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### [Successful Percutaneous Retrieval of a Fractured Stent Graft Delivery System Tip during Endovascular Repair of a Ruptured Abdominal Aortic Aneurysm: A Case Report](#)

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**Introduction:** Endovascular abdominal aortic aneurysm repair (EVAR) is widely accepted as the modality of choice for repair of infrarenal abdominal aortic aneurysm (AAA). While current stent-grafts used are very reliable, fracture of the stent-graft delivery system tip is a rare complication during this procedure as reported by the manufacturer of the specific device. This case report describes an occurrence of stent-graft delivery system fracture and the subsequent intraoperative management of this complication.

**Method:** An 81-year-old man presented to the emergency department with a ruptured infrarenal AAA. He had previously undergone elective EVAR a few days prior and was now discovered to have separation of the right iliac limb from the contralateral limb of the main body. Following establishment of a 12F Gore access sheath in the right groin, the separated segment was bridged with an 18mm x 18mm x 115mm iliac limb stent graft. However, after deployment, the delivery system was noted to be fractured and the graft tip was seen within the main body of the aortic graft. The separated deployment component was then pushed into the descending thoracic aorta. The access sheath was upsized to a 16F and a snare catheter was introduced over the Lunderquist wire to the level of the graft tip where it was then cinched onto the fractured component. The snare catheter, fractured component, and wire were then withdrawn together and removed through the right groin without difficulty.

**Result:** At the conclusion of the procedure, the stent-graft delivery system tip was recovered in one piece through the 16F sheath which was confirmed to be removed on table and with fluoroscopy. The repair was completed without incident and the patient was discharged without complications.

**Conclusion:** Our case demonstrates the successful retrieval of a stent-graft delivery system tip by coaxial snare technique that separated intraoperatively during EVAR. As a very rare occurrence during stent graft deployment, and a known failure mode of these devices, we highlight the technique of retrieval. Importantly, this complication did not delay the placement of the stent graft in this critical patient. Thus, it is vital for the performing surgeon to be familiar with techniques for the removal of intravascular foreign bodies while performing emergent EVAR.

## The Characteristics Of Covid-19 Patients With Pneumothorax And Their Outcomes

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**Introduction:** To describe the characteristics of COVID-19 patients who developed pneumothorax and their outcomes to better understand how to potentially prevent future instances.

**Methods:** Retrospective chart review of patients admitted to the ICU with a COVID-19 diagnosis from March 2020 to February 2021 in the intensive care unit of a community teaching hospital. Patients with pneumothorax requiring thoracostomy tubes were included. Iatrogenic pneumothorax secondary to central venous access placement with excluded.

**Results:** A total of 76 patients with COVID-19 diagnosis required chest tube placement for pneumothorax. There were 54 male patients (71%) and 22 female patients (29%). The average age was 60 years old (range 25-90) and average BMI was 32.5kg/m<sup>2</sup>. 197% of patients had prior smoking history while 3 patients had prior diagnosis of chronic obstructive pulmonary disease (COPD). In terms of comorbidities, 35.5% of patients had diabetes mellitus, while 1.4% had end state renal disease. 87% of patients (66/76) received steroids and 69.7% (53/76) received remdesivir. 90.1% (69/76) of patients who developed pneumothorax were intubated, whereas 3 patients were on room air, 3 on hi-flow nasal cannula, and 1 on nasal cannula. Among the intubated patients, 48% were on pressure assist control, 10.7% on pressure regulated volume control (PRVC), 6.7% on volume assist control, 17.3% on pressure regulated ventilation (APRV), 2.7% on pressure support, 1.3% on BIPAP and 1 was ventilated via ambu bag at time of pneumothorax. Two patients were on extracorporeal membrane oxygenation (ECMO). The average positive end expiratory pressure in the intubated patients at the time of pneumothorax was 11.65. The in-hospital mortality rate of this cohort was 87% (66/76).

**Conclusions:** Development of pneumothorax in a COVID-19 patient is a bad prognostic indicator with high mortality rate.

## The Natural Orifice Intracorporeal Anastomosis and Extraction (NICE) Procedure for Benign Diverticular Disease: A Technique Report

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**Introduction:** In the United States, diverticular disease is the leading indication for elective colon surgery. Laparoscopic and traditional robotic sigmoid resections still require a relatively large incision of 6-8 cm for specimen extraction, exposing the patient to the risk of contamination, postoperative infections, and hernias. Surgical site infections have a reported incidence ranging from 2% to 25%, while postoperative ileus occurs in approximately 10% to 30% of cases.

The Natural Orifice Intracorporeal Anastomosis and Extraction (NICE) procedure was first described in 1993. At our institution, it is a completely minimally invasive robotic procedure that involves extracting the resected colon through the natural orifice of the rectum and anus. As a result, the procedure has decreased postoperative pain, lower opioid requirements, is associated with lower rates of wound infection, and a decreased risk of ileus.

Despite these clear advantages, it is estimated that <1% of sigmoid colectomies are performed in this manner due to technical challenges. Here we describe the technique at a single institution for utilizing the NICE procedure to enhance post op recovery and possibly make colorectal surgery one day surgery.

**Method(s):** This is a technique report describing the technical steps to performing a NICE procedure, avoiding a larger abdominal wall incision leading to enhanced post op recovery.

**Results:** We perform the NICE procedure in a robotic-assisted fashion using the DaVinci Xi system. Four 8mm robotic trocars and one 5mm Air Seal trocar are used with placement in the left upper quadrant, the supraumbilical midline, the right lower quadrant, the right paramedian abdomen, and right upper quadrant. The sigmoid and descending colon are mobilized. The

diseased portion of sigmoid colon is then transected distally and proximally using a Vessel sealer. A wound protector is placed into the anus and rectum and the specimen is extracted through the rectum. A handsewn intracorporeal anastomosis is performed using slowly absorbable monofilament suture in a running fashion followed by an imbricating second layer of absorbable polyfilament suture. The pelvis is irrigated and a CO2 colonoscopy is performed to evaluate the anastomosis and check for leaks. The robot is then undocked and the skin incisions are closed. Patients are given a clear liquid diet on POD#0. On POD#1 the foley is removed and they are given a solid diet with the option for discharge if their pain is well controlled, they are tolerating a diet, and passing flatus.

**Conclusion(s):** The NICE procedure is a safe, technically feasible option for sigmoid resection for benign disease that eliminates the traditional abdominal wall incision which leads to enhanced post op recovery.

**Significant Reduction In Pacu Costs With Use Of Celt Acd Compared To Other Closure Devices** Brandon Madris MD, Brittany Davis Keerthivasan Vengatesan, MD, Ronald Truong, MD, Litton Whitaker, MD, Amandeep Juneja MD, Alan M Dietzek, MD  
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**Introduction:** There are a wide variety of arterial closure devices available, most of which require a several-hour PACU stay to ensure adequate hemostasis. The CELT device uses 2 permanent stainless steel implants to achieve hemostasis which reportedly allows quicker return to ambulation. With this in mind, we designed a study to compare outcomes of the new CELT closure device with respect to PACU length of stay and cost as compared to other closure devices.

**Methods:** We designed a single-center double-arm prospective study to compare the outcomes of closure devices available at our facility. Ninety patients were enrolled in the study in an 8-month period between September 15, 2022, and May 15, 2023. The choice of closure device was left to the operator. Forty-six patients underwent closure with the CELT ACD (Vasorum Ltd.) while forty-four patients underwent closure with other devices. Primary endpoints included PACU length of stay and cost. Secondary endpoints included overall complication rate and device failure requiring open repair.

**Results:** The two groups were comparable in their demographic profile. 32.7% of the CELT group was female, compared to 27.3% in the non-CELT group. 22 (47.8%) patients had a 6 French (Fr) CELT closure compared to 10 (22.7%) 6 Fr other closures. 16 (34.8%) patients had a 5 Fr CELT closure compared to 24 (54.5%) 5 Fr other closures. 5 (10.9%) patients had a brachial artery CELT closure compared to 3 (6.8%) patients that had other brachial artery closures. Overall complication rate was comparable between CELT (6.5%) and other devices (6.8%). All 3 failures with the other closure devices required open repair while 1 patient in the CELT group required open repair. Mean PACU length of stay in the CELT group was 120.7 mins compared to 237.7 mins in the other group ( $p < 0.001$ ). Mean PACU cost was \$2285.88 in the CELT group vs \$4501.29 in the other group ( $p < 0.001$ ).

**Conclusion:** The CELT ACD was comparable to other devices in terms of safety and efficacy. There was significantly lower PACU LOS and PACU cost associated with CELT use. The cost of the CELT device is comparable to that of the other devices available at our institution. There was also a trend towards less severe adverse outcomes with CELT device failure vs. the other closure devices.

### **Successful Surgical Treatment of a Rare Primary Hepatic Neuroendocrine Tumor: A Case Report**

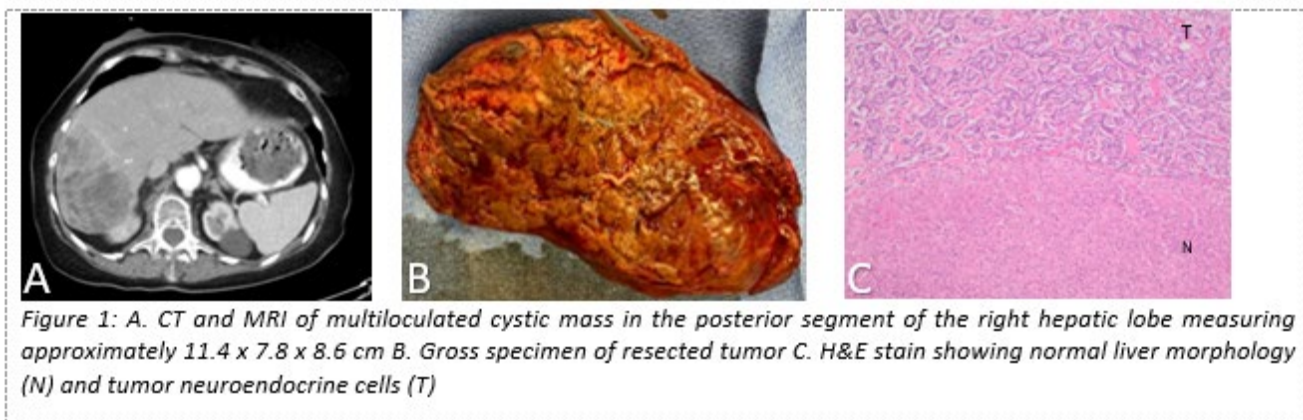
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**Introduction:** Liver is the most common site of metastasis of gastrointestinal neuroendocrine tumors (NETs), however primary hepatic neuroendocrine tumors (PHNET) are very rare, accounting for only 0.3% of all NETs. PHNETs are diagnosed with imaging studies, histopathology and immunohistochemistry. Treatment approaches range from observation to medical and surgical interventions depending on the location, size, grade, stage and hormonal activity of the tumor. Surgical resection of the tumor is often considered effective if the tumor is localized and can be safely removed without affecting liver function.

**Method(s):** We present a case of an 81-year-old female admitted for an unprovoked pulmonary embolism with an incidental finding of enlarging right hepatic multiloculated lesion. Complete surgical resection of right hepatic segments 6-8 with 1 cm margins, and cholecystectomy were performed via an open approach assisted with intraoperative ultrasound. There was no evidence of peritoneal carcinomatosis or metastatic disease.

**Results** Definitive post-surgical diagnosis revealed a well-differentiated NET, G2 with signet ring features. The tumor was positive for synaptophysin, Cam 5.2, CD56, chromogranin, and CK A E1/3. The tumor was negative for S100, HepPar 1, CK 5/6, CK7 and CK20. Mucicarmine, AFP and PAS stains were negative. The follow up PET-DOTA scan was negative for extrahepatic NET lesions, and a final diagnosis of primary hepatic neuroendocrine tumor (PHNET) was established.

**Conclusion(s):** There are no officially accepted treatment guidelines for PHNET, however we propose that complete surgical resection of PHNET carries a favorable outcome due to potential of a complete cure.



### Venous Stent Explant – Technical Considerations and the Role of Intravascular Ultrasound

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**Background:** May-Thurner Syndrome is a vascular condition characterized by compression of the left common iliac vein by the right common iliac artery. Clinically, it commonly presents with symptoms of venous reflux and/or iliofemoral deep vein thrombosis. Current clinical practice guidelines advocate for iliac venous stenting when iliac vein compression is identified as part of the syndrome.

**Introduction:** We report on the technical and clinically successful explantation of a left common and external iliac vein stent that had inadvertently protruded into the wall of the inferior vena cava. Our approach involved the use of open surgical techniques coupled with fluoroscopy and intravascular ultrasound (IVUS) guidance to address this rare and complex complication.

**Case:** A 37-year-old female patient presented with left leg fullness. She was diagnosed with May-Thurner Syndrome and underwent an iliac venous stent placement at a tertiary referral center about two years ago. Two Wallstents (20 mm and 18 mm in diameter) were initially placed extending from the inferior vena cava down into the left external iliac vein. She developed back pain, left leg pain and left leg swelling immediately after the procedure. She followed up with her surgeon and was advised that nothing else was there to be offered. She presented to us with this predicament. A CT Venogram revealed profound oversizing of the patent left iliac venous vasculature with elevation of the overlying arterial vasculature with no other pathology identified. The patient underwent open venous stent explant and endovenectomy of the iliac venous confluence. Concurrent right iliac artery transposition was discussed, however, IVUS performed after stent explant did not reveal any compression. On clinic follow up, her symptoms completely resolved and a 3-month ilio caval ultrasound showed venous patency without any compression.

**Discussion:** The placement of stents in the iliac veins has proven to be an effective and durable treatment strategy for iliac vein compression in patients with May-Thurner Syndrome. However, it is essential to acknowledge the potential of over diagnosis and profound stent oversizing, especially in young patients who have a long life ahead to look forward to.

**Conclusion(s):** Our case report provides valuable insights into the successful management of an iliac vein stent protruding into the inferior vena cava, highlighting the use of employing open surgical techniques with intravascular ultrasound guidance. To the best of our knowledge, there is limited literature documenting cases of iliac stent explantation. This report adds to the growing body of knowledge surrounding the successful explantation of iliac vein stents and contributes to the evolving strategies for addressing complex stent-related issues in the field of vascular surgery.