Sökning i databaser för vetenskaplig evidens: Endoskopisk ultraljudsledd biopsi

Frågeställning

Vilken dagsaktuell vetenskaplig evidens finns för rutinmässig användning av endoskopisk ultraljudsledd biopsi?

Bakgrund

I dag finns flera nya tekniker för endoskopiska undersökningar av organ i bröstkorgen och mag-tarmkanalen. Det samma gäller avbildningstekniker baserade på ultraljud vilka även kan användas för att förbättra noggrannheten när biopsier skall tas från organ som kan nås från kroppsyten eller genom endoskop. Erfarenheterna av endoskopisk ultraljudsledd biopsi (EUS-FNA) är mest omfattande inom lungmedicinen där biopsier tas inte bara i luftrör och lungvävnader utan även mediastinum – mellanrummet mellan lungor, luftrör, hjärtat och den stora kroppspulsådern. Det är t ex av speciellt intresse att kunna undersöka eventuell förekomst av cancerceller i lymfkörtlarna i mediastinum, vilket är ett viktigt mått på generell spridning av tumören och sämre prognos.

Endoskopisk ultraljudsledd biopsi har i flera studier inklusive prospektiva studier (Polkowski, Gerke et al. 2009) och metaanalyser (Micames, McCrory et al. 2007; Thosani, Thosani et al. 2010; Wu, Jiang et al. 2011; Agarwal, Srinivasan et al. 2012) visat sig ge ett bättre diagnostisk resultat än alternativa tekniker och är kostnadseffektiv (Aabakken, Silvestri et al. 1999; Harewood and Wiersema 2001; Scheiman, Carlos et al. 2001; Harewood and Wiersema 2002; Eloubeidi, Tamhane et al. 2005; Chen and Wong 2007; Micames, McCrory et al. 2007; Pellise Urquiza, Fernandez-Esparrach et al. 2007) jämfört med alternativa tekniker (Harewood and Wiersema 2001; Scheiman, Carlos et al. 2001; Harewood and Wiersema 2002; Micames, McCrory et al. 2007; Pellise Urquiza, Fernandez-Esparrach et al. 2007) och medföra färre komplikationer (Vilmann and Larsen 2005; Thosani, Thosani et al. 2010). Mediastinoskopi medför komplikationsrisker på 2-5 % jämfört med mindre än 0,5 % för endoskopisk ultraljudsledd biopsi vars komplikationer vanligen också är mindre allvarliga än de för mediastinoskopi (Eloubeidi, Tamhane et al. 2005; Vilmann and Larsen 2005).

Metodrådets sammanfattande bedömning

Det finns ytterst få prospektiva, randomiserade och kontrollerade studier av effekten av endoskopisk ultraljudsledd biopsi. De retrospektiva studier som finns av endoskopisk ultraljudsledd biopsi är gjorda i högspecialiserade centra och på selekterade patienter. Erfarenheterna av bred användning av tekniken är fortfarande otillräckliga.

Endoskopisk ultraljudsledd biopsi handlar i grunden om diagnostisk åtgärd där studier av sensitivitet, specificitet, prediktiva värden etc. vanligen ses som viktigast. Det diagnostiska värdet av användning av endoskopisk ultraljudsledd biopsi i synnerhet i lungor, mediastinum och i mag-tarmkanalens organ visar sig som regel ha en sensitivitet på mer än 80 % och en

specificitet på över 95 %. Varianter av endoskopisk ultraljudsledd biopsi används i ett flertal olika tillämpningar med variation i resultaten, vilket försvårar generell värdering metodens effekt. Samtliga sju tillgängliga studier av olika tillämpningar av metoden visar att den är kostnadseffektiv jämfört med alternativa metoder.

Sammanfattningsvis tyder denna översiktliga litteraturgranskning på att det finns vetenskapligt stöd för användning av endoskopisk ultraljudsledd biopsi främst i högspecialiserad rutinsjukvård inom lungmedicin och inom utvalda områden av gastroentero- och hepatologin.

Sökning i HTA (Health Technology Assessment) databaser (2012-05-21)

*SBU - Kunskapscentrum för hälso- och sjukvård*en http://www.sbu.se/sv/

Ingen träff på ”ultrajudsledd biopsi” eller ”biopsi”

Socialstyrelsen – nationella riktlinjer
http://www.socialstyrelsen.se/riktlinjer/nationellariktlinjer

Ingen träff på ”ultrajudsledd biopsi” eller ”biopsi”

TRIP databasen http://www.tripdatabase.com/search/advanced

260 artiklar om ”Endoscopic ultrasound guided biopsy”, varav 18 systematiska översikter. Inga träffar på ”EUS-FNA”

År 2008: National institute for Health and Clinical Excellence (NHS): Endobronchial ultrasound-guided transbronchial needle aspiration for mediastinal masses. http://www.nice.org.uk/nicemedia/pdf/IPG254Guidance.pdf

“Current evidence on the safety and efficacy of endobronchial ultrasound-guided transbronchial needle aspiration (EBUS–TBNA) for mediastinal masses appears adequate to support the use of this procedure provided that normal arrangements are in place for consent, audit and clinical governance.”

År 2007: Carlos G. Micames, MD; Douglas C. McCrory, MD; Darren A. Pavey, MD; Paul S. Jowell, MD; and Frank G. Gress, MD Endoscopic Ultrasound-Guided Fine-Needle Aspiration for Non-small Cell Lung Cancer Staging: A Systematic Review and Metaanalysis (Micames, McCrory et al. 2007)
Arton studier som uppfyllde kvalitetskriterierna visade sammantaget att endoskopisk ulraljudsstyrd biopsi fann 83 % (sensitivitet) för patienter (95 %, CI 78 % till 87 %) med metastaser till mediastinala lymfkörtlar och 97 % (specificitet) av patienter (95 %: CI 96 % till 98 %) som inte hade metastaser till lymfkörtlar i mediastinum. Inga allvarliga komplikationer inrapporterades.

År 2002: Harewood, G. C. and M. J. Wiersema "A cost analysis of endoscopic ultrasound in the evaluation of esophageal cancer." The American journal of gastroenterology 97(2): 452-458. (Pellise Urquiza, Fernandez-Esparrach et al. 2007) Fann att endoskopisk ulraljudsstyrd biopsi var mer kostnadseffektiv än både datortomografistyrd biopsi och kirurgi vid diagnostik av tumörer i matstrupen.

*The Cochrane Lib*rary http://www.thecochranelibrary.com/view/0/index.html

En träff på ” Endoscopic ultrasound guided biopsy”

År 2011: Wu, L. M., X. X. Jiang, et al. "Endoscopic ultrasound-guided fine-needle aspiration biopsy in the evaluation of bile duct strictures and gallbladder masses: a systematic review and meta-analysis." European journal of gastroenterology & hepatology 23(2): 113-120 (Chen and Wong 2007) Fann 84 % (95 % CI,78 till 88 %) (sensitivitet) för patienter med förträngningar i gallgångarna eller klumpar i gallblåsan och 100 % (95 % CI, 94 till 100 %) (specificitet) av patienter. Inga allvarliga komplikationer inrapporterades.

En träff på ”EUS-FNA”
År 2010: Thosani et al. Role of EUS-FNA-based cytology in the diagnosis of mucinous pancreatic cystic lesions: a systematic review and meta-analysis (Thosani, Thosani et al. 2010). Metanalys av 11 studier av undersökning av eventuella cancerceller i pankreascystor. Sensitiviteten var 63% och specificiteten 88%. Arean under ROC kurvan var 0,89.

Clinical Evidence http://www.clinicalevidence.com/x/index.html

Inga träffar på “ Endoscopic ultrasound guided biopsy”

International Network of Agencies for Health Technology Assessment http://www.inahta.net/

Inga träffar på “ Endoscopic ultrasound guided biopsy” med 31 träffar på ”guided biopsy” varav en var HTA analys som inte berörde aktuella området.

Nasjonalt kunnskapssenter for helsetjenesten, Norge http://www.kunnskapssenteret.no/

Inga relevanta träffar på ”ultralyd” ”biopsi”

För metodrådet i Sydöstra sjukvårdsregionen den 29 maj 2012

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Litteraturreferenser

Aabakken, L., G. A. Silvestri, et al. (1999). "Cost-efficacy of endoscopic ultrasonography with fine-needle aspiration vs. mediastinotomy in patients with lung cancer and suspected mediastinal adenopathy." Endoscopy **31**(9): 707-711.

> BACKGROUND AND STUDY AIMS: The use of endoscopic ultrasonography (EUS) guidance for fine-needle aspiration (FNA) of mediastinal lymph nodes has become an important aid in the staging of bronchogenic carcinoma. In many cases, it may be an alternative to mediastinoscopy/mediastinotomy (MED), but the cost-effectiveness of the two techniques has not been compared. The aim of this study was to apply a decision-analysis model to compare the cost-effectiveness of EUS and MED in the preoperative staging of patients with non-small-cell lung cancer. PATIENTS AND METHODS: A decision-analysis model was designed, taking as entry criteria lung cancer and abnormal mediastinal lymph nodes verified by computerized tomography (CT). Performance characteristics of MED and EUS were retrieved from the published literature, as were life expectancy data. Direct actual costs of the relevant procedures were retrieved from the billing system of our hospital.

RESULTS: The cost per year of expected survival is US$ 1.729 with the EUS strategy, and US$ 2.411 with the MED strategy. The advantage conferred by EUS remains even when the negative predictive value of EUS is as low as 0.22. CONCLUSION: Because of its low cost and high yield, EUS-guided FNA is a cost-effective aid assessing mediastinal lymphadenopathy.

Agarwal, R., A. Srinivasan, et al. (2012). "Efficacy and safety of convex probe EBUS-TBNA in sarcoidosis: a systematic review and meta-analysis." Respir Med **106**(6): 883-892.

BACKGROUND AND AIM: Real-time endobronchial ultrasound-guided transbronchial needle aspiration (EBUS-TBNA) is a minimally invasive technique for diagnosis of mediastinal lymphadenopathy. Although most studies have reported the utility of EBUS-TBNA in malignancy, its use has been extended to benign conditions including sarcoidosis. Herein, we perform a systematic review and meta-analysis of studies reporting the diagnostic yield and safety of EBUS-TBNA in sarcoidosis. METHODS: We searched the PubMed and EmBase databases for relevant studies published from 2004 to 2011, and included studies that have reported the diagnostic yield of EBUS-TBNA in sarcoidosis. The quality of studies was assessed using the QualSyst tool. We calculated the proportions with 95% confidence interval (CI) to assess the diagnostic yield of EBUS-TBNA in individual studies and then pooled the results using a random effects model. Heterogeneity was assessed using the I(2) and Cochran-Q tests while publication bias was assessed using both graphical and statistical methods. RESULTS: Our search yielded 15 studies (553 patients of sarcoidosis). The diagnostic yield of EBUS-TBNA ranged from 54 to 93% with the pooled diagnostic accuracy being 79% (95% CI, 71-86%) by the random effects model. The yield was not statistically different in studies employing on-site cytological evaluation (80.1%) vs. those without (81.3%). However, the diagnostic yield was significantly higher in prospective studies (83.9%) vs. the retrospective studies (74.3%). Only five minor complications were reported in 553 patients. There was evidence of heterogeneity and publication bias. CONCLUSIONS: EBUS-TBNA is a safe and efficacious procedure in the diagnosis of sarcoidosis, and should be routinely employed wherever available.

Chen, V. K. and R. C. Wong (2007). "Endoscopic Doppler ultrasound versus endoscopic stigmata-directed management of acute peptic ulcer hemorrhage: a multimodel cost analysis." Dig Dis Sci **52**(1): 149-160.

Recurrent bleeding from acute peptic ulcer hemorrhage is problematic. Studies have shown that Doppler ultrasound (DOP-US) is useful in decreasing rebleeding. We analyzed associated costs and outcomes to better define the role of DOP-US versus Conventional (Forrest classification endoscopic stigmata) in the management of acute peptic ulcer bleeding. Two separate decision analyses were constructed. Recurrent bleeding, failed esophagogastroduodenoscopy (EGD) hemostasis, complications, and surgery rates were derived from medical literature. Costs were based on Medicare data. DOP-US is preferred over Conventional in acute peptic ulcer bleeding with average cost savings per patient ranging from 853 dollars (decision-tree modeling) to

1,160 dollars (Monte Carlo simulation). High-dose intravenous proton-pump inhibitors lowered rates of recurrent bleeding for both Conventional and DOP-US, resulting in a lower but still persistent average cost savings per patient for DOP-US (decision-tree modeling = 328 dollars, Monte Carlo simulation = 560 dollars). This decision analyses identified DOP-US as the preferred cost-minimizing strategy in acute peptic ulcer hemorrhage. Results of cost analyses were most dependent on hospitalization costs and recurrent bleeding rates.

Eloubeidi, M. A., A. Tamhane, et al. (2005). "Endoscopic ultrasound-guided fine-needle aspiration in patients with non-small cell lung cancer and prior negative mediastinoscopy." Ann Thorac Surg **80**(4): 1231-1239.

BACKGROUND: Mediastinoscopy and endoscopic ultrasound-guided fine-needle aspiration biopsy (EUS-FNA) are complementary for staging non-small cell lung cancer (NSCLC) patients. We assessed (1) the yield of EUS-FNA of malignant lymph nodes in NSCLC patients with combined anterior and posterior lymph nodes that had already undergone mediastinoscopy and (2) the cost implications associated with alternative initial strategies. METHODS: All patients underwent chest computed tomography (CT) and/or positron emission tomography (PET), and mediastinoscopy. Then, the posterior mediastinal stations (7, 8, and 9) or station 5 were targeted with EUS-FNA. The reference standard included thoracotomy with complete thoracic lymphadenectomy, repeat clinical imaging, or long-term clinical follow-up. A Monte Carlo cost-analysis model evaluated the expected costs and outcomes associated with staging of NSCLC. RESULTS: Thirty-five NSCLC patients met inclusion criteria (median age 65 years; 80% men). Endoscopic ultrasound-guided FNA was performed in 53 lymph nodes in various stations, the subcarinal station (7) being the most common (47.3%). Of the 35 patients who had a prior negative mediastinoscopy, 13 patients (37.1%) had malignant N2 or N3 lymph nodes. Accuracy of EUS-FNA (98.1%) was significantly higher than that of CT (41.5%; $p < 0.001$) and PET (40%; $p < 0.001$). Initial EUS-FNA resulted in average costs per patient of 1,867 dollars (SD +/- 4,308 dollars) while initial mediastinoscopy cost 12,900 dollars (SD +/- 4,164.40 dollars). If initial EUS-FNA is utilized rather than initial mediastinoscopy, an average cost saving of 11,033 dollars per patient would result. CONCLUSIONS: In patients with NSCLC and combined anterior and posterior lymph nodes, starting with EUS-FNA would preclude mediastinoscopy in more than one third of the patients. Endoscopic ultrasound-guided FNA is a safe outpatient procedure that is less invasive and less costly than mediastinoscopy.

Harewood, G. C. and M. J. Wiersema (2001). "A cost analysis of endoscopic ultrasound in the evaluation of pancreatic head adenocarcinoma." Am J Gastroenterol **96**(9): 2651-2656.

OBJECTIVE: Endoscopic ultrasound (EUS)-guided fine needle aspiration (FNA) biopsy of nonperitumoral (NPT) lymph nodes (LN) can be helpful in preoperative staging of pancreatic head adenocarcinoma. The economic impact of this staging strategy has not yet been described. The aim of this study was to apply a decision analysis model to compare the costs of three approaches to the management of

nonmetastatic pancreatic head adenocarcinoma: EUS FNA versus CT-guided FNA versus surgery. A cost minimization approach was employed, as viewed from the perspective of the payer. METHODS: A decision analysis model was designed using DATA Version 3.5, taking the entry criteria as "resectable" pancreatic head adenocarcinoma as determined by helical CT. Detection of metastatic NPT LN on FNA signified unresectability and obviated the need for surgery. Baseline probabilities were varied through plausible ranges using sensitivity analysis. Cost inputs were based on Medicare professional plus facility fees. The endpoint was cost of management per patient. RESULTS: EUS FNA was the least costly strategy ($15,938) compared with CT FNA ($16,378) and surgery ($18,723). Sensitivity analysis revealed that EUS FNA remained the least costly option provided the frequency of NPT LN involvement was >4%; below this value, surgery became the least costly. CONCLUSIONS: EUS FNA is the least costly staging strategy in the workup of patients with nonmetastatic pancreatic head adenocarcinoma primarily because of confirmation of NPT LN involvement avoiding unnecessary surgery. These results support performing EUS in patients whose tumors are thought to be resectable on helical CT to enhance NPT LN assessment.

Harewood, G. C. and M. J. Wiersema (2002). "A cost analysis of endoscopic ultrasound in the evaluation of esophageal cancer." Am J Gastroenterol **97**(2): 452-458.

OBJECTIVE: The use of endoscopic ultrasound (EUS) with guided fine needle aspiration (FNA) of suspicious lymph nodes has become an important aid in the staging of esophageal carcinoma. The economic impact of this staging strategy has not yet been described. We applied a decision analysis model to compare the costs of EUS FNA, CT-guided FNA, and surgery in the management of esophageal tumors. A cost-minimization approach was employed, as viewed from the perspective of the payer. METHODS: A decision analysis model with three management arms was designed using DATA 3.5 software, taking the entry criteria as esophageal carcinoma without evidence of distant metastases as determined by CT. Detection of tumor on celiac lymph node (CLN) FNA signified unresectability and prompted palliative treatment: chemoradiotherapy with endoscopic esophageal stenting rather than surgery. Baseline probabilities were varied through plausible ranges using sensitivity analysis. Cost inputs were based on Medicare professional fees plus Medicare facility fees. The endpoint was the cost of management per patient. RESULTS: EUS FNA was the least costly strategy ($13,811), compared to CT FNA ($14,350) and surgery ($13,992). The model outcome was sensitive to changes in both EUS FNA sensitivity and prevalence of CLN metastases. EUS FNA remained the least costly option provided the prevalence of CLN involvement was >16%; below this value, surgery became the most economical strategy. CONCLUSION: By minimizing unnecessary surgery, primarily by detecting CLN involvement, EUS FNA is the least costly staging strategy in the workup of patients with nonmetastatic esophageal cancer. Under certain circumstances, surgery is the preferred strategy.

Micames, C. G., D. C. McCrory, et al. (2007). "Endoscopic ultrasound-guided fine-needle aspiration for non-small cell lung cancer staging: A systematic review and metaanalysis." Chest **131**(2): 539-548.

BACKGROUND: Endoscopic ultrasound (EUS)-guided fine-needle aspiration (FNA) is a minimally invasive alternative technique for mediastinal staging of non-small cell lung cancer. A metaanalysis was performed to estimate the diagnostic accuracy of EUS-FNA for staging mediastinal lymph nodes (N2/N3 disease) in patients with lung cancer. METHODS: Relevant studies were identified using Medline (1966 to November 2005), CINAHL, and citation indexing. Included studies used histology or adequate clinical follow-up (> 6 months) as the "gold standard," and provided sufficient data for calculating sensitivity and specificity. Summary receiver operating characteristic curves metaanalysis was performed to estimate the pooled sensitivity and specificity. RESULTS: In 18 eligible studies, EUS-FNA identified 83% of patients (95% confidence interval [CI], 78 to 87%) with positive mediastinal lymph nodes (pooled sensitivity) and 97% of patients (95% CI, 96 to 98%) with negative mediastinal lymph nodes (pooled specificity). In eight studies that were limited to patients who had abnormal mediastinal lymph nodes seen on CT scans, the sensitivity was 90% (95% CI, 84 to 94%) and the specificity was 97% (95% CI, 95 to 98%). In patients without abnormal mediastinal lymph nodes seen on CT scans (four studies), the pooled sensitivity was 58% (95% CI, 39 to 75%). Minor complications were reported in 10 cases (0.8%). There were no major complications. CONCLUSIONS: EUS-FNA is a safe modality for the invasive staging of lung cancer that is highly sensitive when used to confirm metastasis to mediastinal lymph nodes seen on CT scans. In addition, among lung cancer patients with normal mediastinal adenopathy seen on CT scans, despite lower sensitivity, it has the potential to prevent unnecessary surgery in a large proportion of cases missed by CT scanning.

Pellise Urquiza, M., G. Fernandez-Esparrach, et al. (2007). "Endoscopic ultrasound-guided fine needle aspiration: predictive factors of accurate diagnosis and cost-minimization analysis of on-site pathologist." Gastroenterol Hepatol **30**(6): 319-324.

AIMS: To evaluate a) new diagnoses by endoscopic ultrasound guided real-time fine-needle aspiration (EUS-FNA) compared with EUS alone; b) the predictive factors for an accurate EUS-FNA diagnosis, and c) the cost-effectiveness of the presence of an on-site cytopathologist. PATIENTS AND METHODS: Demographic data, ultrasonographic characteristics, technical information on EUS-FNA and cytological results were prospectively collected in 213 patients. The gold standard used was pathological examination or clinical follow-up. Operating characteristics of EUS-FNA, multivariate analysis, and a cost-minimization study of on-site evaluation were performed with these variables. RESULTS: Samples were obtained from a total of 262 lesions: extramural masses (n = 115), lymph nodes (n = 96), cysts (n = 40) and intramural lesions (n = 11). The overall accuracy of EUS-FNA was 89% (234/262 lesions). The accuracy of EUS in discriminating between malignant and benign disease was 92% but 105 lesions (40% of the total) were classified as indeterminate. The addition of FNA to EUS allowed almost all lesions (89%) to be diagnosed with an accuracy of 90%. The only variable independently associated with an incorrect

diagnosis was intramural location of the target lesion. The effectiveness of EUS-FNA in the complete series progressively increased, reaching a plateau in the fourth pass. The presence of an attendant cytopathologist was cost-effective. CONCLUSIONS: EUS-FNA allows diagnosis of most lesions classified as indeterminate by EUS alone. The only factor independently associated with low accuracy is intramural location of the lesion. The availability of an on-site cytopathologist is cost-effective.

Polkowski, M., W. Gerke, et al. (2009). "Diagnostic yield and safety of endoscopic ultrasound-guided trucut [corrected] biopsy in patients with gastric submucosal tumors: a prospective study." Endoscopy **41**(4): 329-334.

BACKGROUND AND STUDY AIMS: Endoscopic-ultrasound-guided trucut needle biopsy (EUS-TCB) has not been adequately evaluated in patients with submucosal tumors (SMTs). PATIENTS AND METHODS: This prospective, uncontrolled study involving 49 consecutive patients with hypoechoic gastric SMTs (> or = 20 mm) evaluated diagnostic yield and 30-day morbidity of EUS-TCB, factors related to the success of EUS-TCB, and agreement between EUS-TCB and the surgical pathology diagnosis. Seventy-three percent of tumors were gastrointestinal stromal tumors (GIST). RESULTS: Tumor tissue adequate for diagnosis was obtained by EUS-TCB in 31 patients (63 %; 95 %CI 49 % to 75 %). In the remaining cases, EUS-TCB provided no tissue (n = 11) or an insufficient amount (n = 7). Logistic regression analysis showed that tumor location on the lesser curvature of the stomach was the only independent predictor of obtaining diagnostic material [odds ratio (OR) 7.4; 95 %CI 1.9 to 28; P = 0.004]. The experience of the endosonographer, the size of the tumor, and the location of the tumor relative to the long axis of the stomach were not related to the success of the biopsy. Agreement between EUS-TCB and surgical pathology specimens in respect of the diagnosis and CD117 status was high (0.9, standard error 0.31; and 0.95, standard error 0.16, respectively); however, there was no correlation between the mitotic index as determined on EUS-TCB and that determined on the surgical pathology specimen (correlation coefficient, 0.08). There were two severe septic complications in 52 procedures (3.9 %; 95 %CI 0.3 % to 14 %). CONCLUSIONS: The diagnostic yield of EUS-TCB in patients with gastric SMTs was moderate. Tissue samples were too small to reliably determine the mitotic index. Antibiotic prophylaxis should be considered because of possible septic complications.

Scheiman, J. M., R. C. Carlos, et al. (2001). "Can endoscopic ultrasound or magnetic resonance cholangiopancreatography replace ERCP in patients with suspected biliary disease? A prospective trial and cost analysis." Am J Gastroenterol **96**(10): 2900-2904.

OBJECTIVES: ERCP is the gold standard for pancreaticobiliary evaluation but is associated with complications. Less invasive diagnostic alternatives with similar capabilities may be cost-effective, particularly in situations involving low prevalence of disease. The aim of this study was to compare the performance of endoscopic ultrasound (EUS) with magnetic resonance cholangiopancreatography (MRCP) and ERCP in the same patients with suspected extrahepatic biliary disease. The economic

outcomes of EUS-, MRCP-, and ERCP-based diagnostic strategies were evaluated. METHODS: Prospective cohort study of patients referred for ERCP with suspected biliary disease. MRCP and EUS were performed within 24 h before ERCP. The investigators were blinded to the results of the alternative imaging studies. A cost-utility analysis was performed for initial ERCP, MRCP, and EUS strategies for these patients. RESULTS: A total of 30 patients were studied. ERCP cholangiogram failed in one patient, and another patient did not complete MRCP because of claustrophobia. The final diagnoses (N = 28) were CBD stone (mean = 4 mm; range = 3-6 mm) in five patients; biliary stricture in three patients, and normal biliary tree in 20. Two patients had pancreatitis after therapeutic ERCP, one after precut sphincterotomy followed by a normal cholangiogram. EUS was more sensitive than MRCP in the detection of choledocolithiasis (80% vs 40%), with similar specificity. MRCP had a poor specificity and positive predictive value for the diagnosis of biliary stricture (76%/25%) compared to EUS (100%/100%), with similar sensitivity. The overall accuracy of MRCP for any abnormality was 61% (95% CI = 0.41-0.78) compared to 89% (CI = 0.72-0.98) for EUS. Among those patients with a normal biliary tree, the proportion correctly identified with each test was 95% for EUS and 65% for MRCP ($p < 0.02$). The cost for each strategy per patient evaluated was $1346 for ERCP, $1111 for EUS, and $1145 for MRCP. CONCLUSIONS: In this patient population with a low disease prevalence, EUS was superior to MRCP for choledocholithiasis. EUS was most useful for confirming a normal biliary tree and should be considered a low-risk alternative to ERCP. Although MRCP had the lowest procedural reimbursement, the initial EUS strategy had the greatest cost-utility by avoiding unnecessary ERCP examinations.

Thosani, N., S. Thosani, et al. (2010). "Role of EUS-FNA-based cytology in the diagnosis of mucinous pancreatic cystic lesions: a systematic review and meta-analysis." Dig Dis Sci **55**(10): 2756-2766.

BACKGROUND: Preoperative diagnosis of malignancy in pancreatic cystic lesions (PCLs) remains challenging. Most non-mucinous cystic lesions (NMCLs) are benign, but mucinous cystic lesions (MCLs) are more likely to be premalignant or malignant. AIM: The aim of this study was to assess the sensitivity, specificity, and positive and negative likelihood ratios (LRs) of EUS-FNA-based cytology in differentiating MCLs from non-mucinous PCLs. METHODS: We conducted a comprehensive search of MEDLINE, SCOPUS, Cochrane, and "CINAHL Plus" databases to identify studies, in which the results of EUS-FNA-based cytology of PCLs were compared with those of surgical biopsy or surgical excision histopathology. A DerSimonian-Laird random effect model was used to estimate the pooled sensitivity, specificity, and LRs, and a summary receiver-operating characteristic (SROC) curve was constructed. RESULTS: We included 376 patients from 11 distinct studies who underwent EUS-FNA-based cytology and also had histopathological diagnosis. The pooled sensitivity and specificity in diagnosing MCLs were 0.63 (95% CI, 0.56-0.70) and 0.88 (95% CI, 0.83-0.93), respectively. The positive and negative LRs in diagnosing MCLs were 4.46 (95% CI, 1.21-16.43) and 0.46 (95% CI, 0.25-0.86), respectively. The area under the curve (AUC) was 0.89. CONCLUSIONS: EUS-FNA-based cytology has overall

low sensitivity but good specificity in differentiating MCLs from NMCLs. Further research is required to improve the overall sensitivity of EUS-FNA-based cytology to diagnose MCLs while evaluating PCL.

Vilmann, P. and S. S. Larsen (2005). "Endoscopic ultrasound-guided biopsy in the chest: little to lose, much to gain." Eur Respir J **25**(3): 400-401.

Wu, L. M., X. X. Jiang, et al. (2011). "Endoscopic ultrasound-guided fine-needle aspiration biopsy in the evaluation of bile duct strictures and gallbladder masses: a systematic review and meta-analysis." Eur J Gastroenterol Hepatol **23**(2): 113-120.

STUDY OBJECTIVES: Recently, there are very few research on endoscopic ultrasound-guided fine needle aspiration (EUS-FNA) of bile duct and gallbladder masses. The objective of this study was to assess the overall diagnostic accuracy of EUS-FNA in the evaluation of patients with bile duct strictures and gallbladder masses with a meta-analysis. METHODS: The MEDLINE, EMBASE, Cancerlit and Cochrane Library, and other database, from January 1995 to July 2010, were searched for studies evaluating EUS-FNA accuracy. Meta-analysis methods were used to obtain pooled estimates of sensitivity, specificity, diagnostic odds ratio, summary receiver operating characteristic curves, and the Q* index. RESULTS: A total of nine studies with 284 patients, who fulfilled all the inclusion criteria, were considered for the analysis. EUS-FNA had a pooled sensitivity of 0.84 (95% confidence interval: 0.78-0.88) and a pooled specificity of 1.00 (95% confidence interval: 0.94-1.00). Overall area under the curve was 0.9254, The Q* index was 0.8598 and the calculated diagnostic odds ratio was 75.1. No complications occurred. CONCLUSION: EUS-FNA was an accurate and safe tool in the evaluation bile duct and gallbladder masses. High-quality prospective studies regarding EUS-FNA in the evaluation of patients with bile duct and gallbladder masses are still needed to be conducted.