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Analysis of Instrument Traffic During Laparoscopic Robot-Assisted Pancreaticoduodenectomy

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Context Robotic surgery entails specific issues that are not present, or are not equally relevant, in open surgery or conventional laparoscopy. Instrument traffic (IT) is one of such issues. IT is the time during which surgery is paused because the surgeon at the console is waiting for the action of the surgeon the table (e.g., instrument change, camera cleaning, introduction/withdrawal of needles). **Objective** We provide the first objective evaluation of IT during robotic pancreatico-duodenectomy (PD). **Methods** The operative videos of 12 robot-assisted PDs were reviewed to define IT. The analysis included: crude IT time (CITT), relative IT time (RITT) (defined as the percentage of operative time spent for IT), number of robotic instruments changes (RIC), time spent for RIC (TRIC), number of pure laparoscopic actions (PLA), and time spent for PLA (TPLA). Figures were estimated for the entire operation as well as for dissection and reconstruction phases. Details on pancreaticojejunostomy (PJ) or hepaticojejunostomy (HJ) were related to IT to define their relative impact on operative time. **Results** Mean operative time was 517 min (range 420-600 min). Mean CITT was 3,681.6 sec (RITT 11.89%). Mean RIC or PLA was 315.7. Each RIC or PLA paused surgery for 11.8 sec. Mean RIC was 184.4 (TRIC 2,633.8 sec). Mean PLA was 131.4 (TPLA 1,039.5 sec). Mean dissection time was 326.9 min. Mean CITT was 2,095.1 sec (RITT 10.68%). Mean RIC was 105.8 (TRIC 1,645.2 sec). Mean PLA was 35.7 (TPLA 382.5 sec). Each RIC or PLA paused surgery for 14.4 sec. PJ was made by invaginating technique or duct-to-mucosa. The last one required fewer stitches, but did not reduced CITT or RIC. HJ was performed using either 4 half running sutures or interrupted external stitches plus inner half running sutures. Despite similar CITT the former technique was associated with fewer RIC. **Conclusions** Some 12% of operative time of laparoscopic robot-assisted PD is wasted because of IT. Since in this series operative time of robotic PD averaged 517 minutes, IT prolonged surgery of more than one hour. Technology improvements and/or refinements in surgical technique are expected to reduce IT during robotic PD.