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# Laparoscopic pancreaticoduodenectomy : CUSUM analysis in a developing single surgeon

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**Introduction** : Laparoscopic pancreaticoduodenectomy(LPD) was the one of most technically challenging operations of minimally invasive surgery(MIS). This retrospective study aimed to analyze the learning curve of a single surgeon who carried out 63 LPD in a single center.

**Methods** : from August 2015 to August 2018, 63 patient underwent laparoscopic pancreaticoduodenectomy in hallym sacred heart hospital by a single surgeon. The patient characteristics, perioperative variables, and immediate postoperative outcomes were retrospectively collected and analysed. The cumulative sum(CUSUM) analysis was used to identify the inflexion points which corresponded to the learning curve.

**Results** : From the CUSUM analysis, two distinct phase of the learning curve were identified(early group:1-34 cases and late group:35-63 cases). Among two groups, there was no significant difference in perioperative oucomes. Non-significant reduction were observed in operation time(mean, 448min vs. 425min, p=0.239), conversion rate(8.8% vs. 3.4%, p=0.618), postoperative complication(Clavien-Dindo grade III or higher, 26.5% vs. 20.7%, p=0.768), and intraoperative transfusion rate(35.3% vs. 20.7%, p=0.267). Except pancreas adenocarcinoma, two distinct phase of the learning curve were identified(early group:1-31 cases and late group:32-45 cases). there was significant difference in operation time(mean, 439min vs. 367min, p<0.001) and intraoperative transfusion rate(35.5% vs. 7.1%, p=0.07). Non-significant reduction were observed in conversion rate, postoperative stay, and complication.

**Conclusions** : Laparoscopic pancreaticoduodenectomy can be safely and feasibly performed selected cases by experienced hepatobiliary-pancreas surgeons. Conservatively, the learning curve was completed after about 30 LPD in excluding PDAC.

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