



## ORIGINAL ARTICLE

# Initial validation of a training program focused on laparoscopic radical nephrectomy<sup>☆</sup>



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### KEYWORDS

Laparoscopic surgery;  
Nephrectomy;  
Skills;  
Training;  
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### Abstract

**Objective:** To assess a training model focused on laparoscopic nephrectomy.

**Material and methods:** 16 residents participated in the study, who attended a training program with a theoretical session (1 h) and a dry (7 h) and a wet lab (13 h). During animal training, the first and last nephrectomies were assessed through the completion time and the global rating scale "Objective and Structured Assessment of Technical Skills" (OSATS). Before and after the course, they performed 3 tasks on the virtual reality simulator LAPMentor (1) eye-hand coordination; (2) hand-hand coordination; and (3) transference of objects, registering time and movement metrics. All participants completed a questionnaire related to the training components on a 5-point rating scale.

**Results:** The participants performed the last nephrectomy faster ( $p < .001$ ) and with higher OSATS scores ( $p < .001$ ). After the course, they completed the LAPMentor tasks faster ( $p < .05$ ). The number of movements decreased in all tasks (1)  $p < .001$ , (2)  $p < .05$ , and (3)  $p < .05$ , and the path length in tasks 1 ( $p < .05$ ) and 2 ( $p < .05$ ). The movement speeds increased in tasks 2 ( $p < .001$ ) and 3 ( $p < .001$ ). With regards to the questionnaire, the usefulness of the animal training and the necessity of training on them prior to their laparoscopic clinical practice were the questions with the highest score ( $4.92 \pm .28$ ).

**Conclusions:** The combination of physical simulation and animal training constitute an effective training model for improving basic and advanced skills for laparoscopic nephrectomy. The component preferred by the urology residents was the animal training.

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**PALABRAS CLAVE**

Cirugía laparoscópica;  
Nefrectomía;  
Habilidades;  
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Urología

## Validación inicial de un programa de formación enfocado a la nefrectomía radical laparoscópica

### Resumen

**Objetivo:** Evaluar un modelo de formación enfocado a la nefrectomía laparoscópica.

**Material y métodos:** Participaron en el estudio 16 residentes, quienes realizaron un programa formativo con una sesión teórica (1 h) y práctica en simulador (7 h) y modelo animal (13 h). La primera y última nefrectomía experimental fue evaluada mediante el tiempo y la escala global *Objective and Structured Assessment of Technical Skills* (OSATS). Antes y después del curso realizaron 3 ejercicios en el simulador de realidad virtual LAPMentor: 1) coordinación ojo-mano; 2) coordinación mano-mano; y 3) transferencia de objetos, registrando las métricas de tiempo y movimiento. Todos los participantes rellenaron un cuestionario sobre los componentes formativos en una escala del 1 al 5.

**Resultados:** Los participantes realizaron la última nefrectomía más rápido ( $p < 0,001$ ) y con mayor puntuación OSATS ( $p < 0,001$ ). Después del curso realizaron los ejercicios en LAPMentor más rápido ( $p < 0,05$ ). El número de movimientos disminuyó en todos los ejercicios: 1)  $p < 0,001$ ; 2)  $p < 0,05$ ; y 3)  $p < 0,05$ , y la distancia recorrida en los ejercicios 1 ( $p < 0,05$ ) y 2 ( $p < 0,05$ ). La velocidad de movimientos aumentó en los ejercicios 2 ( $p < 0,001$ ) y 3 ( $p < 0,001$ ). En el cuestionario las preguntas con la mayor puntuación fueron la utilidad del entrenamiento en animal y la necesidad del mismo antes de la práctica de laparoscopia clínica ( $4,92 \pm 0,28$ ).

**Conclusiones:** La combinación de simulación física y entrenamiento en animal constituye un modelo de formación efectivo para la mejora de habilidades básicas y avanzadas para la nefrectomía laparoscópica. El componente preferido por los residentes fue el modelo animal.

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## Introduction

Urological laparoscopic surgery does not include simple procedures that enable progressive learning; therefore, implementing a training program would be convenient to expeditiously and safely facilitate the transition to clinical practice. In a survey performed by the Annual Congress of European Association of Urology in 2012, it was observed that the majority of residents rated their laparoscopic experience as “poor,” although 77% of the respondents rated the motivation to perform laparoscopic surgery as “high” or “very high”, and 81% of the respondents considered a post-residency fellowship in laparoscopy.<sup>1</sup> This type of postgraduate training, which has primarily been implemented in the United States, has achieved successful outcomes because incorporating a fellowship has been demonstrated to promote a faster and safer implementation of advanced laparoscopic techniques.<sup>2</sup> Nevertheless, there has been no similar policy at the European level, and no European scientific society has proposed or developed standard models.<sup>3</sup>

Therefore, an alternative method that enables surgeons to safely acquire laparoscopic skills and shorten their learning curve is intensive laboratory training. This modality can be held within the normal hospital setting, given the financial pressure to increase productivity. Intensive training courses constitute one of the most demanded options because it is compatible with the time limitation of urologists, thus allowing surgeons to complete their hospital training in laparoscopic surgery and shorten the learning curve.

This training modality has been implemented in our institution to teach minimally invasive surgical techniques for the last 20 years. However, these training courses must be validated as useful training tools.<sup>4</sup>

Ultimately, in view of the training difficulties, the present study aimed to validate a structured training model for efficiently developing urological laparoscopic surgical skills using a balanced combination of simulation and animal training.

## Material and methods

### Study subjects

Participants were recruited from several running editions (2010–2012) of the Course in basic urological laparoscopy imparted in our center. Inclusion criteria were to be a resident and to have not performed any laparoscopic procedure as primary surgeon. One month before the course, they signed their informed consent to participate in the study. Once in our center and before commencing the course, the trainees completed a survey in which the demographic data and information concerning their previous laparoscopic and simulation experience were recorded.

### Training program

All of the training activities included in the study were approved by our Institutional Ethical Committee, concerning

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