



# Robotic Single-Site *Plus* One Port: Pancreas Enucleation

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## Abstract

**Purpose** Laparoscopic approaches to enucleation of the pancreas have been frequently described. Here we present a case of robotic single-site plus one port pancreas enucleation. To our knowledge, this enucleation surgical technique is the first to be reported in the medical literature.

**Methods** A 46-year-old male patient without previous medical or surgical history was incidentally diagnosed with a pancreatic mass during evaluation of intermittent right flank pain. Robotic single-site plus one port pancreas enucleation was performed using the Da Vinci single-site surgical platform with one additional port on November 16, 2016. Usual robotic instruments such as hook, bipolar, and vessel sealer with endo-wrist function could be used to facilitate effective surgical procedure with the additional port. The resected specimen was delivered through the umbilicus and a drain was not inserted.

**Results** Total operation time was 124 min with total console time of 73 min. Estimated blood loss was 50 cm<sup>3</sup>. Final pathology result was neuroendocrine tumor, grade 1. The patient was discharged without any complications on postoperative day #4.

**Conclusions** Robotic single-site plus one port pancreas enucleation seems feasible with acceptable perioperative outcomes.

**Keywords** Robotic · Enucleation · Single site · Minimally invasive · Neuroendocrine tumor

## Background

Robotic approaches to pancreatic surgery are increasing. We have previously reported our experiences with robotic single-site plus one port distal pancreatectomy in benign and low-grade malignant pancreatic tumors.<sup>1</sup> In the treatment of neuroendocrine tumors of the pancreas, preservation of pancreatic function should be strongly considered since tumors are usually benign. Therefore, enucleation is recommended when

possible.<sup>2,3</sup> Here, we present a case of robotic single-site plus one port pancreas enucleation. To our knowledge, this enucleation surgical technique is the first to be reported in the medical literature.

## Methods

A 46-year-old male patient without previous medical or operation history was incidentally diagnosed with a pancreatic mass during evaluation of intermittent right flank pain. The patient's body mass index (BMI) was 28.38 kg/m<sup>2</sup>. The pancreatic mass was 1.7 cm sized and well-enhanced in the superoposterior aspect of the pancreas body. Robotic single-site plus one port pancreas enucleation was performed on November 16, 2016, using the Da Vinci single-site surgical platform (DVSSP) with one additional port. An additional robotic 12-mm port was placed on the left anterior axillary line, along the DVSSP level. Usual robotic instruments such as hook, bipolar, and vessel sealer with endo-wrist function can be used with this additional port to assist in this meticulous surgical procedure. The resected specimen was delivered through the umbilicus and a drain was not inserted.

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**Table 1** Literature review of robotic enucleation of pancreatic tumors

Study	Year	N	Number of ports	Operation time (min)	Estimated blood loss (ml)	Morbidity (%)	Pancreatic fistula (%)	Hospital stay (days)
Zureikat et al. <sup>4</sup>	2013	10	5 (multi-port)	206 ± 67	50 ± 25	50	30	5 (3–12)
Shi et al. <sup>5</sup>	2016	26	5 (multi-port)	125 ± 51	76 ± 86.4	46	46	22.6 (10–40)
Current study	2017	1	2 (single-site plus one port)	124	50	–	–	4

## Results

Total operation time was 124 min with a total console time of 73 min. Estimated blood loss was 50 cc. The final pathology result was neuroendocrine tumor, grade 1. The patient was discharged without any complications on postoperative day (POD) #4. Abdominal computerized tomography (CT) scan on POD #3 showed minimal fluid collection around the previous tumor location. Follow-up CT scan at 10 months after the operation showed that fluid collection was resolved and the patient was doing well without any sequelae or complications.

## Conclusion

Robotic single-site plus one port pancreas enucleation seems feasible and safe with acceptable perioperative outcomes (Table 1)

**Author Contribution** Dr. Jae Uk Chong: Data acquisition, analysis and interpretation, drafting and revising of the manuscript, final approval for publication, accountable for all aspects of the work

Dr. Chang Moo Kang: Conception and design of the study, interpretation of data, critical revision of manuscript, final approval for publication, accountable for all aspects of the work

## Compliance with Ethical Standards

**Conflict of Interest** The authors declare that they have no conflicts of interest.

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