Meeting Report

Report of EUS Presentations during the 20th UEGW Meeting in Amsterdam

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INTRODUCTION

During the last UEGW meeting in Amsterdam, 55 presentations were related to Endoscopic Ultrasound (EUS). Twenty oral presentations and 35 posters were presented and 1 session was dedicated to therapeutic EUS including 4 conferences on the place of EUS guided biliary drainage as an alternative to percutaneous transhepatic cholangiography (PTC), on the role of EUS guided pancreatic collection drainage, a state of the art of the EUS guided celiac neurolysis and the future of the therapeutic EUS.

The aim of this paper is to report the highlights of these communications on EUS. I have separated the presentations in 3 groups:

Group 1: Diagnostic EUS and new technologies as ContRast EUS and elastography
Group 2: New advances in EUS-FNA and FNB
Group 3: Therapeutic EUS

DIAGNOSTIC EUS AND NEW TECHNOLOGIES AS CONTRAST EUS AND ELASTOGRAPHY

Regarding diagnostic EUS, we report a study on the impacts of EUS on the need for spyglass cholangioscopy (SGC) in the evaluation of difficult biliary strictures. N'Guyen et al. have evaluated the utility of EUS-FNA in patients who were referred for SGC for biliary strictures. The clinical impact of EUS-FNA was prospectively examined in 31 patients. EUS identified ductal or peri-ductal abnormalities responsible for the biliary strictures in 90% of cases (28/31), with FNA possible in 70% (22/31) and provided positive histo-cytology in 17 (55%) patients. EUS avoided the need for SGC in 57% (18/31) patients with potential cost saving of ~US $70,000.

EUS evaluation should be an integral part of the diagnostic work-up for biliary strictures, and SGC should be reserved for cases where EUS-FNA is not helpful.

Elastography EUS and Contrast-enhanced EUS were the 2 new techniques mainly reported during the UEGW 2012, we summarize here these presentations. A first pilot study on usefulness of contrast-enhanced harmonic endoscopic ultrasound (CEH-EUS) for the diagnosis of chronic pancreatitis was presented by Iglesias et al. on 12 patients and revealed that CEH-EUS enhances the lobular pattern seen by conventional EUS in CP patients and the washout of contrast is markedly faster in CP patients compared to controls. A larger study will be necessary to finalize these previous results. Saftoiu et al. reported the preliminary results of artificial neural networks (ANN) analysis of contrast enhanced harmonic endoscopic ultrasound in differential diagnosis of focal pancreatic masses. A total of 121 cases were included in this analysis. Final diagnosis was based on cytology findings, surgical histology, and/or clinical follow-up. They analyzed CEH-EUS recorded movies containing the early/arterial and the late/venous phase. Median peak intensities were recorded from two areas of interest, one inside the suspected pancreatic formation and one in healthy surrounding parenchyma for each movie frame, thus obtaining the time intensity curve (TIC). Raw numeric data was vectored in an ANN feed-forward system trained to classify the lesions. A total of 78 patients (64.5%) were diagnosed with pancreatic adenocarcinoma, while 43 (35.5%) were diagnosed with chronic pseudotumoral pancreatitis. Semi-automated ANN classification showed 92.3% training accuracy and 89.2% testing accuracy, with a specificity of 91.2%, sensitivity of 87.4%, positive predictive value of 90.2% and negative predictive value of 85.9%. These preliminary results show a good accuracy of an automated computer-aided diagnostic system designed to differentiate between focal pancreatic lesions based on quantitative data from CEH-EUS investigations. A Korean team has studied the feasibility of contrast enhanced EUS in differentiating benign and malignant lesions of gallbladder. But, no
difference was showed between benign and malignant lesions of the gallbladder.

Regarding EUS elastography, Gong et al. have reported a meta-analysis on EUS elastography for differential diagnosis of solid pancreatic neoplasms. Seven studies involving 752 patients were included. The pooled sensitivity of EUS elastography for the differential diagnosis of solid pancreatic neoplasms was 97% (95% CI, 0.95-0.98), and the specificity was 76% (95% CI, 0.69-0.82). This meta-analysis shows that EUS elastography is an accurate and useful tool for the differential diagnosis of solid pancreatic neoplasms with very high sensitivity and relatively low specificity. The results indicated that EUS elastography might not only provide complementary information to conventional EUS imaging, but also potentially increase the yield of FNA and reduce the number of unnecessary biopsies. A very interesting paper was showed by Dominguez-Munoz et al. on the place of EUS guided elastography to predict pancreatic exocrine insufficiency (PEI) and need for pancreatic enzyme replacement therapy (PERT) in patients with chronic pancreatitis (CP). In 101 patients suffering of CP, The degree of pancreatic fibrosis as measured by EUS-guided Elastography allows quantifying the probability of PEI and the need for PERT in patients with CP. Patients with PEI had a higher SR (4.38, 95% CI 3.75-5.00) than those with a normal breath test result (2.97, 95% CI 2.80-3.14) (P < 0.001).

Finally, Ghonea et al. have reported the diagnostic value of combined quantitative contrast-enhanced harmonic endoscopic ultrasound and endoscopic ultrasound elastography in pancreatic focal masses. 52 patients with chronic pseudotumoral pancreatitis (n = 22) and pancreatic cancer (n = 30) were include in this study. For EUS elastography and CEH-EUS, the sensitivity/specificity/positive and negative predictive values were 86.6% / 36.3% / 76.9% / 23.1% and 86.6% / 72.7% / 81.2% / 80%, respectively. When the two methods were performed sequentially, they obtained significantly higher values - 93.3% / 81.8% / 87.5% / 90% compared to EUS elastography (P = 0.002) and CEH-EUS (P = 0.038). Using both EUS elastography and CEH-EUS seems to be the best option for the non-invasive investigation of pancreatic focal masses. But, further large-scale multicenter studies are required to validate the diagnostic approach.

**NEW ADVANCES IN EUS-FNA AND FNB**

Two Italians papers have reported the usefulness of EUS-FNA in the diagnosis of pancreatic neuroendocrine tumors (pNETs) and value of ki-67 expression measurement on cytological specimens. EUS-FNA is a valuable method in the detection and diagnosis of pNETs. Ki-67 expression on cytological samples is easy to be determined on high cellularity specimens. The cytological Ki-67 may effectively improve the preoperative assessment of pNETs.

Three studies were related to the EUS-FNA in pancreatic cystic lesion. Ardengh et al. reported his results on 446 patients with a sensitivity, specificity, positive, and negative predictive value, and accuracy for the histologic diagnosis were 62%, 98.9%, 88.6%, 94.8% and 94.2%. These results are very good and superior those published in the literature. The second study on cystic lesion was a randomized study between EUS-FNA and EUS guided brush cytology. Sixty five patients were included (34 in group EUS-FNA and 31 in group Brush). The use of Echobrush does not improve the diagnostic accuracy of standard EUS-FNA for the differential diagnosis of pancreatic cystic lesion in this study. Tarantino et al. have reported the final results of a large prospective multicenter study on complications of endoscopic ultrasound fine needle aspiration on pancreatic cystic lesion. Two hundred and twenty six patients were enrolled in this study. Complications, none of which were severe, occurred in 14/228 procedures (6.1%). There were mild complications in 9/14 (64.3%), and moderate ones in 5/14 (35.7%). Complications resolved with medical treatment in 11 (1 with blood transfusion), with endoscopic hemostasis in 2, and were self-limiting - without therapy - in 1. Complications were not related to gender, age, comorbidity, site and size of pancreatic cystic lesion, size and track of the needle.

Finally, an Australian team showed a randomized study between standard 22-G needle vs the new Pro-core (PC) 22-G needle in patients with upper GI masses. 97 consecutive patients who were referred for EUS guided biopsy of mass lesions within or adjacent to the upper gastrointestinal tract were randomized to either the use of 22-F FNA or PC needle. Diagnostic yield was significantly higher in the PC group as compared to the FNA group [46/50 (92%) vs. 36/47 (77%), P = 0.03]. In the PC group, core-like tissues were obtained in 32/50 (62%) patients, allowing histological assessment and if required, further immunohistochemical evaluation. But abdominal pain (with 1 proven pancreatitis) was more commonly observed in patients who had biopsy with PC than FNA needle (5/50 vs. 0/47; P = 0.06). This adverse event was no longer observed in the PC group after the number of passes was reduced to 2 per mass.

**THERAPEUTIC EUS**

Therapeutic EUS represent today an alternative to Surgery or radiologic procedures when standard endoscopic procedures failed as ERCP. We report in the following paragraph the most representative communications (Fig. 1).

Oostenburg et al. confirmed that EUS guided pelvic abscess drainage is the best procedure than surgical or radiologic drainage. Eight consecutive patients were enrolled. The technique was successful in 7/8 patients. In 6 patients two 7F double pigtail catheters were passed and coiled into the cavity. In one patient only one 7-F double pigtail catheter could be deployed. In all seven patients there was resolution of the abscess enabling to remove the catheters.

Jang et al. reported their experience in EUS guided pancreatic drainage (EUS-PD) after ERCP failure. Twenty-
nine consecutive patients with symptom who experienced the failure of transpapillary approach and underwent EUS-PD were included. Indications included altered anatomy \((n = 13)\) or failed ERCP \((n = 16)\). The median follow-up period was 693 days (range 8-1927 days). EUS-PD were successful in 26 patients \((26/29, 90\% \text{ technical success rate})\). The approach using transgastric route was 85\% of patients and rendezvous method was used for 2 patients among them. A plastic stent was inserted for 81\% of patients and the mean dilated main pancreatic. Follow-up loss was observed in one patient. Eighteen out of 25 remaining patients showed complete pain relief during follow-up period \((18/25, 72\% \text{ clinical success rate})\). Two pneumoperitoneums were noted within 1 months of procedure \((2/29, 6.8\% \text{ complication rate})\). The first stent dysfunction such as migration or obstruction was observed in 56\% of patients. Median time for the occurrence of first stent dysfunction was 156 days (range, 9-547 days). EUS-PD is relatively effective and safe for symptomatic patients with pancreatic duct obstruction after failed transpapillary drainage. Also, favorable outcome may be expected in case which stent is inserted across the stricture site.

We reported two large studies on EUS-guided biliary drainage (EUS-BD). The first is a comparative non randomized study between EUS-BD and PTC after failure of ERCP. Bapaye et al.\(^\text{15}\) showed in 51 patients \((25 \text{ EUS-BD vs.} 26 \text{ PTC})\) superiority over PTC for internal stent placement \((92\% \text{ vs.} 46\%, P < 0.05, \text{ significant})\) and complications: EUS-BD - 5/25 \((20\%)\), PTC - 12/26 \((46\%, P < 0.05, \text{ significant})\). But further randomized studies with larger sample size are warranted. Isayama et al.\(^\text{16}\) reported the Japanese multicenter experience of EUS-BD (Fig. 2). Fifty-five patients were included, the technical success rate was 95\% \((95/93\%)\), and reasons for failure were 2 failed dilations of anastomosis and 1 puncture failure. There were 10 procedure related complications \((18\%, 15/26\%): \text{ bile-leaf (3/1), pneumoperitonium (1/0), bleeding (1/1), stent migration (2/0) and biloma (0/1). Bile-leaf and pneumoperitonium were only observed in cases with plastic stent placement (10\%). Covered SEMS may be useful to prevent bile/air leakage and bleeding this procedure.}

Finally, a Spanish study\(^\text{17}\) showed the utility to perform EUS-guided transenteric gallbladder drainage using a new fistula-forming lumen-apposing metal stent (axios stent). Three patients from a single, tertiary hospital were prospectively included. Insertion of AXIOS stent was successful in 11/13 cases \((\text{technical success rate, 84.61\%})\). All patients \((11/11)\) experienced immediate symptomatic relief \((\text{clinical success rate, 100\%})\). In 4/11 patients \((36.36\%)\) a second tubular coaxial SEMS was inserted to ensure permeability. Cholecystoscopy was performed in 6/11 cases. No patient developed stent migration or bile leakage. There were no recurrences after a median follow-up of 100.81 days \((24-210)\). This new stent will open in the future new horizons for therapeutic EUS allowing the creation of gastrointestinal anastomosis. This Axios stent was also evaluated in the EUS guided drainage of pancreatic fluid collection (PFC) with a promising result.\(^\text{18}\) Seventeen patients were included. Median diameter of the PFCs was 110 \((\text{range 60-200 mm})\). A transgastric approach was used in all patients and AXIOS stent placement was technically successful in all patients. In 1 patient the first stent did not deploy and the second stent was successfully placed during the same procedure. Resolution of the PFC was achieved in 14/16 \((88\%)\) patients after a median of 30 days while 2 patients underwent surgery because of a retroperitoneal abscess \((n = 1)\) and persistent infection of the PFC \((n = 1)\). AXIOS stent removal was performed in 14 patients. So far, clinical success is promising; however, longer follow-up and larger patient numbers are needed.

REFERENCES

1. Nguyen NQ, Schoeman M, Ruszkiewicz A. Impacts of endoscopic
ultrasound on the need for spyglass cholangioscopy in the evaluation of difficult biliary strictures. *Endoscopy* 2012; 44 (Suppl 1) A146.

2. Iglesias-Garcia J, Lindqvist B, Cruz-Soares JB, et al. Usefulness of contrast-enhanced harmonic endoscopic ultrasound (CEH-EUS) for the diagnosis of chronic pancreatitis: a pilot study. *Endoscopy* 2012; 44 (Suppl 1) A145.

3. Saffoiu A, Iglesias-Garcia J, Vilmann P, et al. Artificial neural networks analysis of contrast enhanced harmonic endoscopic ultrasound in differential diagnosis of focal pancreatic masses: preliminary results of a European multicenter study. *Gut* 2012; 61 (Suppl 3) A45.

4. Gong T, Hu D, Zhu Q. Endoscopic ultrasound elastography for differential diagnosis of solid pancreatic neoplasms: a meta-analysis. *Endoscopy* 2012; 44 (Suppl 1) A263.

5. Dominguez-Munoz JE, Castineira-Alvarino M, Luaces-Regueira M, et al. Endoscopic ultrasound (EUS)-guided elastography predicts pancreatic exocrine insufficiency (PEI) and need for pancreatic enzyme replacement therapy (PERT) in patients with chronic pancreatitis (CP). *Gut* 2012; 61 (Suppl 3) A76.

6. Gheonea DI, Streba CT, Iordache S, et al. Diagnostic value of combined quantitative contrast-enhanced harmonic endoscopic ultrasound and endoscopic ultrasound elastography in pancreatic focal masses. *Endoscopy* 2012; 44 (Suppl 1) A93.

7. De Angelis C, Pacchioni D, Barreca A, et al. Role of endoscopic ultrasound-guided fine needle aspiration (EUS-FNA) in the diagnosis of pancreatic neuroendocrine tumors (PNETS) and value of ki-67 expression measurement on cytological specimens. *Endoscopy* 2012; 44 (Suppl 1) A124.

8. Petrone MC, Testoni S, Carrara S, et al. Neuroendocrine tumors: a single center experience over an 11-year period. *Endoscopy* 2012; 44 (Suppl 1) A262.

9. Ardengh JC, Lopes CV, Kemp R, et al. Does eus-fna provide good material for microhistology in cystic lesions of the pancreas? A large prospective study. *Endoscopy* 2012; 44 (Suppl 1) A262.

10. Larino-Noia J, Iglesias-Garcia J, Macias M, et al. A multicenter, prospective, comparative, randomized open-trial of cytologic brushing guided vs fine-needle aspiration (FNA) guided by endoscopic ultrasound for the pathological diagnosis of cystic pancreatic lesions. *Endoscopy* 2012; 44 (Suppl 1) A262.

11. Tarantino I, Fabbrì C, Di Mitri R, et al. Complications of endoscopic ultrasound fine needle aspiration on pancreatic cystic lesion: final results from a large prospective multicenter study. *Endoscopy* 2012; 44 (Suppl 1) A94.

12. Nguyen NQ. Diagnostic yield of eus guided biopsy with 22g pro-core needles for upper gastrointestinal mass lesions: a randomised comparative study against FNA needles. *Endoscopy* 2012; 44 (Suppl 1) A146.

13. Oostenbrug L, Hamacher B, Bakker M, et al. Endoscopic ultrasound-guided drainage of pelvic abscesses as preferred treatment option. *Endoscopy* 2012; 44 (Suppl 1) A145.

14. Jang JW, Lee SS, Park DH, et al. EUS-guided pancreatic duct drainage for symptomatic patients with pancreatic duct obstruction after failed transpapillary drainage: long-term follow-up results. *Endoscopy* 2012; 44 (Suppl 1) A93.

15. Bapaye A, Ahér A, Doiphode M. Comparison of endoscopic ultrasound guided biliary stenting (EUS-BS) and percutaneous transhepatic cholangiography guided internal biliary stenting (PTC-BS) in patients with malignant biliary obstruction and failed ERCP due to an inaccessible papilla. *Endoscopy* 2012; 44 (Suppl 1) A21.

16. Isayama H, Kawakubo K, Kato H, et al. Japanese multicenter experience of EUS-guided biliary drainage (EUS-BD). *Gut* 2012; 61 (Suppl 3) A20.

17. De La Serna Higuera C, Ruiz-Zorrilla R, Gil P, et al. Endoscopic-ultrasonographic (EUS)-guided transenteric gallbladder drainage with a new fistula-forming lumen-apposing metal stent. *Endoscopy* 2012; 44 (Suppl 1) A21.

18. Walter D, Siersema PS, Vleggaar FP, et al. A novel large-diameter metal stent, the axios stent, for endoscopic ultrasonography-guided drainage of peripancreatic fluid collections: a multicenter experience. *Endoscopy* 2012; 44 (Suppl 1) A21.