A multi-institutional survey on the practice of endoscopic ultrasound (EUS) guided pseudocyst drainage in the Asian EUS group

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Background: There is a lack of consensus on how endoscopic ultrasound (EUS) guided pseudocyst drainage should be performed. This survey was carried out amongst members of the Asian Endoscopic Ultrasonography Group (AEG) to describe their practices in performing this procedure.

Methods: This was an Asia wide multi-institutional survey amongst members of the Asian EUS group conducted between November and December 2013. The responses to a 19-question survey with regard to the practice of pseudocyst drainage were obtained.

Results: In total, 19 endoscopists responded to the questionnaire and the mean (SD) number of procedures performed by each endoscopist was 87.95 (40); 42.2 % believed that prior endoscopic retrograde cholangiopancreatography (ERCP) is required and pancreatic duct stenting is indicated in patients with pancreatic duct disruption; 47.4 % used tapered catheters for track dilation and 42.1 % used the cystotome; 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).

Conclusion: This was the first Asia wide survey in the practice of pseudocyst drainage. There were wide variations in practice and randomized studies are urgently needed to establish the best approach for management of this condition. There is also a pressing need for establishment of a consensus for safe practices.

Introduction

The use of endoscopic ultrasound (EUS) guided pancreatic pseudocyst drainage was first described in 1992 [1]. Thereafter, there have been numerous reports on the outcomes of the procedure for treatment of pseudocysts. Despite it being one of the earliest described interventional EUS procedures, the numbers of high quality randomized studies published on the topic have been surprisingly limited [2–5]. Also, the literature is scarce with regard to how the procedure should be taught and learnt, and what constitutes the minimal experience required to claim proficiency [6, 7]. Furthermore, there is a lack of consensus on how the procedure should be carried out and there remains a need for standardization of the procedure.

The Asian EUS group (AEG) was first established in 2012. The group consists of regional leaders experienced in EUS, with a primary aim of promoting education and research of EUS in Asia. Recognizing the knowledge deficiencies associated with EUS guided pseudocyst drainage, a questionnaire survey was conducted amongst AEG members to assess the practice of the procedure, and to identify key areas of controversies to guide future research. The aim of the current study is to present the results of the questionnaire survey amongst AEG members on the practice of EUS guided pseudocyst drainage.

Patients and methods

A 19-question survey with regard to the practice of pseudocyst drainage was circulated amongst AEG members in November and December 2013 (**Appendix 1**). Before completing the survey, the participants were reminded that the questions listed were only directed towards EUS guided drainage of pure fluid containing pseudocysts and not directed to patients suffering from walled-off pancreatic necrosis or pancreatic abscesses. This was emphasized as the outcomes of the EUS guided drainage were dependent on the

	≥40 procedures (n=10)	<40 procedures (n=9)	*P*-value
EUS, n (%)	10 (100)	4 (44.4)	0.011[1]
Other methods of endoscopic drainage, n (%)	0 (0)	5 (55.6)	
Prescription of antibiotics, n (%)	9 (90)	7 (77.8)	0.582
Insertion of pancreatic stent, n (%)	4 (40)	4 (44.4)	1
Double-wire technique, n (%)	6 (60)	7 (77.8)	0.628
Tapered catheter, n (%)	5 (50)	4 (44.4)	1
Cystotome, n (%)	7 (70)	1 (11.1)	0.020[1]
Needle-knife, n (%)	3 (30)	4 (44.4)	0.650
Use of transcystic catheters, n (%)	7 (70)	7 (77.8)	1
Duration of stents < 3 months, n (%)	6 (60)	0 (0)	0.011[1]

EUS, endoscopic ultrasound.
[1] *P*-values < 0.05 are statistically significant.

Table 1 Comparison of the practice of pseudocyst drainage amongst endoscopists of different levels of experience

type of pancreatic fluid collection and the outcomes would be significantly influenced by the nature of these collections [8]. The responses to the questions were reported in an anonymous fashion.

Design of the questionnaire

The questions in the questionnaire were grouped under several sections – background demographics, prior experience in advanced endoscopy and pseudocyst drainage, preprocedural preparation, technical considerations, and post-procedural management. Since there is a lack of international guidelines or consensus on the procedure, the formulation of questions used was based on the regional expert's opinion on what constituted the most important aspects or controversial areas of EUS guided pseudocyst drainage.

Comparison of outcomes in experienced and inexperienced endoscopists

The practices of experienced and inexperienced endoscopists were also compared. Since there is no consensus on what constitutes the minimum experience required to gain proficiency in pseudocyst drainage, the endoscopists who participated in this study were divided into two groups based on the median number of procedures performed by each endoscopist.

Statistical analysis

Continuous variables were reported as mean ± standard deviation (SD), or median and range when the distribution was highly skewed. Categorical variables were summarized with frequencies and proportions. Comparisons were made by chi-squared test or Fisher's exact test for categorical data and a two-sided *P*-value of < 0.05 was taken as statistically significant. Statistical analyses were performed using SPSS® 20.0 statistical software (SPSS, Chicago, Illinois, USA).

Results

In total, 19 endoscopists responded to the survey and all had prior experience in EUS guided pseudocyst drainage. Of the respondents, 17 were gastroenterologists and two were surgeons. The mean (SD) years of experience was 15.21 (6.97) years and the mean (SD) number of procedures performed by each endoscopist was 87.95 (40) procedures while the median number of procedures performed by each was 40. All respondents practiced EUS guided pseudocyst drainage and only five (26.3%) practiced other endoscopic methods of pseudocyst drainage including esophagogastroduodenoscopy (EGD) or endoscopic retrograde cholangiopancreatography (ERCP) guided drainage. The reported mean technical success rate, clinical success rate, and adverse events rates of all the respondents were 97.29%, 92.18%, and 13.5%, respectively. Before the procedure, 84.2% of the respondents would give antibiotics and admit the patient; 42.2% believed that prior ERCP was required and pancreatic duct stenting was indicated in patients with partial and complete pancreatic duct disruption, while 52.6% of the endoscopists believed that ERCP before drainage was not required.

With regard to technical considerations during EUS guided pseudocyst drainage, three respondents (15.8%) never used fluoroscopy while the remaining 63.2% always used fluoroscopy and 21% recommended its use during the procedure. Furthermore, 89.5% preferred using a linear echoendoscope and 10.5% favored the use of a forward viewing echoendoscope. All the respondents performed the initial puncture with a 19-gauge needle and the majority (63.2%) then passed a 0.035″ guide-wire into the cyst; 68.4% would insert double guide-wires for insertion of two plastic stents. Two endoscopists (10.5%) would routinely insert three stents. The choice of instruments used for track dilation included a tapered catheter (47.4%), cystotome (42.1%), needle-knife (36.8%), and balloon dilator (78.9%), and 84.1% would dilate the track to 8 – 10 mm in diameter. Metallic stents were only used by 10.5% of the respondents and transcystic catheters were employed by 26.3% when there were signs of infection. Post-procedurally, 89.5% of them would continue the antibiotics up to 1 week and 68.5% of the endoscopists would place the stents for 3 months to 1 year after the pseudocyst had resolved.

The responses of those endoscopists with an experience of ≥ 40 procedures were then compared with those with < 40 procedures (**Table 1**). Significantly more endoscopists in the less experienced group practiced other methods of endoscopic pseudocyst drainage ($P=0.011$), whilst those with more experience used the cystotome as the method of track dilation during cyst puncture more frequently ($P=0.02$), and removed the stents in less than 3 months after insertion ($P=0.011$).

In terms of technical proficiency, 68.4% believed that at least 10 procedures were required to gain proficiency while 13.6% believed that 25 procedures was a minimum; 42.1% believed that prior experience in ERCP was essential before embarking on learning EUS guided drainage while 47.4% believed that possession of the skills of ERCP was recommended and beneficial.

Discussion

In the current study, the practices of EUS guided pseudocyst drainage amongst members of the Asian EUS group were surveyed. There were wide variations in the techniques adopted amongst the group members, and the practice of the procedure also varied depending on the experience of the endoscopist. This is a reflection of the lack of consensus or guidelines on how the procedure should best be performed.

In an earlier survey conducted amongst American Society for Gastrointestinal Endoscopy (ASGE) members almost 10 years ago, such wide variations in the techniques of pseudocyst drainage were also observed [9]. In that study, only 50 % of the respondents practiced EUS guided drainage. ERCP was performed before drainage by 47 % of the endoscopists. A needle-knife was used to enter the pseudocyst by 53 % of the respondents. The median number of plastic stents placed was 2 (range 1 – 5) and they were left in place for a median duration of 6 weeks (range 2 – 30 weeks).

Interestingly, despite the large number of studies published on this topic over the last decade, the variations in practice recorded in the current survey were similar to that study performed 10 years ago. This observation may be partly explained by the relative lack of practice-defining studies in the literature. Several key areas of controversy on EUS guided pseudocyst drainage remain. First, the optimal modality of draining pancreatic pseudocysts remains controversial. Although pseudocysts are increasingly drained by endoscopic means, there are a lack of randomized studies comparing endoscopic, percutaneous, or surgical approaches. In the only randomized study comparing EUS guided and open surgical cystogastrostomy, there were no differences in success and complications rates [4]; however the EUS approach was significantly cheaper and associated with a shorter hospital stay and better quality of life scores. On the other hand, when comparing esophagogastroduodenoscopy (EGD) versus EUS guided drainage, a meta-analysis of only two randomized trials showed that both approaches had similar success and complication rates; however the EUS approach was associated with a higher technical success rate in nonbulging cysts [10].

On the other hand, whether endoscopic retrograde cholangiopancreatography (ERCP) is required before drainage is also uncertain. This discussion originated in surgical literature in the 1980 s and still remains controversial [11,12]. ERCP serves two purposes, the first is to delineate the pancreatic ductal anatomy, and the second is to provide drainage of the pancreatic duct when there is communication with the pseudocyst; however whether pancreatic ductal drainage is still required when pseudocyst drainage has been achieved by the transmural route is debatable. Almost half of the respondents from both recent surveys would perform ERCP before drainage and they believed that pancreatic duct stenting was indicated in patients with partial or complete pancreatic duct injury. Nevertheless, such practice is only supported by a few, small retrospective studies. In two studies, partial pancreatic duct disruption with a stent bridging the site and a longer duration of stenting were factors associated with a higher likelihood of resolution of the ductal disruption [13,14]. In the only study combining transmural pseudocyst drainage and pancreatic duct stenting, the patients who received pancreatic duct stenting had significantly higher rates of treatment success (97.5 % vs 80 %, $P=0.001$) and 7.7 % of the patients developed recurrences [15].

In addition, the optimal number and type of stents that should be used for drainage were also seldom addressed in previous studies. Although only a small proportion of respondents in this survey used metallic stents for drainage, such practice is increasingly reported in the literature [16 – 18]. The potential advantages of using metallic stents for drainage of pancreatic fluid collections include the ease of insertion, avoidance of multiple guide-wires, changes in instruments, and providing a passage for insertion of the endoscope for necrosectomy. Such potential benefits need to be balanced against the cost and the risk of increasing morbidities by up to 33 %, and further studies are required to justify its routine use [18].

Furthermore, some differences in the practice of drainage were observed amongst the experienced and inexperienced groups. The experienced group tended to use the cystotome for track dilation more often and removed the stents earlier, while the inexperienced group practiced other methods of endoscopic drainage more frequently. Such differences may be explained by the learning curve of the endoscopist and demonstrates the fact that the more experienced tended to use techniques that were safer and more efficient. In order to overcome these learning curve issues, structured training programs, such as those conducted by AEG, may potentially enhance the acquisition of knowledge and skills, and reduce the number of procedures required to gain proficiency [19]. On the other hand, since the participants in this survey consisted of mostly regional leaders, they are experienced operators and the results may not be translated into daily practice.

There are several limitations to the current study. First, this was a cross-sectional study with a small number of respondents and the findings may be the subject of type II errors. In addition, the endoscopists' responses may not be a true reflection of their actual practice. Third, the questionnaire was not validated and may potentially introduce biases to the responses.

In conclusion, this was the first Asia wide survey into the practice of pseudocyst drainage. Despite it being one of the most described interventional EUS procedures, there were still wide variations in the practice, and randomized studies are urgently needed to establish the best approach for management of this condition. Furthermore, there is a pressing need for establishment of a consensus for safe practices.

Competing interests: None

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Appendix

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