



## Learning Curve in Robotic Partial Nephrectomy: Short for Endless?

Alexandre Stievano Carlos\*

Department of Urology, Hospital Santa Marcelina, Brazil

### Editorial

Renal Cell Carcinoma (RCC) is the third most common cancer of the urinary tract, its incidence has been increasing for some years due to improved access and quality of imaging tests, its treatment remains imminently surgical [1,2]. In this context, Partial Nephrectomy (PN) has already proved to be oncologically equivalent to radical nephrectomy; open partial nephrectomy remains the gold standard in the current guidelines for both the treatment of small masses and for locally advanced kidney tumors [1-3]. The advancement of laparoscopic and robotic techniques has raised questions about what would be the standard technique for performing partial nephrectomy for the treatment of kidney tumors, the potential for reducing the Warm Ischemia Time (WIT) in addition to a faster learning curve are factors that favor the choice of Robotic Partial Nephrectomy (RPN) [1,4-6]. The studies that analyze the learning curve are mostly retrospective analysis of casuistry, the number of surgeries to reach the learning curve can vary according to the literature from 35 to 143 cases, some studies even suggest that the surgeon's evolution would be continuous and the learning curve can be considered endless [1,7-14]. One of the questions to be answered when analyzing the learning curve in robotic surgery and whether the surgeon's previous experience with Laparoscopic Partial Nephrectomy (LPN) reduces the learning curve to the point that it is considered a prerequisite for RPN. Hanzly et al. in a retrospective study compared the learning curves of LPN and RPN of 2 surgeons with no previous experience in laparoscopy, after performing 116 surgeries in each group, they observed that the RPN achieved better operative time, lower WIT and better kidney function results than LPN. Laviana et al. in a systematic review suggested that RPN had a faster learning curve when compared to LPN even in those cases where the robotic surgeon had no previous experience in laparoscopy, however the previous experience in minimally invasive surgery makes the transition from LPN for RPN can occur without a significant learning curve. The study with the largest published casuistry is a retrospective analysis of 500 cases of RPN over 12 years of experience, the authors showed that when comparing the first 6 years with the last 6 years of experience, there were less positive margins, less WIT, less complications and reduction the length of hospital stay after the first 143 cases despite the operated cases being more complex. The same authors suggested the influence of 3 potential learning curves on the perioperative results of the RPN: Service experience, surgeon and assistant, they suggest better results from 100 cases performed at the service, 35 by the surgeon and 15 surgeries for the first assistant. Castilho et al. in a retrospective study analyzing data from 1 surgeon with no previous experience in laparoscopy showed after 50 operated cases and improvement in the rates at which the trifecta was reached, the subsequent 50 cases achieved a reduction in WIT even with increased tumor complexity. Motoyama et al. in a retrospective study analyzed 65 patients operated by the same surgeon with no experience with LPN but with extensive experience in robotic prostatectomy, the authors observed a reduction in surgical time to less than 150 min after 60 cases, WIT<20 min after 40 cases and considered that previous experience with LPN is not necessarily a prerequisite for RPN [15]. Xie et al. [16] observed in 144 cases operated by a surgeon with previous experience in laparoscopy that the number of cases required to achieve MIC>80% was 75. In similar retrospective studies Omidele et al. analyzed 131 cases and suggested that the plate auto reach trifecta was between 61 and 90 cases, Roman et al. suggested after analyzing 100 cases that the curve can vary from 20 to 65 cases, these among other studies suggest that the learning curve for RPN is lower for surgeons with experience in laparoscopy [10,16]. Larcher et al. in a retrospective analysis of the surgeon's experience on a case-by-case basis observed a trend in the WIT plateau around 14 min after 150 cases, the multivariate logistic and linear regression analysis of complications observed a linear progressive reduction curve even after 300 cases, suggesting that the learning curve for complications would be endless. There are few prospective studies on the subject, the surgeon's previous experience with LPN apparently reduces the learning curve but it does not seem to be a prerequisite for RP, in addition there is practically no standardization in training

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#### \*Correspondence:

Alexandre Stievano Carlos,  
Department of Urology, Hospital Santa  
Marcelina, São Paulo, Brazil,  
E-mail: ale\_carlos@uol.com.br

Received Date: 30 Mar 2021

Accepted Date: 26 Apr 2021

Published Date: 29 Apr 2021

#### Citation:

Carlos AS. Learning Curve in Robotic  
Partial Nephrectomy: Short for  
Endless?. Clin Surg. 2021; 6: 3147.

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programs for RPN [17]. The fact is that continuous training beyond the learning curve is a reality for the modern surgeon and can become one of the challenges for new generations of robotic surgeons.

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