

Hand-Sewn Cystogastrostomy Using the Novel Single-Incision Laparoscopy with Flexible-Tip Laparoscope

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Abstract

Laparoscopy performed through a single incision has been increasingly reported as a novel technique implemented in a wide variety of surgical procedures. We report what we believe to be the first case of cystogastrostomy for treatment of a pancreatic pseudocyst using this technique. Patient developed pancreatic pseudocyst after severe biliary pancreatitis. The cyst was noted to increase in size on follow-up computed tomography scans. In addition, patient developed symptoms requiring intervention.

Introduction

PANCREATIC PSEUDOCYSTS (PP) are chronic collections of pancreatic fluid, encased by a wall of nonepithelialized granulation tissue and fibrosis. They constitute the most common complication of chronic pancreatitis, occurring in 20%–38% of patients with this condition, as well as up to 5%–15% of patients with acute pancreatitis.^{1,2} Asymptomatic PP can be managed expectantly, frequently resolving without complications, whereas symptomatic, enlarging, or large (>6 cm in diameter) ones frequently require treatment.¹ Methods of treatment include percutaneous,³ endoscopic, and surgical approaches. Laparoscopy has been described as a safe and effective treatment option for PP drainage.^{4–6} Due to its known advantage of faster recovery and decreased postoperative pain, laparoscopy has gradually played more important role in the surgical management of PP.

Laparoscopy performed through a single incision, usually umbilical, is a novel approach that allows completing the operation without the need for several additional laparoscopic incisions.

Due to the superior cosmetic results, and possibly decreased postoperative pain, this technique is increasing in popularity and is being attempted in a wide variety of surgical procedures, such as cholecystectomy, splenectomy, hernia repair, and bariatric surgery.^{7–9} We report what we believe to

be the first case of a single incision cystogastrostomy for drainage of a PP.

Case Report

A 53-year-old morbidly obese patient originally presented with acute biliary pancreatitis. Computed tomography (CT) showed pancreatitis with a small, thin-walled cyst in the distal pancreas. Laparoscopic cholecystectomy was performed after the acute attack had resolved with recommendation to observe the PP with serial imaging.

Follow-up CT 6 months later showed significant growth of the PP to 9.0×9.9 cm, which was now abutting the posterior gastric wall (Fig. 1). Patient developed early satiety, postprandial abdominal pain, and severe nausea without vomiting. Repeat CT 6 months later showed the cyst to be persistent and unchanged in size. At that time, patient symptoms had worsened; therefore, a drainage procedure was planned.

Patient was morbidly obese, and had developed symptomatic keloids after her laparoscopic gallbladder surgery. Single transumbilical surgical approach was discussed with her and she consented knowing the novelty of this approach.

The procedure was completed successfully, and patient was discharged after 48 hours.

On her 3 months' follow-up, she was asymptomatic and was very satisfied with the operation. She did not take any

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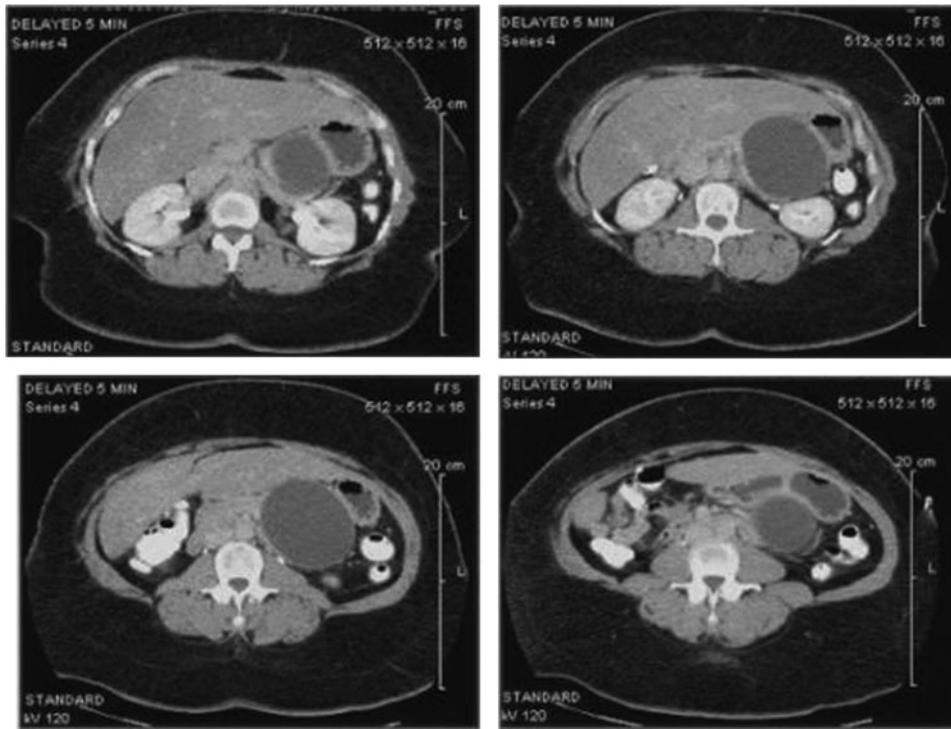


FIG. 1. Pancreatic pseudocyst abutting the posterior wall of the stomach.

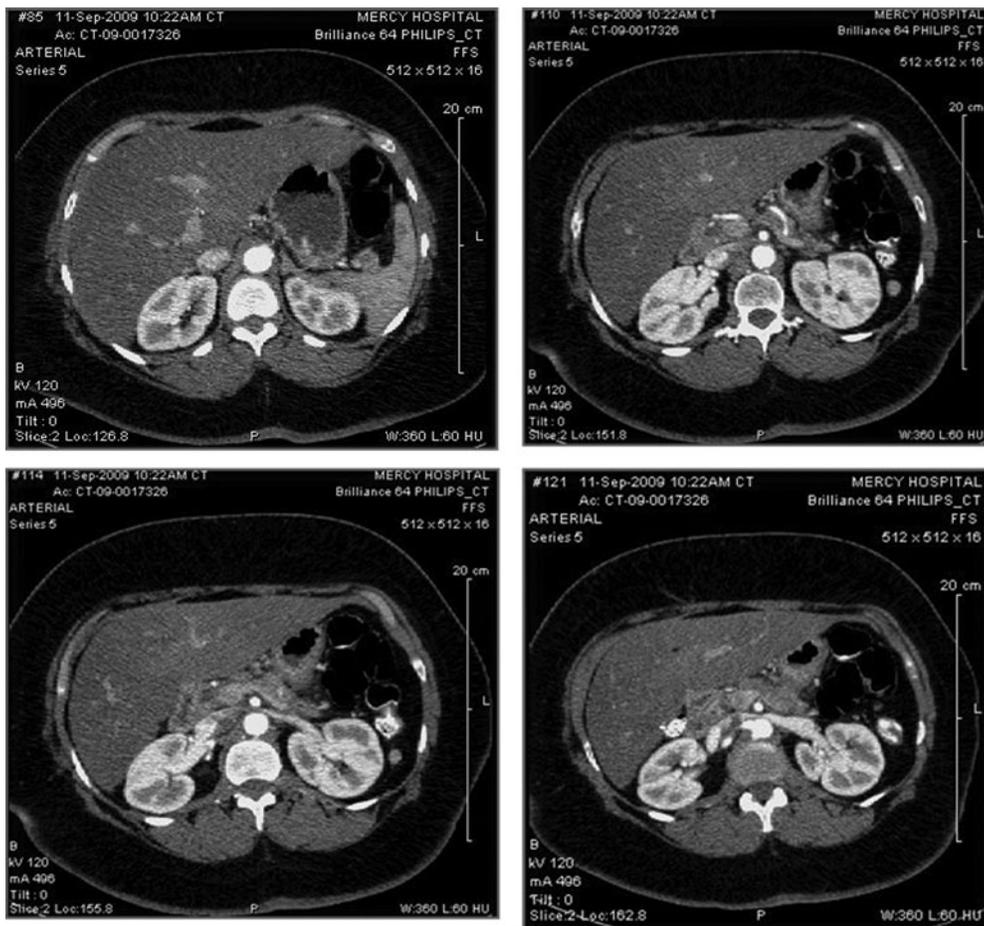


FIG. 2. Complete pancreatic pseudocyst resolution, 3 months postoperatively.



FIG. 3. TriPort access port (by Olympus).

narcotics after discharge. Her follow-up CT scan showed complete resolution of the pseudocyst (Fig. 2).

Operative Procedure

After induction of general anesthesia, the patient was placed in supine position with 30° reverse Trendelenburg position. The abdomen was entered through the umbilicus with 1.5 cm fascial incision, through which a Multichannel TriPort® (Olympus) was placed under direct vision.

This multichannel port allows insertion of multiple laparoscopic instruments simultaneously (has two 5-mm and one 10-mm openings, with two additional small 2-mm openings for insufflations and deflation of gas) (Fig. 3). Diagnostic laparoscopy showed an obvious bulge at the midgastric body. The procedure was facilitated by implementing the concept of

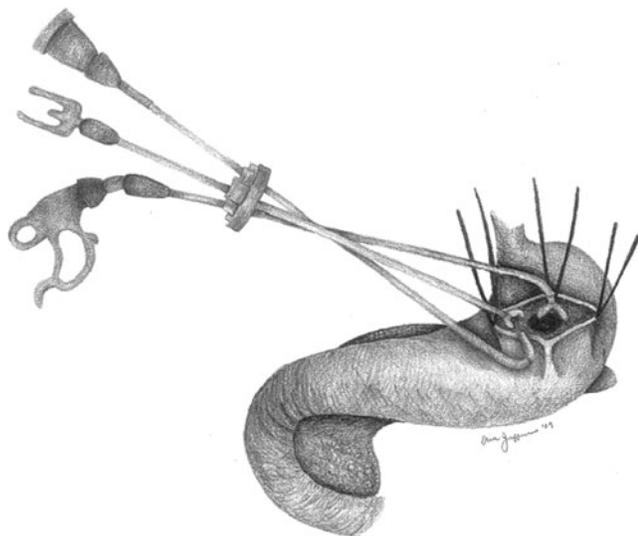


FIG. 4. Implementing the concept of reticulation in single-incision surgery.



FIG. 5. EndoEYE flexible-tip 5-mm scope (by Olympus).

reticulation to better ergonomically manage the tight space and complete the advanced tasks needed (Fig. 4). This involved using a flexible tip 5-mm laparoscope (EndoEYE™ by Olympus) (Fig. 5), and a reticulating 5-mm grasper (Real Hand™ by Novare) (Fig. 6).

The 5-mm reticulating laparoscope was placed through the 5-mm port. The camera holder stands on patient's left side (opposite to the surgeon). The reticulation of the laparoscope allows the camera holder to place the handle low against patient left thigh while the tip is reticulated down providing a wide view from above looking down on the operative field.

By holding the camera in this fashion, the operating surgeon gets free space to move both hands. In addition, moving the scope shaft away from the operative field gives more freedom to moving instruments inside the abdominal cavity.



FIG. 6. Real Hand reticulating 5-mm grasper (by Novare).

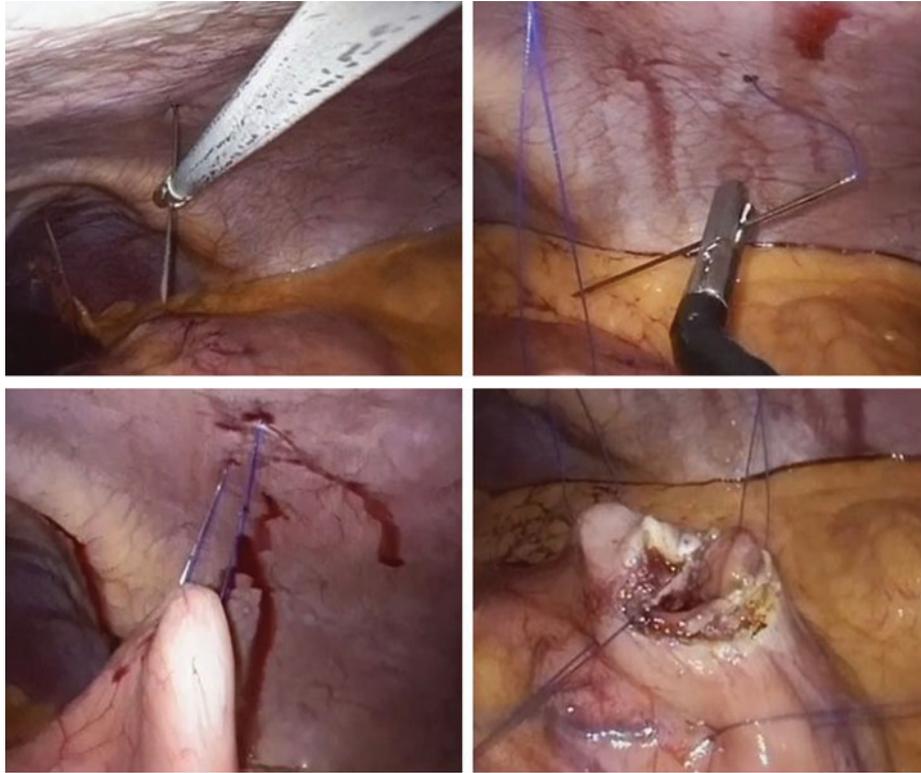


FIG. 7. Applying Prolene sutures for retraction and exposure.

At laparoscopy an obvious bulge was noted in the body of stomach. Anterior longitudinal gastrotomy (6 cm) was performed over the center of the bulge. A straight Keith needle was used to place four Prolene sutures along the cut edges of stomach from four different angles. Traction on each suture

(held at the skin level with hemostats) kept the anterior gastrotomy wide open and exposed the bulging posterior gastric wall (Fig. 7).

In the absence of an assistant (TriPort has only three openings, one is used for the laparoscope, leaving only two operating ports), we use percutaneous sutures for retraction and exposure of stomach. We use the straight Keith needle for this purpose. Its long length is beneficial in obese patients (Fig. 7). We also prefer to use monofilament suture as it cause less tissue trauma (these sutures are eventually pulled out).



FIG. 8. Entering the pseudocyst cavity and aspirating its content.



FIG. 9. Enlarging the cyst opening for wide drainage. Posterior wall is well shown and biopsies were taken.



FIG. 10. Reticulation proved advantageous for suturing.



FIG. 12. Skin incision used to complete the operation.

A laparoscopic aspiration needle was used to confirm the location of the PP by aspirating clear pancreatic fluid (sent for cytology). The cyst wall was then opened using a hook cautery and biopsies were obtained. About 30 cc of clear fluid was aspirated using a suction device (Fig. 8). The opening was then enlarged to about 5 cm using the harmonic scalpel (Fig. 9). This step was originally planned to be done using a linear endoscopic stapler, but we realized that the stapler diameter does not allow insertion through the 10-mm opening of the TriPort. This problem is now solved with the new generation of access ports called Quadport[®], which has four working ports, including a 15-mm-diameter one. In our case, the edges of cystogastrostomy were hand sewn.

Intracorporeal suturing was the most difficult task to perform in this operation. To facilitate this task, a reticulating instrument was used to allow suture manipulation and knot tying. Endostitch[®] (Covidien) was the suturing device, aided by a reticulating grasper called Real Hand (Novare). Long suture (35 cm) was used to perform a running stitch all around the cystogastrostomy. A stay suture was first placed at the 12

o'clock position leaving a long tail; then, a running suture was performed and eventually tied intracorporeally to the long tail. Articulation of our grasper helped against the ergonomic challenges of the tight working space, especially with suturing (Fig. 10) and intracorporeal knot tying (Fig. 11).

The gastrotomy was then closed in the similar fashion using running suture and intracorporeal knot tying. This was done after inserting a nasogastric tube, and placing the tip appropriately under vision. The nasogastric tube was to keep test the anastomosis and for postoperative management.

The closure of stomach was tested for leak by insufflating the stomach with air and looking for any bubbles under saline. No drains were used.

The 15-mm fascial opening was closed with a single figure of eight stitch. The skin was closed with few interrupted absorbable subcuticular stitches (Figs. 12 and 13).

Postoperatively, patient had an unremarkable recovery with minimal pain. Upper gastrointestinal series (UGI) was done on postoperative day 1, which was normal. She tolerated diet and was discharged home after 48 hours.



FIG. 11. Using reticulation to facilitate intracorporeal tying.



FIG. 13. Postoperative day 1. Keloids from lap chole are shown in this morbidly obese patient. Umbilical wound not visible.

Discussion

Since the introduction of laparoscopy, surgeons have continuously worked to advance technology, and perhaps reshape the way surgery is performed.

Concepts such as telesurgery using robotics, natural orifice surgery, and single-site surgery started emerging last decade, all in an attempt to decrease pain, accelerate recovery, and ultimately improve the overall outcome.

Laparoscopy performed through a single incision may prove to be the next logical step of this evolution. This, however, creates new challenges as far as techniques and instrumentations.

Eliminating the ability of trocars triangulation, as well as having all instruments passed through same access, poses significant technical and ergonomical challenge. This limits significantly the mobility of the surgeon's hands, and causes what we call "instruments jam" due to the rigid parallel shafts being too close together. We believe that the only way to manage this issue is the use of reticulating or curved instruments (Figs. 4, 6, and 8).

Finally, although trocar-related injuries are uncommon, they are frequently reported¹⁰; as far as access, we believe that single-site access would increase safety, as the larger ports are usually placed under direct vision. We use a multichannel access port placed through a 15-mm easy-to-close fascial incision. We believe that this to be superior to making multiple entry wounds separated by few millimeters of fascia. This in turn may lead to a lower rate of incisional hernia. In addition, we found that the ability to rotate the multichannel port and

changing the relative location of instruments is very advantageous. It is to be stressed at this time, that a steep, frequently frustrating learning curve cannot be avoided in mastering this novel technique.

Conclusion

We report here a single-incision laparoscopy to be a safe and feasible alternative to conventional laparoscopy for an increasing number and wide variety of procedures.

Disclosure Statement

No competing financial interests exist.

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