

## Laparoscopic Pancreatic Pseudocystogastrostomy, Series Case Report

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## Abstract

**Background:** Pancreatic pseudocysts (PPC) are the most common complications of acute and chronic pancreatitis. Almost half is spontaneously resolved, and the rest requires surgical intervention if it is symptomatic or complicated. The options for surgical intervention are open, minimally invasive laparoscopic surgery. However, there is an option for endoscopic or percutaneous ultrasonic guided drainage. Three cases of pancreatic pseudocysts (PPC) are presented and are managed entirely by laparoscopic pancreatic pseudocystogastrostomy (LPPCG) and other options discussed.

**Case Summary:** Three cases of large pseudocyst of the pancreas are presented with a similar story and different age. All of them are presented as a complication of microlithiasis of gallbladder stones. The patients underwent complete blood and biochemical investigations. The Ultrasonography was supported by a computerized tomography (CT) of the abdomen to identify the relationship with the gastric wall. All were prepared preoperatively and underwent posterior pancreatic pseudocystogastrostomy laparoscopic stapling. The postoperative period was uneventful and the patients followed it between 8 months, 2 years and 6 years with excellent resolution [1].

**Conclusion:** The laparoscopic pancreatic pseudocystogastrostomy (LPPCG) is a minimally invasive procedure that proves to be excellent in the drainage and resolution of the pseudocyst of the pancreas. No complications or recurrences were found in this small series study and few complications and low recurrence are mentioned in literature works. Therefore, we recommend having a large number of similar cases to conclude that it is the best minimally invasive procedure for the treatment of the pseudocyst of the pancreas.

**Keywords:** Pseudocyst Pancreas, Pancreatitis, Laparoscopic Cystogastrostomy, Endoscopic, Percutaneous Drainage.

## Introduction

The pancreatic pseudocyst was described two centuries ago by Morgan et al. who established its formation and anatomical characteristics for the first time. Currently, this pseudocyst is defined as the accumulation of fluid formed by digestive enzymes, pancreatic fluid and even some blood content within the walls composed of granulation tissue and fibrosis, which is unique in 99% of the cases [1, 2]. Pancreatic pseudocysts are the most common complication of acute and chronic pancreatitis, with an incidence of 14.6% in acute pancreatitis and 41.8% in acute-chronic pancreatitis [3-5]. According to the revised classification of Atlanta 2012, the pancreatic pseudocyst is an encapsulated fluid collection with a well-defined inflammatory wall, minimal or no necrosis, which often requires maturation for more than four weeks from the onset of an acute pancreatic episode [6]. The previously established dogma that a collection of walled pancreatic fluid measuring 6cm for more than 6 weeks is an indication for intervention has decreased. However, recent advances in radiology and endoscopy have led physicians to implement percutaneous and endoscopic drainage (ED) in their

treatment algorithms. On the other hand, Christos Agalianos et al. noted that laparoscopic surgery, with its advantages, has become an attractive alternative option when surgical drainage (ED) is required.

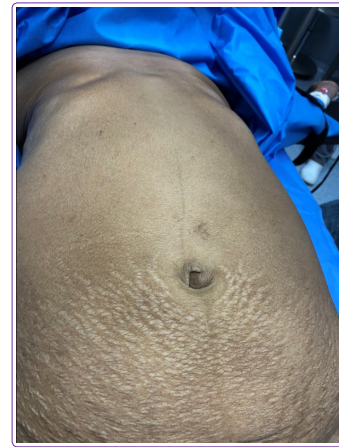
Vitas et al. demonstrated that 38% of the pseudocysts of more than 10cm in size treated conservatively were resolved for more than 6 months after diagnosis without serious complications [7]. Other series have shown similar results with successful conservative management in 39-48% of asymptomatic pancreatic pseudocysts, regardless of size [8, 9]. There are different approaches to debride and drain WON: classic open necrosectomy is to enter the lesser sac through the gastrocolic ligament or the transverse mesocolon and gently debride the pancreatic necrosus. The transgastric approach can be performed openly or laparoscopically. Finally, a retroperitoneal approach (which includes open or videoscopic techniques) has been described. A non-surgical approach includes percutaneous or endoscopic debridement. Transmural endoscopic drainage can be performed by an interventional endoscopist in carefully selected patients, but often requires multiple sessions [10].

In this case series study, I present my experience with the laparoscopic management of mature pancreatic pseudocyst of the pancreas using

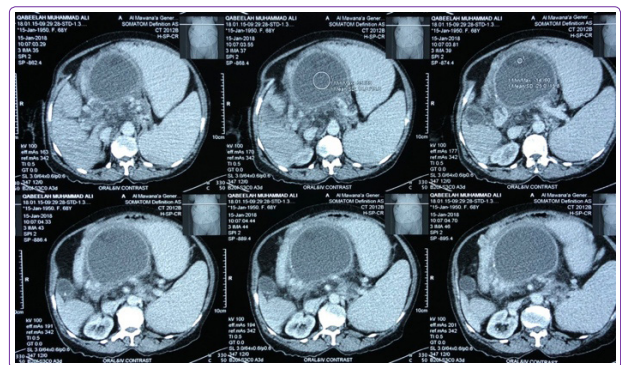
Laparoscopic pancreatic pseudocystogastrostomy (LPPCG) and the result was impressive.

### Case One

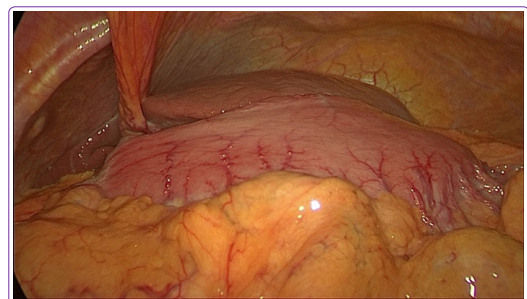
A 69-year-old woman consulted the emergency department of the private hospital of Almowast on January 31, 2018, with mild abdominal pain, recurrent attacks of vomiting and diarrhea with greenish stool during the last month. She has a medical history of diabetes mellitus and ischemic heart disease. In addition, she has lost appetite and weight of approximately 12kg in 2 months. She did not have jaundice, but she was pale with slight edema in her legs. The abdominal findings were; prominent epigastric swelling (Figure 1), and mild epigastric sensitivity. She was subjected to laboratory tests, whole blood, showed a hemoglobin of 8.6 g/dl and a hematocrit of 25% and mild leukocytosis. The biochemical investigations carried out on her show increased pancreatic enzymes, hypoproteinemia, hypokalemia. Ultrasonic examination and computed tomography (CT) of the abdomen showed a large pancreatic pseudocyst in the body of the pancreas, 18-14-9cm in size, and multiple small gallstones without common bile duct stones, the cyst positioned retrogastric, with the sign of walled-off necrosis (WON) and minimal ascites (Figure 2). The decision was made to perform a laparoscopic pancreatic pseudocystogastrostomy after supportive rehydration and the patient's complete cardiopulmonary evaluation, anesthetic consultation and approved consent of the patient. Under general anesthesia and supine position. The abdominal cavity was accessed through a 10mm camera port in the infraumbilical position to avoid displacement of the stomach or mesentery. Other ports were a surgeon port of 12mm in the midclavicular line at the level of the navel, a surgeon port of 5mm in the left midclavicular line one inch above the umbilical level and a port of assistance of 5mm in the line subcostal anterior axillary. The findings were a large bulge in the body and antrum of the stomach, (Figure 3) some liver scars such as fibrosis and a normal-appearing gallbladder. A gastrotomy was performed on the anterior gastric wall starting from the antrum using the Thunderbeat® energy forceps (Figure 4 & 5). The posterior gastric wall was also found bulging anteriorly. Laparoscopic needle aspiration confirms the pancreatic pseudocyst, which was a turbid, whitish fluid. Using the energy clamps, the posterior gastric wall was also incised, and a jet of turbid fluid (Figure 6, A B) came out. The hole was enlarged, and more suction was performed. Then, the pseudocystogastrostomy was performed using a 60mm linear stapler (Figure 7 A, B). At this time, the 30-degree camera can be directed into the pseudocyst cavity, where the walled-off necrosis of greenish brown colored could be visualized and evacuated (Figure 8, A B). The base and the anastomosis line were inspected for bleeding and irrigated with normal saline into the cyst cavity. The closure of the anterior wall of the stomach was achieved by two blue injections of 60mm linear stapler (Figure 9, A B). In this step, the main intervention was completed, a temporary drain and a nasogastric tube were also inserted into the stomach. The patient was admitted to the intensive care unit for 4 days, she was slightly dehydrated, acidotic, with hypokalemia and anemia. The correction of the dehydration, electrolytes, and anemia was performed. The patient's vital signs remain stable, she started taking oral fluid diet after 72 hours and was discharged after 8 days. One month later, the patient gained weight and ultrasound showed a reduced pseudocyst cavity with mild peri-cystic edema. The follow-up period is approximately 8 months, the pseudocyst almost disappeared and the pancreas seemed normal.



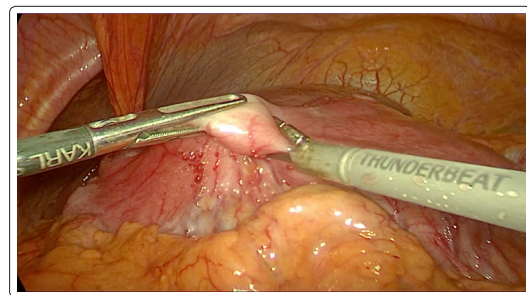
**Figure 1:** Upper abdomen, epigastric swelling of the pseudocyst of the pancreas.



**Figure 2:** The big body of pancreas retrogastric cyst, with walled off necrosis (WON), and some gas shadow.

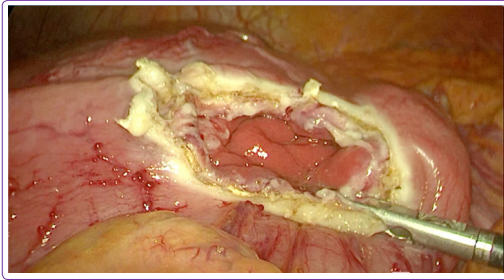


**Figure 3:** Stomach bulge anteriorly by a posterior pseudocyst of the pancreas

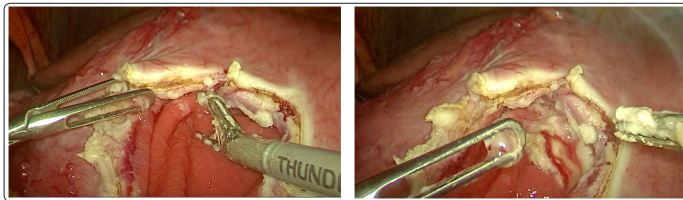


**Figure 4:** Anterior gastrotomy started at the antrum using Thunderbeat® energy forceps.

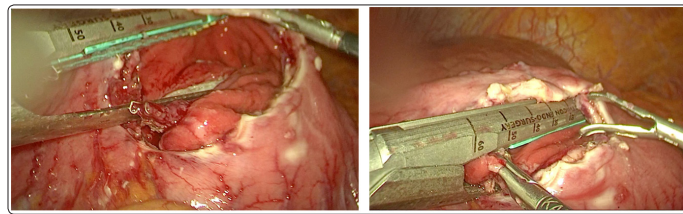




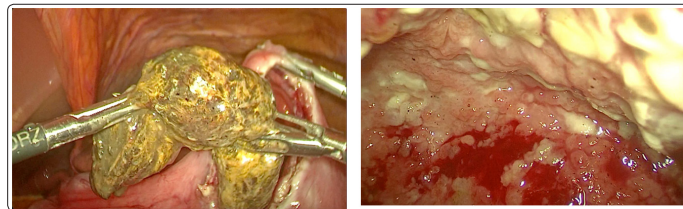
**Figure 5:** Anterior gastrotomy revealing the posterior gastric wall with pseudocyst of pancreas impression



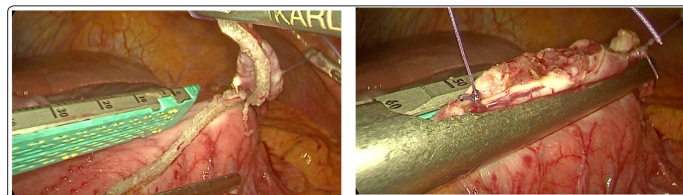
**Figure 6 A:** opening the pseudocyst using Thunderbeat®, **B:** yellow white purulent discharge evacuated



**Figure 7 A, B:** Stapling anastomosis, pseudocystogastrostomy using linear 60mm stapler.



**Figure 8, A, B:** Removal of wall-off necrosis, and residual pancreatic pseudocyst cavity



**Figure 9 A, B:** Stapling closure of gastrotomy using Echelon 60 linear staple Ethicon®.



**Figure 10:** Single incision multiport laparoscopic surgery port

### Case Two

A 47-year-old patient reported in 2016 in the medical city of Faruk with a complaint of severe acute pancreatitis with a large swelling in the abdomen, abdominal tenderness, and weight loss. The abdominal computed tomography (CT) showed a large pancreatic pseudocyst 21 - 12 - 9mm in size in the body of the pancreas, displacing the stomach and colon anteriorly, also a thick liquid and necrotic tissue within the pseudocyst.

The decision was made to perform an anterior laparoscopic transgastric approach on her. To avoid injuries to the underlying viscera due to the adherence of the cystic swelling to the upper abdominal wall. The anterior gastrotomy was performed with electrocautery-hook, the pseudocyst was partially aspirated to avoid the loss of the cystic cavity. Then, the cyst was accessed using harmonic forceps and a dark brown liquid aspirated by suction. The pseudocystogastrostomy with stapling was performed with an anastomosis of 60mm wide to allow drainage and effective collapse of the pseudocyst, the anterior gastrotomy was closed with a continuous suture of VICRYL® coated with 2/0 (polyglactin 910). Suture | Ethicon.

The postoperative clinical course was without incident. After one week, a follow-up computerized tomography revealed a slight decrease in the size of the pseudocyst and less edema. The patient was discharged on the tenth postoperative day and was followed-up during the last 2 years using simple ultrasonography and biochemical studies showed the complete disappearance of the pseudocyst without further attacks of pancreatitis.

### Case Three

A 16-year-old girl came to my clinic with abdominal pain, jaundice, malaise in 2012 and was managed in the private hospital of Ibn-Albaytar. She was a known case of sickle cell anemia and secondary gallstones. The investigations reveal severe anemia, leukocytosis, indirect hyperbilirubinemia, high levels of amylase and lipase. Ultrasonography and a computed tomography (CT) scan showed necrotizing pancreatitis. It was treated conservatively, rehydrated, transfused blood and antibiotics for 10 days. The patient improved and was discharged home. He returned to the clinic after about 2 months with abdominal pain and vomiting. The investigations again carried out on her showed severe leukocytosis, amylase and lipase were extremely high. Abdominal computed tomography revealed a pseudocyst of the pancreas that improved the well-formed wall. Now the decision was made to make a transumbilical laparoscopic access from a single incision to the pseudocyst since the axis of the organ is susceptible to such an approach. Using a 5mm camera port and 2 other surgeon ports of 5mm, an entrance to the abdominal cavity was made with the SILS technique, and a curvilinear incision of 3cm was made below the navel impression (Figure 10). The findings revealed a large gastric swelling with edema of the nearby mesentery. An anterior gastrotomy was performed with an electrocautery hook, after aspiration, a bulging of the posterior gastric wall was discovered confirming the location and content of the pseudocyst. The sack was entered using the same hook around 1600 cc of yellow turbid fluid was sucked out. The anastomosis was established using a 30mm linear Covidien® stapler. The gastrotomy was closed with a continuous suture PDS number 2/0. The patient was observed for 2 days in a high dependency room. When she was stable, they sent her to the ward. The postoperative period was approximately 8 days without incident.

Follow-up after 14 days with a complete blood count and an ultrasonography of the abdomen that reveals improvement and collapse of the pseudocyst cavity. The patient did not attend regular follow up until 4 years and she attends the clinic for some gynecological reason. The new evaluation showed a complete resolution of the pseudocyst and pancreas, and the SILS incision was very strong.

## Discussion

The classic open surgical approach to the treatment of the pseudocyst of the pancreas requires a laparotomy with the attendant risks of morbidity and mortality. The development of advanced laparoscopic techniques and technologies offers new modalities for the treatment of this pathology. Laparoscopic surgery is a method in which the lumen of the pseudocyst is anastomosed to the posterior wall of the stomach or the jejunum with a linear endoscopic stapler or with laparoscopic suturing techniques; this provides continuous internal drainage and decompression of the pancreatic pseudocyst [11-15]. Therefore, the three cases presented here are an excellent example of the minimally invasive laparoscopic approach to the management of the pseudocyst of the pancreas, and this does not exclude the value of other methods when indicated, and each has its own indications, benefits, and restrictions. Transpapillary / transductal endoscopic drainage is recommended for the pancreatic pseudocyst communicating with the main PD or one of its lateral branches located in the head or the body of the pancreas. A limited number of pancreatic pseudocysts can be drained through a transcapillary insertion of a stent that joins the main pancreatic duct or an altered lateral branch. A favorable predictor of successful therapy is a dilated Wirsung duct over a stenotic area under the stent [11, 12, 16, 17]. The best results are obtained when the pseudocyst is greater than 6 months or less than 60mm [18, 19]. Other drainage modalities: percutaneous drainage guided by a pancreatic pseudocyst image is a well-established and relatively inexpensive drainage method that involves simple percutaneous aspiration or drainage. It is performed more frequently under control with ultrasound or CT, and in some cases, under MRI or fluoroscopic guidance [11, 20-26]. Single-pass needle aspiration of PPC is associated with a high recurrence rate (70% or more) and can not be considered the optimal treatment [11, 21]. The continuous vacuum drainage system is more effective because it continuously evacuates the contents of the cyst and therefore avoids the lytic action of pancreatic enzymes that can lead to the obliteration of the cyst cavity. This approach has achieved high success rates of initial drainage (70% -100%) and reduced recurrence rates [11, 21, 27, 28]. Laparoscopic drainage of the mature pancreatic pseudocyst is usually the definitive treatment because it is associated with a low rate of complications and a good result in the period of postoperative follow-up. Currently, most pancreatic pseudocysts can be addressed and managed using a laparoscopic approach, which is due to the availability of advanced imaging and camera systems, improved hemostatic equipment, and excellent suturing and stapling techniques [27, 29]. Laparoscopic procedures for the pancreatic pseudocyst include; pancreatic pseudocystostomy, pseudocystoduodenostomy, and pseudocystojejunostomy. Cystogastrostomy is the most commonly used in laparoscopic procedure, and it can be done through endogastric, transgastric or exogastric routes. In cases where pseudocysts contain significant residues due to the larger stoma size that is created, laparoscopy seems to have a clear advantage over endoscopic drainage [11, 27, 30]. The cases presented it as the best example of the transgastric approach. Several authors reported that laparoscopic drainage was

associated with low morbidity (immediate preoperative bleeding and infection), rapid recovery, and recurrence rates comparable to those reported for open surgery. The disadvantage of laparoscopic surgery is that it may not be suitable for patients who are not able to undergo general anesthesia or for patients who have undergone extensive previous abdominal surgery. Currently, there have been few randomized controlled studies comparing the various minimally invasive approaches in the treatment of PPCs. Several groups around the world have developed new minimally invasive approaches for the treatment of PPC. The applicability of these techniques depends to a large extent on the availability of specialized knowledge and multidisciplinary teams that are dedicated to the treatment of pancreatic diseases [31, 32].

## Conclusion

Laparoscopic pancreatic pseudocystogastrostomy (LPPCG) is a recommended minimally invasive procedure option with excellent functional drainage and a low incidence of complications, recurrence, morbidity, and mortality. It is the procedure that acts when other endoscopic or percutaneous options fail. Advice to register, analyze more cases and compare them with other minimally invasive treatment modalities.

## References

1. Khanna AK, Satyendra K, Kumar P (2012) Pancreatic pseudocyst: therapeutic dilemma. *IntJ In ammat* 2012: 279476.
2. Ramirez CG, De La Peña MS, Lihó NA (2010) Cistogastroanastomosis laparoscópica en el tratamiento de pseudoquistes pancreáticos: reporte de un caso y revisión de la literatura. *CirugEndoscóp* 11: 20-24.
3. Aghdassi AA, Mayerle J, Kra M, Sielenkämper AW, Heidecke CD, et al. (2006) Pancreatic pseudocysts-when and how to treat? *HPB (Oxford)* 8: 432-441.
4. Bradley EL, Gonzalez AC, Clements JL (1976) Acute pancreatic pseudocysts: incidence and implications. *Ann Surg* 184: 734-737.
5. Maringhini A, Uomo G, Patti R, Rabitti P, Termini A, et al. (1999) Pseudocysts in acute nonalcoholic pancreatitis: incidence and natural history. *Dig Dis Sci* 44: 1669-1673.
6. Naoum E, Zavos A, Goudis K, Sarros C, Pitsargiotis E, et al. (2003) Pancreatic pseudocysts: 10 years of experience. *J Hepatobiliary Pancreat Surg* 10: 373-376.
7. Ramos-De la Medina A, Reid-Lombardo KM, Sarr MG (2009) Strategies for surgical treatment of pseudocysts and acute pancreatitis. *Wiley Online Library* doi.org/10.1002/9781444300123.ch30
8. Vitas GJ, Sarr MG (1992) Selected management of pancreatic pseudocysts: operative versus expectant management. *Surgery* 111: 123-130.
9. Cheruvu CV, Clarke MG, Prentice M, Eyre-Brook IA (2003) Conservative treatment as an option in the management of pancreatic pseudocyst. *Ann R Coll Surg Engl* 85: 313-316.
10. Bergman S, Melvin WS (2007) Operative and nonoperative management of pancreatic pseudocysts. *Surg Clin North Am* 87: 1447-1460.
11. Ibrahim Nassour, Zeeshan Ramzan, Sachin Kukreja (2016) Robotic cystogastrostomy and debridement of walled-off pancreatic necrosis. *J Robot Surg* 10: 279-282.
12. Bhattacharya D, Ammori BJ (2003) Minimally invasive approaches to the management of pancreatic pseudocysts: review of the literature. *SurgLaparoscEndoscPercutan Tech*



- 13: 141-148.
13. Gumaste VV, Aron J (2010) Pseudocyst management: endoscopic drainage and other emerging techniques. *J Clin Gastroenterol* 44: 326-331.
  14. Aghdassi A, Mayerle J, Kraft M, Sielenkämper AW, Heidecke CD, et al. (2008) Diagnosis and treatment of pancreatic pseudocysts in chronic pancreatitis. *Pancreas* 36: 105-112.
  15. Park AE, Heniford BT (2002) Therapeutic laparoscopy of the pancreas. *Ann Surg* 236: 149-158.
  16. Aljarabah M, Ammori BJ (2007) Laparoscopic and endoscopic approaches for drainage of pancreatic pseudocysts: a systematic review of published series. *SurgEndosc* 21: 1936-1944.
  17. Barthet M, Lamblin G, Gasmi M, Vitton V, Desjeux A, et al. Clinical usefulness of a treatment algorithm for pancreatic pseudocysts. *GastrointestEndosc* 67: 245-252.
  18. Godil A, Chen YK (2000) Endoscopic management of benign pancreatic disease. *Pancreas* 20: 1-13.
  19. Catalano MF, Geenen JE, Schmalz MJ, Johnson GK, Dean RS, et al. (1995) Treatment of pancreatic pseudocysts with ductal communication by transpapillary pancreatic duct endoprosthesis. *GastrointestEndosc* 42: 214-218.
  20. Seicean A, Vultur S (2015) Endoscopic therapy in chronic pancreatitis: current perspectives. *ClinExp Gastroenterol* 8: 1-11.
  21. Zerem E (2014) Treatment of severe acute pancreatitis and its complications. *World J Gastroenterol* 20: 13879-13892.
  22. Zerem E, Imamović G, Omerović S, Ljuca F, Haracić B (2010) Percutaneous treatment for symptomatic pancreatic pseudocysts: Long-term results in a single center. *Eur J Intern Med* 21: 393-397.
  23. Zerem E, Imamović G, Omerović S (2012) What is the optimal treatment for pancreatic pseudocysts? *Scand J Gastroenterol* 47: 124-125.
  24. Gumaste VV, Pitchumoni CS (1994) Pancreatic pseudocyst. *Gastroenterologist* 4: 33-43.
  25. Balthazar EJ, Freeny PC, vanSonnenberg E (1994) Imaging and intervention in acute pancreatitis. *Radiology* 193: 297-306.
  26. Kariniemi J, Sequeiros RB, Ojala R, Tervonen O (2006) Feasibility of MR imaging-guided percutaneous drainage of pancreatic fluid collections. *J VascIntervRadiol* 17: 1321-1326.
  27. Polaków J, Serwatka W, Dobrzycki S, Ładny JR, Janica J, et al. (2004) A new diagnostic approach to pancreatic pseudocyst fine-needle puncture: three-dimensional sonography. *J Hepatobiliary Pancreat Surg* 11: 159-163.
  28. Aghdassi A, Mayerle J, Kraft M, Sielenkämper AW, Heidecke CD, et al. (2008) Diagnosis and treatment of pancreatic pseudocysts in chronic pancreatitis. *Pancreas* 36: 105-112.
  29. Spivak H, Galloway JR, Amerson JR, Fink AS, Branum GD, et al. (1998) Management of pancreatic pseudocysts. *J Am Coll Surg* 186: 507-511.
  30. Palanivelu C, Senthilkumar K, Madhankumar MV, Rajan PS, Shetty AR, et al. (2007) Management of pancreatic pseudocyst in the era of laparoscopic surgery--experience from a tertiary center. *Surg Endosc* 21: 2262-2267.
  31. Gumaste VV, Aron J (2010) Pseudocyst management: endoscopic drainage and other emerging techniques. *J Clin Gastroenterol* 44: 326-331.
  32. Redwan AA, Hamad MA, Omar MA (2017) Pancreatic Pseudocyst Dilemma: Cumulative Multicenter Experience in Management Using Endoscopy, Laparoscopy, and Open Surgery. *J Laparoendosc Adv Surg Tech A* 27: 1022-1030.

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