We wish our readers a very happy New Year. In this section, we review the latest literature that has been published about EUS in peer-reviewed journals.

Also, we have commissioned a project to develop the third edition of our textbook ENDOSONOGRAPHY.

The readers are encouraged to email Shyam Varadarajulu (svaradarajulu@yahoo.com) with suggestions on how to improve the textbook and make it more practical in daily use.

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TECHNOLOGY UPDATE

I. EUS-guided FNA:

a) Meta-analysis comparing the 22 and 25-gauge needles for EUS-FNA of solid pancreatic mass lesions

This meta-analysis reviewed eight studies involving 1292 patients. The pooled sensitivity and specificity of the 22 G needle were 0.85 (95%CI, 0.82 – 0.88) and 1 (95%CI, 0.98 – 1) respectively. The pooled sensitivity and specificity of the 25 G needle were 0.93 (95%CI, 0.91 – 0.96) and 0.97 (95%CI, 0.93 – 0.99) respectively. The study concluded that the 25 G needle is associated with a higher sensitivity (P = 0.0003) but comparable specificity (P = 0.97) to the 22 G needle.

Editor’s take: This study has proven what was long suspected, i.e. thinner gauge (25G) needles are technically more user friendly and better for sampling pancreatic head and uncinate lesions. In prior randomized trials, although the diagnostic accuracy of the 25G needle was better than that of the 22G needle, due to sample size limitations, this advantage was statistically insignificant. This meta-analysis has conclusively proven the superiority of the 25G needles. In our opinion, the different gauge needles perform equally well for sampling pancreatic body and tail lesions. However, for transduodenal sampling of pancreatic masses, the thinner 25G needle induces less resistance on the shaft of the echoendoscope and thereby facilitates better sampling.
**b) Algorithmic approach to EUS-guided FNA and Interventions** (Bang JY et al. Gastrointest Endosc 2013; Epub ahead of print)

In this study, the authors developed an algorithm to optimize the use of resources during EUS-guided FNA and interventions. In phase I of the study which was retrospective, the cohort comprised of 548 patients. The 19-gauge needle was used for interventions, and the 22– or 25-gauge needle was used interchangeably for performing FNAs. At phase I, the technical failure rate (use of more than one needle per FNA/intervention) was 11.5%. Based on these observations, an algorithm was proposed by which all transduodenal FNAs were performed using a 25-gauge needle and other FNAs with a 22-gauge needle. All transduodenal interventions were performed with a Flexible 19-gauge needle and other interventions with a standard 19-gauge needle. This algorithm was then tested prospectively in phase II on 500 patients.

In phase II, compared with that of phase I, the overall technical failure rate (1.6% vs. 11.5%; P < .001) for both FNA (1.8% vs. 10.9%; P < .001) and therapeutic interventions (0% vs. 16.4%; P = .001) were less. Although there was no difference in diagnostic adequacy (97.1% vs. 98.4%; P = .191) or complications (0.4% vs. 0.2%; P = 1.0) between phases I and II, the average cost per case was significantly less in phase II ($199.59 vs. $188.30; P = .008). The authors concluded that an algorithmic approach to EUS-FNA/interventions yielded better technical outcomes and cost savings without compromising diagnostic adequacy.

**Editor’s take:** This is a simple study that proves that an algorithmic roadmap to EUS-guided FNA and interventions can yield better technical outcomes and cost savings without compromise in diagnostic accuracy. Bottom line: Thinner needles (25G) are better for transduodenal FNAs. For other FNAs, the 22 or 25G needles can be used interchangeably. For transduodenal interventions, the Flexible 19G needle (made of nitinol) is better. For transrectal, transesophageal or transgastric interventions, the standard 19G needle functions equally well. Of note, the Flexible 19G needle is expensive and hence the reason for its sparing use.

**II. Clinical Practice**

**a) Preoperative routine evaluation of bilateral adrenal glands by EUS-FNA in patients with potentially resectable lung cancer** (Uemura S et al. Endoscopy 2013; Epub ahead of print)

In a series of 150 consecutive, potentially resectable, lung cancer patients the investigators evaluated the right and left adrenal glands by EUS-FNA. The left adrenal gland could be visualized in 100% of cases and the right adrenal gland in 131 (87.3%) patients. The reasons for inability to visualize the right adrenal gland were altered surgical anatomy or duodenal stricture in 4 patients and technical inability in 15 others. When a mass was visualized, FNA was feasible in all cases.

**Editor’s take:** This elegant study challenges the conventional wisdom that visualization of the right adrenal gland by EUS is not possible. No, in fact, it is feasible in a majority of patients! The right adrenal gland is best visualized from the duodenal bulb by tracing the IVC towards the liver hilum. In the opinion of the editors, a pathologically enlarged right adrenal is much easier to visualize than a normal gland. An altered configuration to the gland: oval, irregular or diffuse mass is usually predictive of pathological disease and warrants an FNA. With the advent of EBUS, a majority of mediastinal FNA is performed by Pulmonologists and Thoracic Surgeons. The ability to FNA the adr-
nal gland (in lung mass/cancer patients) is still within the realm of GI endoscopists and it is important for us to learn this maneuver.

**b) Rapid on–site evaluation by an endosonographer during EUS–FNA of pancreatic solid masses** (Hayashi T et al. J Gastroenterol Hepatol 2013; Epub ahead of print).

In this study, two endosonographers performed rapid onsite evaluation (ROSE) of FNA specimens of solid pancreatic masses with the objective of improving diagnostic accuracy. During phase I, they performed 53 FNAs of solid pancreatic masses over a three year period and were trained in cytological interpretation by a pathologist. In phase II, they performed ROSE on 85 FNAs (after the phase I training period) of solid pancreatic masses. The rates of diagnostic accuracy improved from 69.2% in phase I to 91.8% in phase II (p<0.001). Also, the non–diagnostic rates decreased from 26.4% in phase I to 8.2% in phase II and the median number of passes to diagnosis decreased from 3 (phase I) to 2 (Phase II) (p=0.03).

**Editor’s take:** A basic understanding of cytopathology is imperative for every endosonographer. It is unfortunate that the focus on cytopathology interpretation during EUS training is negligible to minimal at best. In our opinion, one does not require a three–year training to interpret slides. Basic competency can be achieved in a much shorter time frame. While an endosonographer can perform ROSE, a diagnosis can be certified ONLY by a pathologist. Therefore, it is important for the endosonographer to focus on specimen adequacy than diagnostic accuracy. For an endosonographer performing ROSE, the objective must be to confirm that the needle is in the “correct place” and that “adequate tissue” is being procured for off–site diagnosis. This will obviate the need for an onsite cytopathologist or cytotechnician while at the same time improving the procedural outcomes.

**c) A meta–analysis on EUS–FNA of pancreatic cyst neoplasms** (Thornton GD et al. Pancreatology 2013; Epub ahead of print)

As imaging alone is inadequate, FNA for cytology and assessment of CEA levels is important for the differentiation of mucinous from non–mucinous pancreatic cysts. In a meta–analysis of 18 studies involving 1438 patients, for cytology, the pooled sensitivity was 54% (95% CI, 49–59%) and the pooled specificity was 93% (95% CI, 90–95%); for CEA, the pooled sensitivity was 63% (95% CI, 59–67%) and the pooled specificity was 88% (95% CI, 83–91%). The authors concluded that FNA has a modest sensitivity but a high specificity.

**Editor’s take:** The results of a meta–analysis must be interpreted with caution: the outcomes are only as good as the quality of studies being evaluated. However, we agree with these results. When EUS–FNA suggests that a pancreatic cyst is mucinous, it is accurate >85% of the time. However, when EUS–FNA suggests that a cyst in non–mucinous, it is accurate in only 50–60%. In our opinion, assessment of pancreatic cyst neoplasms should be based on (a) morphology, (b) cytology and (c) CEA levels. Despite systematic evaluation, the assessment may be inaccurate in 10–15% of cases. Mucinous neoplasms are premalignant and the 5–year survival dramatically decreases once the cyst becomes malignant, from 95% to 55%. Therefore, in patients managed non–operatively, close surveillance is imperative.

This is a retrospective study of 105 patients who underwent resection for suspected side-branch IPMN at a tertiary care cancer center. Pancreatic adenocarcinoma was diagnosed in 43% of cysts that measures > 3cm, 48% of cysts that measured 2–3cm, 11% of cysts that measured 1–2cm and 14% of cysts that measured < 1cm. High-grade dysplasia was diagnosed in 20% of cysts > 3cm, 23% of cysts 2–3cm, 16% of cysts 1–2cm and 43% of cysts < 1cm in size. Intracystic septations were seen in 26% and mural nodules in only 2% of all cysts.

**Editor's take:** This study is from a cancer center and only 10% of patients were symptomatic. In routine practice, most patients with pancreatic cysts are referred for evaluation of “incidental findings’ on CT scan. Therefore, there certainly is an element of selection bias in this study. A preponderance of evidence in this study suggests that, the best cut-off for resection will be 2cm as cancer was seen in 48% of cysts that measured 2–3 cm in size. Also, conventional wisdom is to stratify using high-risk features such as septations and mural nodules. In this study, these features were present only in a minority of patients. In our opinion, if a patient with mucinous cyst is symptomatic, with cyst size > 2cm and is a surgical candidate, surgery should be recommended. If not, survey closely and DOCUMENT the findings carefully.

**e) EUS–FNA characteristics of cystic neuroendocrine tumors (CNET) of the pancreas** (Yoon WJ et al. Endoscopy 2013; Epub ahead of print)

In a retrospective study of 19 patients, the authors characterized EUS features and FNA findings of pancreatic CNET. There were no definitive morphological features that were pathognomonic of CNET. The median diameter was 24mm, cysts were unilocular or had septations with thin walls or had a solid–cystic component to them. On FNA, when compared to mucinous cysts, the CEA levels were very low, the cyst walls were thicker and cytology was diagnostic in 73%. When FNA was performed, aspiration of the solid component yielded neoplastic cytology than when the fluid was sampled (100 vs. 50%).

**Editor’s take:** The presence of a low CEA level does not preclude a diagnosis of CNET. Yet again, assessment of pancreatic cysts must be methodical: (a) morphology, (b) cytology and (c) CEA levels. When in doubt, in operable patients, recommend surgery. In others, survey closely.

II. Interventional EUS

**a) EUS–guided cholangiopancreatography (ESCP) for biliary and pancreatic duct drainage: A Spanish National Registry** (Vila JJ et al. Gastrointest Endosc 2012; 76: 1133–41)
In a multicenter retrospective study of 125 patients, biliary ESCP was performed in 106 patients and pancreatic ESCP in 19. Technical success was 67.2% and treatment success was 63.2%. Complications occurred in 29 patients (23.2%). The most common reason for technical failure was guidewire manipulation (68.2%) and the most common reason for complications was related to transmural fistula formation (58.6%).

**Editor's take:** It is truly refreshing to read a publication without bias. The study shows that ESCP is associated with a treatment failure rate of 35% and a complication rate of 25%. Major complications reported include perforation, pancreatitis, cholangitis, infection, bile leak and major hemorrhage. We NEED better methodology and dedicated accessories to move forward with this procedural indication! Until then, following a failed ERCP, conventional alternatives such as PTC should be the first-line treatment alternative. ESCP should be reserved for expert endosonographers performing procedures in a research setting.