laparoscopy, theory and practice using Verres and trocars; Theory of the pneumoperitoneum (Physiological changes), tower knowledge, quality cables and connections, whitening.

Module 3 in Swine: Verres' revision and placement, trocar placement, CO2 leak detection (insufflator TIPS), Triangulation, use of 45° laparoscope, camera bimanuality without loss of horizon, complete examination of cavity, mirror work, Intestinal examination, lateral suture in a single plane, calculation of distance between points.

Module 4 in Human: Operating Room Tips, Tower review, electrocautery, insufflator, cialitics, application of insufflator theory, 45° camera use and complete abdominal cavity examination, Operating Room ergonomics and overall work results of the Surgical

Team.

Results

The total population of the study was 55 trainees, of whom 24 were assistants, 26 residents, 4 general practitioners and a graduating nurse who was in the last year of medical school. The specialties attending the training were as follows: general surgery 32, gynecology 11, urology 3, surgery oncology 3 and pediatric surgery 1. The attendance of the male population was higher with 72.7% and female attendance with 27.3%.

The practical tests pursue a synergy with bimanual or ambidextrous ability, so the evaluation to be taken into account was the transfer of objects, where the shorter the time the better the evaluation, which at the beginning of the training had an average of 189.6 seconds and at the end of same 68.4 seconds; being the highest value 375 seconds and the lowest 44 seconds.

The results of the cognitive test are -mostly- directly proportional to the practice, where the average of the tests evaluated (at 20 points the top score) is 5.2 points at the beginning and 15.4 points at the end of the training, the lowest achieved score being of 0 points and the highest 20 points, the latter being only achieved in the post test.

Conclusions

The cognitive and motor level of the trainees -with which they initially attend the CEPCEA Training Center Program- is deficient according to the standards to be expected at the end of their residency (or during the same), which by contrast highlights and demonstrates their improvement and development through the intensive training received in the program.

There is no difference in the development of practical and cognitive skills between an assistant and a resident; on the contrary, we realized that the learning curve is faster in someone who has no experience in laparoscopy than in those already trained, who come in with certain learned skills, but unfortunately also with some "corks" -or preconceived ideas- which may be hard to dislodge.

The basic training in laparoscopic surgery provided by the CEPCEA Training Center Program develops skills which are useful and applicable to all surgical specialties that perform this type of minimally invasive surgery.

The training program in Laparoscopic Surgery at CEPCEA Training Center is, therefore, efficient, necessary and crucial to the development of manual and theoretical skills and dexterities in laparoscopic surgery in all its surgical specialties.

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