Radical Antegrade Modular Pancreatosplenectomy in Singapore General Hospital

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Introduction
Distal pancreatectomy is the standard surgical approach for left sided pancreatic cancer. However, primary outcomes of distal pancreatectomy remains unsatisfactory. In 2003, Strasberg described a new technique, termed Radical Antegrade Modular Pancreatosplenectomy (RAMPS). This procedure aims to improve the surgical goals of radical oncological surgery by decreasing the number of positive resection margins and increasing the lymph node retrieval rates, performing a right-to-left pancreatosplenectomy and two plane posterior dissection associated with early vascular control and pancreatic neck dissection.

RAMPS also offers better visualization of the posterior dissection plane, thus decreasing the number of positive circumferential margins (retropancreatic margins). The purpose of this report is to present the results of the RAMPS procedure from a single center’s early experience.

Methods
A retrospective single center review was performed between 2012 and 2018. Only malignant tumors on final pathology review were included. Both open and minimally invasive approaches were included. Primary outcome of this study was R0 resection and secondary outcomes included postoperative complication rate, intraoperative blood loss, operative time, number of lymph node harvested, duration of hospital stay.

Results
181 Distal/Subtotal pancreatectomies were performed, of which 11 patients underwent RAMPS for tumor at body/neck of pancreas during the study period. 10 were anterior, 1 was posterior RAMPS; 5/11(45%) were via minimally invasive approaches (laparoscopic and robotic). 8 patients (72.7%) had adenocarcinoma, 2 patients (18.2%) had pNET and 1 had IPMN high grade dysplasia (9.1%). Mean operative time was 258 mins (open approach-235 mins; MIS- 297 mins). 10 patients (90.9%) had pancreatic resection margin clearance; 9 patients (81.8%) had posterior pancreatic margin clearance.

Mean number of lymph node retrieval was 18.3(open approach-25.5; MIS-29.7). Mean length of hospital stay was 10.7 days (open approach-12 days; MIS 9 days). There was no 30-day mortality and 30-day morbidity, Grade ≥ III (Clavien-Dindo classification) is 9%.

Conclusion
Our single centre early experience showed that RAMPS may improve the tangential margins and the enbloc harvesting of lymph nodes. It is a safe operation and the minimally invasive approach may be helpful to decrease hospital stay and without oncological compromise.