



Robotic Enucleation for Cystic Tumors of the Pancreas

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Dear Editor in Chief, Indian Journal of Surgery,

Pancreatic enucleation is a parenchyma-sparing procedure that can preserve normal pancreatic parenchyma and reduce the surgical trauma and the risk of endocrine and exocrine insufficiency caused to parenchymal loss. Especially for benign and borderline cystic tumors of the pancreas, enucleation offers a very reasonable option of treatment. Robotic platforms offer unique technical and visual features which can facilitate surgical procedures in parenchymal organs. Here we describe the technique of robotic enucleation of cystic tumors of the pancreas. The technique is displayed in a video of an enucleation with utilization of a DaVinciXI® device in a 34-mm cystic tumor of the pancreatic body.

The patient was a 42-year-old female with a clinical diagnosis of a 34-mm cystic tumor in the body of the pancreas. The relevant pancreatic cystic neoplasms for differential diagnosis in this case include serous cystadenoma (SC), mucinous cystic neoplasm (MCN), and branch duct type intraductal papillary mucinous neoplasm (BD-IPMN). In specific case, the MRI diagnosis was BD-IPMN. The EUS also suspected BD-IPMN with connection to the pancreatic duct system. The cytology from the cystic fluid showed aggregates of columnar cells suspicious for MCN. The low CEA in the cystic fluid lowers the likelihood of IPMN and MCN, but was not able to exclude IPMN and MCN in the light of the other findings. The indication for surgery was given as MCN was under suspicion from cystic fluid cytology and BD-IPMN > 2 cm in a young patient was under suspicion from MRI and EUS. The DaVinciXI® robotic system was used for robotic enucleation. The surgical technique of robotic enucleation is explained in the [video](#).

The operative time was 130 min with an estimated blood loss of 20 ml. The postoperative course was uneventful. No

pancreatic fistula occurred and the drain was removed on postoperative day 4. The patient was discharged on postoperative day 5. The postoperative pathology report stated SC without malignant features.

In this case, the cystic lesion was deeply embedded in the pancreatic body parenchyma and proximity to the main duct preoperatively assumed. Our surgical strategy was a parenchyma-sparing enucleation with the most optimal intraoperative visualization possible. Therefore, the robotic platform was utilized. The stability of the camera and the high magnification allow the best identification of luminal or tumorous connections from the cystic lesion to the main duct. Also, intraoperative injury to the main duct would be identifiable thanks to the improved visualization. For these contingencies, we would have adapted our strategy and do a central segmental resection or distal pancreatic resection.

Due to the increased routine use of higher resolution imaging techniques in diagnostics, the frequency of diagnosis of small pancreatic benign and borderline tumors and cysts has also steeply increased over the last decade [1]. Diagnostic accuracy of imaging studies (CT, MRI, EUS) for differentiation between benign, pre-malignant/malignant lesions is only 53–73 [2]. Traditionally pancreaticoduodenectomy or distal pancreatectomy was typically performed for these entities. These procedures are still associated with lethal postoperative complications and postoperative pancreatic insufficiency and do have negative impact on the quality of patients' lives [3]. Up to date, an estimated proportion of 14% of resections is performed for asymptomatic benign cysts, preoperatively suspected to be potentially pre-malignant cysts [2]. Enucleation of a pancreatic tumor is a parenchyma-sparing procedure that can preserve normal pancreatic parenchyma and reduce the surgical trauma risk of endocrine and exocrine insufficiency caused to parenchymal loss [4].

In our experience, robotic enucleation is a promising and safe procedure. Due to the clear and highly magnifying optical field and the possibility of subtle and precise control of the surgical instruments of the robotic platform, surgeons can separate the tumor exactly from the surrounding

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pancreatic tissue and perform meticulous dissection easier than in conventional laparoscopy or laparotomy, which might be a benefit to protect delicate structures like the main pancreatic duct. In the light of the only moderate accuracy of all diagnostic imaging modalities for differentiation between benign, pre-malignant/malignant lesions, with the consequence of a high rate of benign cysts in the surgical collective, robotic enucleation offers a very reasonable strategy.

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Declarations

Ethics Approval and Consent to Participate Because this was a single report, and not a trial or observational research, there was no requirement for ethical approval.

Conflict of Interest The authors declare no competing interests.

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