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Review Article

Development of the Asian EUS Group consensus in pancreatic pseudocyst drainage

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A B S T R A C T

Drainage of pseudocyst and walled-off pancreatic necrosis has traditionally been achieved by surgical means. Recently, there has been a progressive shift in paradigm to performing endoscopic drainage for these conditions. Endoscopic ultrasound (EUS)-guided drainage is the preferred approach for drainage of pancreatic pseudocyst. However, many controversies still exist on the optimal management and wide variations in techniques exist. There is a pressing need for establishment of a consensus for safe practices in EUS-guided pseudocyst drainage.

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Introduction

Drainage of pseudocyst and walled-off pancreatic necrosis (WOPN) has traditionally been achieved by surgical means. Recently, there has been a progressive shift in paradigm to performing endoscopic drainage for these conditions. However, many variations in techniques of endoscopic drainage have been described and a great deal of controversies exists regarding the optimal endoscopic management of these conditions. The aim of this manuscript is to review the current controversies in the optimal management of Endoscopic ultrasound (EUS)-guided pseudocyst drainage and highlight the need of establishing a consensus for safe practices in EUS-guided pseudocyst drainage.

Historical Evolution in Endoscopic Management of Pancreatic Fluid Collections

Endoscopic management of pancreatic fluid collection (PFC) was first described in the 1970s. In the first report, a patient suffering from a pseudocyst complicating alcoholic pancreatitis was

treated by transmural endoscopic aspiration with a regular gastroscope using a 21-gauge needle.¹ The patient recovered uneventfully but the cyst recurred soon after treatment. Subsequently, pseudocyst aspiration via endoscopic retrograde cholangiopancreatography (ERCP) was reported in 1984.² Aspiration of the pseudocyst was performed via the accessory pancreatic duct and 300 mL of amylase rich fluid was drained. There was complete resolution of the pseudocyst on follow-up ultrasound 1 week after the procedure. EUS-guided pseudocyst drainage was then described around 10 years later.³ A linear array echoendoscope was used to identify the pseudocyst, followed by puncture with a diathermy needle and insertion of a guidewire into the pseudocyst. The endoscope was then changed to a therapeutic duodenoscope for insertion of a 10 Fr pigtail stent. This was followed by a report on a fully EUS-guided pseudocyst drainage using a therapeutic echoendoscope with a 2.4 mm channel.⁴ The pseudocyst was punctured with a needle knife followed by dilation of the track with a 4 mm balloon and insertion of a 4 cm 6 Fr double pigtail stent. There was complete resolution of the pseudocyst at 6 weeks. Thereafter, the first case series on endoscopic therapy for pancre-

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atic necrosis was reported by Baron et al⁵ in 1996. Eleven patients received transgastric drainage of organized pancreatic necrosis. Complete resolution was achieved in 9 patients (81.8%) and complications occurred in 5 patients (45.5%). Thereafter, numerous authors reported on their experience of endoscopic management of PFCs.⁶ Endoscopic management of PFCs has evolved to become the mainstay of treatment of pseudocyst and WOPN.

Current Controversies in Endoscopic Management of Pseudocyst

Optimal approach for drainage of pseudocyst

Endoscopic drainage of pseudocyst can be achieved by esophagogastroduodenoscopy (EGD), ERCP, or EUS guidance. There is a paucity of high quality literature comparing the efficacies of the various approaches. In the systematic review, 10 comparative studies were identified and only 3 were randomized trials.⁶ Surgical drainage appeared to reduce mortality and adverse events rate compared to the percutaneous approach. EUS-guided and surgical drainage had similar clinical success and adverse events rates but the EUS approach reduced hospital stay, cost and improved quality of life. EUS and EGD-guided drainage are both feasible but the success rate of the EUS approach was better for non-bulging cyst. Thus, it was concluded that EUS-guided drainage appeared to be advantageous in drainage of pancreatic pseudocysts located adjacent to the stomach or duodenum. Furthermore, a recent study including 375 patients suggested after EUS-guided transmural drainage, the addition of transpapillary drainage has no added benefit and may in fact reduce the long term resolution rate of PFC's.⁷ However, others may argue that transpapillary drainage alone may be adequate for drainage if there is a clear communication to the pancreatic duct transmural drainage is not required.

Plastic versus metallic stent for pseudocyst drainage

Pseudocyst are commonly drained with plastic stents. However, the stents are of small diameter and blockade may result

in recurrence or superimposed infection (Fig. 1).⁸ Drainage may be improved with insertion of multiple stents but the process is time consuming. Recently, the uses of self-expanding metal stents (SEMS) for drainage of PFC's have been described (Fig. 2). The potential advantages include improved drainage with a large diameter stent, avoidance of multiple wires, ease of insertion and the potential for intervention through the stent.^{9–11} However, these advantages need to be balanced against the cost and risk of the procedure. Early reports employed conventional covered biliary SEMS for drainage. A complication rate of 15% to 33% was reported. The causes of these complications include stent migration, track dehiscence and bleeding.

When comparing plastic versus metallic stents for pseudocyst drainage, a study that included 230 patients noted higher complete resolution rates with SEMS (89% vs 98%, $P = 0.001$) and lower procedural adverse events (30% vs 16%, $P = 0.006$). On multivariate analysis, the use of plastic stents was 2.9 times more likely to experience adverse events.¹² Whilst in a systematic review (17 studies, 881 patients), no difference in overall treatment success between patients treated with plastic and metal stents for both pseudocysts (85% vs 83%) and walled-off necrosis (70% vs 78%). Also, there was no difference in the rates of adverse events (16% vs 23%) or recurrence (10% vs 9%) between plastic and metal stents.¹³ Thus, it remains controversial whether SEMS provide added benefit in pseudocyst drainage.

Recently, several EUS specific stent systems became available. The described stent systems include the AXIOS stent (Boston Scientific Corp, Marlborough, MA, USA), Niti-S Spaxus stent (Taewoong Medical, Gimpo, Korea) and Niti-S NAGI stent (Taewoong Medical).^{14,15} These stents share several design characteristics. They can be deployed under endoscopic, EUS or fluoroscopic guidance. They are short with flared flanges at both ends. They are also large in diameter, potentially allowing the introduction of a gastroscope for intervention. The AXIOS and Spaxus stent also possess lumen-apposing capabilities to prevent leakage of gastrointestinal contents. Whether these specific stent systems would provide superior outcomes in pseudocyst drainage remains to be investigated.

Fig. 1. Drainage of an infected pseudocyst with plastic stents.

Fig. 2. Drainage of a pancreatic tail collection with the AXIOS stent (Boston Scientific Corp, Marlborough, MA, USA).

Adjunctive measures to pseudocyst drainage

A number of adjunctive measures to transmural drainage of pseudocyst have been described. These included the use of nasocystic catheters and pancreatic stents.^{16–19} Supporting literatures on these techniques are sparse and the efficacies are uncertain. The use of nasocystic catheters may be useful in pseudocysts or WOPN with solid debris as a means of providing irrigation to the cavity (Fig. 3).^{16,17} The volume of irrigation is variable amongst different studies, ranging from 100 mL/hr to 50 mL three times a day. With the use of nasocystic drains, the short-term treatment success and the complete resolution rates at 1 year was reported to be higher whilst the stent occlusion rate is lower in one study.

The role of ERCP in the management of pseudocyst is to identify patients with pancreatic ductal leak for pancreatic duct stenting.^{19,20} As mentioned above, the use of transpapillary stenting appeared to provide no additional benefit in patients that already received transmural drainage. However, in two studies, it was suggested that if the pancreatic duct stent could bridge the site of leak, treatment success rate was higher. Thus, suggesting that in patients with partial disruption or leakage from a side branch, the use of the pancreatic stent may be useful.

The Need for a Consensus in the Optimal Management of Pancreatic Pseudocyst

As evident from the above discussion, wide variations in the practice of pseudocyst drainage exist. This was further confirmed in a multi-institutional survey on the practice of EUS-guided pseudocyst drainage amongst 19 institutions in Asia.²¹ Forty-two percent of the respondents believed that prior ERCP is required and pancreatic duct stenting is indicated in patients with pancreatic duct disruption. The 42.1% used the cystotome and 84.1% would dilate the track up to 8 to 10 mm in size. Metallic stents were used by 10.5% of the respondents and transcystic catheters were employed by 26.3%. Those who were more experienced in the procedure tended to use the cystotome more frequently ($P = 0.02$) and removed the stents in less than 3 months after insertion ($P = 0.011$). There were wide variations in the techniques adopted amongst the group and the practice of the procedure also varied

depending on the experience of the endoscopist. Thus, there is pressing need for establishment of a consensus for safe practices in EUS-guided pseudocyst drainage.

Development of a Consensus in the Optimal Management of Pancreatic Pseudocyst from the Asian EUS Group

Early in the establishment of the Asian EUS Group, it was recognized that Asia was leading the development of many interventional EUS procedures in the world. As a result, an interventional subgroup aiming to establish consensus in various EUS interventional procedures was established in 2013. The procedures in examination include: pseudocyst drainage, biliary drainage, pancreatic duct drainage, celiac plexus neurolysis and pancreatic cyst ablation.

Regarding drainage of PFCs, the group decided to focus on pseudocyst drainage. It was felt that treatment of WOPN is a different clinical entity and that many facets in endoscopic treatment of WOPN is still in evolution and consensus is difficult to be made. The aim of the consensus would be to establish a guideline on the optimal management of EUS-guided pancreatic pseudocyst drainage. The following areas were addressed including indications of treatment, optimal approach, pre-drainage evaluation, pre-procedural preparations, procedural details, adjunctive treatments, management of complications and competency and training.

It is noted, however, that level I evidence is lacking in many of these aspects. Nevertheless, clinicians would still need to make clinical decisions based on the current available evidence. Thus, we sort to define the appropriate and necessary processes of care in EUS-guided pseudocyst drainage, utilizing the RAND/UCLA appropriateness methodology.^{22,23} This is a well-described methodology developed to determine appropriate care in situations where evidence-based guidelines are not feasible. The procedure was also shown to produce criteria that have face, construct, and predictive ability. The construct of the consensus have commenced since July 2014 and completed in June 2015 after several rounds of voting. The consensus consist of 16 statements covering aspects in EUS-guided pseudocyst drainage as stated above and we eagerly await the publishing of the consensus.

Conclusions

EUS-guided drainage is the preferred approach for drainage of pancreatic pseudocyst. However, many controversies still exist on the optimal management and wide variations in techniques exist. There is a pressing need for establishment of a consensus for safe practices in EUS-guided pseudocyst drainage.

Conflicts of Interest

No potential conflict of interest relevant to this article was reported.

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Fig. 3. The use of nasocystic catheter in an infected pseudocyst.

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