20 - Learning curve of uretero-neocystostomy: in robotic surgery there is a new parameter to evaluate

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BACKGROUND

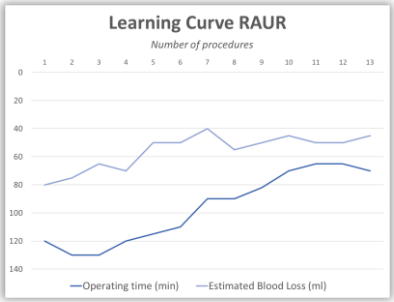
Learning curve (LC) is defined as the period for a surgeon to achieve a complete competence about a new specific surgical procedure. A LC is designed by analysis in the time of a one or more several outcomes: many authors chose operating time (OT), estimated blood loss (EBL), rate of complications, biochemical recurrence, etc. Currently, there is not a definition or a classification of LC since many factors can influence this period (surgeon's attitude, intensity of the performed procedures, confidence with a similar procedure with open technique, previous simulations with virtual reality, etc...), and numerous learning curve can be possibly designed on different peri- or post-operative outcomes. Furthermore, a specific procedure has a specific outcome: for example, for radical prostatectomy, the rate of free margins, the continence scores, and the rate of biochemical recurrence can be useful as outcomes, but they are unusable for urethral stenosis. There are no studies in the literature that analyze the learning curve about ureteral surgery, particularly on direct uretero-neocystostomy (1).

PATIENTS AND METHODS

We retrospectively have collected the operating time and estimated blood loss of 26 adult patients who underwent ureteroneocystostomy between 2014 and 2018 in the Department of Urology, Santa Maria alle Scotte Hospital, Siena. Thirteen patients received RAUR (robot-assisted ureteral reimplantation), while others received OUR (open ureteral reimplantation). Robotic procedures were carried out by a urologist in training regarding the robotic approach to the pathologies of the ureter, while the open procedures were conducted by a urologist with proven experience on ureteral pathologies with an open approach.

RESULTS

Operating time (min) average resulted 97 for RAUR and 132 for OUR, while estimated blood loss (ml) average resulted respectively 55,7 and 235,7. In Figure 1 the learning curves designed from data collected. There is a statistically significant difference ($p < 0.05$) in both parameters (Mann-Whitney U test).



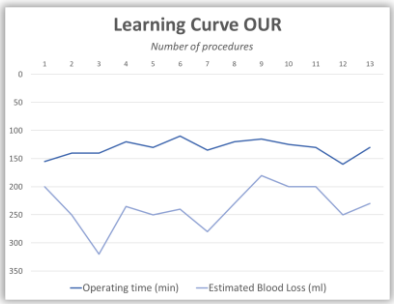


Figure 1 – In the first chart related to RAUR procedure, the learning curve of single operator in training based on Operating Time (min) and Estimated Blood Loss (ml) shows a classical trend of the LC: an initial slow improvement, the steep phase and an initial plateau. In the second chart related to OUR procedure and base on the same parameters, the learning curve of a single expert operator shows a stabilized plateau"

DISCUSSION

There are no studies in the literature that report the LC of RAUR. The analysis of our results showed in the LC of RAUR procedures a classical trend of the LC observed in other settings: an initial slow improvement followed by the steep phase (a rapid improvement) and an initial plateau, although we need further cases to confirm the successful stabilization of learning. However, it is interesting to point out how a single surgeon in training for a robotic procedure, with a previous experience of 30-50 open procedures, has reached, in thirteen procedures and without a high intensity of training (the procedures carried out in a period of two years), better parameters than the expert surgeon with OUR procedures. On the other hand, in the LC of OUR the two parameters are already in plateau, a sign that the operator has achieved the best competence in terms of operating time and estimated intraoperative blood loss. Unfortunately, it is not possible to compare the data in the literature to highlight any similarities or differences. However, it is possible to state that the robot is a perfect assistant for a young surgeon. A parameter to be considered in the use of the robot, which is emerging in the comparative studies of outcomes and costs between robotic and open surgery, is its utility in reducing the surgeon's learning curve: a comment to the unique RCT on the robotic prostatecomy vs open prostatectomy appeared on the European Urology, and signed by the Italian Maurizio Brausi (3), claims that need to put the non-statistical difference between the two procedures into context of the operator. About this, the robotic prostatectomies were performed by a young surgeon who has as experience a number of 200 robotic prostatectomies while the open prostatectomies were carried out by an experienced surgeon, with an experience of 1500.

CONCLUSION

Learning-curve for RAUR has shown that thirteen procedures allow to reach an initial plateau. In the comparison studies between the robotic technique and open technique it is necessary to include in the total economy also the saving of money and time in terms of "training" for the young surgeons: a young urologist can reach performance levels of an experienced urologist in shorter time if supported by the robot.

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