

**Jaundice
EVIDENCE TABLE**

Reference	Study Type	Patients/ Events	Study Objective (Purpose of Study)	Study Results	Strength of Evidence
1. Arvan DA. Diagnostic Strategies for Common Problems. In: Panzer RJ, Black FR, Griner PF, eds. Philadelphia, Pa: <i>American College of Physicians</i> . 1991:131-140.	15	N/A	N/A	N/A	N/A
2. Pasanen PA, Pikkarainen P, Alhava E, Partanen K, Janatuinen E. Evaluation of a computer-based diagnostic score system in the diagnosis of jaundice and cholestasis. <i>Scand J Gastroenterol</i> 1993; 28(8):732-736.	9	220	Prospective series of patients with jaundice and/or cholestasis were analyzed with discriminate analysis to evaluate the diagnostic value of various symptoms and signs and basic hepatopancreatobiliary laboratory tests in the differential diagnosis of these patients. Also, computer-based diagnostic score (DS) system was developed and compared with the diagnostic value of clinical evaluation (CE), US, CT, and ERCP.	<ul style="list-style-type: none"> • Diagnostic sensitivity of DS in the detection of extrahepatic disease was 96%, with a specificity of 80% and an efficiency of 93%. • The sensitivities of the imaging methods (62-85%) were inferior to that of DS, whereas, the specificities were better (94-98%). • The sensitivity of CE was only slightly lower (86%) than that of DS, but the specificity was lowest (57%). 	2
3. Costamagna G, Gabrielli A, Mutignani M, Perri V, Buononato M, Crucitti F. Endoscopic diagnosis and treatment of malignant biliary strictures: review of 505 patients. <i>Acta Gastroenterol Belg</i> 1993; 56(2):201-206.	10	505	Retrospective review to determine the value of ERCP and endoscopic drainage in the diagnosis and treatment of patients with malignant biliary obstruction.	ERCP to diagnose and localize obstructive lesions, followed by endoscopic biliary drainage can be strongly considered in all patients with suspected malignant obstructive jaundice.	2
4. Pasanen PA, Partanen KP, Pikkarainen PH, Alhava EM, Janatuinen EK, Pirinen AE. A comparison of ultrasound, computed tomography and endoscopic retrograde cholangiopancreatography in the differential diagnosis of benign and malignant jaundice and cholestasis. <i>Eur J Surg</i> 1993; 159(1):23-29.	9	220	Prospective study to assess accuracy of US, CT and ERCP in distinguishing between benign and malignant causes of jaundice and in determining cholestasis without jaundice.	<ul style="list-style-type: none"> • The benign nature of the extrahepatic obstruction was correctly defined by US, CT, and ERCP in 53%, 53%, and 90% of patients, respectively, and the corresponding figures for choledocholithiasis were 22%, 25%, and 79% (ERCP compared with each of the other techniques, p<0.0001). Intrahepatic benign diseases were diagnosed by US and CT in a third of cases. • Malignant extrahepatic obstruction was correctly diagnosed in 57%, 80%, and 83%, respectively and the corresponding figures for pancreatic cancer were 60%, 97%, and 89% (US compared with CT, p<0.01, and with ERCP, p<0.05). Intrahepatic malignant lesions were diagnosed by US, CT, and ERCP in 100%, 77%, and 60% of patients, respectively. • Results emphasize that the 3 imaging methods are complementary. 	2

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5. Poynard T, Chaput JC, Etienne JP. Relations between effectiveness of a diagnostic test, prevalence of the disease, and percentages of uninterpretable results. An example in the diagnosis of jaundice. <i>Med Decis Making</i> 1982; 2(3):285-297.	12	N/A	Ten hepatologists and ten hepatobiliary surgeons were interviewed, and 19 articles were reviewed to study the relations between effectiveness of a diagnostic test, prevalence of the disease, and percentages of uninterpretable results in the diagnosis of jaundice.	Effectiveness must take into account the percentages of uninterpretable results and must be expressed as a function of prevalence.	3
6. DeWitt J, Devereaux B, Chriswell M, et al. Comparison of endoscopic ultrasonography and multidetector computed tomography for detecting and staging pancreatic cancer. <i>Ann Intern Med</i> 2004; 141(10):753-763.	9	120	Prospective, observational, cohort study to compare endoscopic US and multidetector CT for the detection, staging and resectability of known or suspected locoregional pancreatic cancer.	<ul style="list-style-type: none"> • For the 80 patients with cancer, the sensitivity of endoscopic US (98% [95% CI, 91%-100%]) for detecting a pancreatic mass was greater than that of CT (86% [CI, 77%-93%]; P=0.012). • For the 53 surgical patients, endoscopic US was superior to CT for tumor staging accuracy (67% vs 41%; P<0.001) but equivalent for nodal staging accuracy (44% vs 47%; P>0.2). • Of the 25 resectable pancreatic tumors in patients recommended for surgery, endoscopic US and CT correctly identified 88% and 92%, respectively, as resectable. • Of the 28 unresectable pancreatic tumors in patients recommended for surgery, endoscopic US and CT correctly identified 68% and 64%, respectively, as unresectable. • Compared with multidetector CT, endoscopic US is superior for tumor detection and staging but similar for nodal staging and resectability of preoperatively suspected nonmetastatic pancreatic cancer. 	2

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7. House MG, Yeo CJ, Cameron JL, et al. Predicting resectability of periampullary cancer with three-dimensional computed tomography. <i>J Gastrointest Surg</i> 2004; 8(3):280-288.	10	140	To evaluate the impact of preoperative 3D-CT in determining the resectability of patients with periampullary tumors. CT findings were compared to intraoperative findings.	<ul style="list-style-type: none"> • 115 had periampullary cancers, 25 had benign diseases. Among the patients with periampullary cancer, the extent of local tumor burden involving the pancreas and peripancreatic tissues was accurately depicted by 3D-CT in 93% of the patients. • 3D-CT was 95% accurate in determining cancer invasion of the superior mesenteric vessels. • Preoperative 3D-CT accurately predicted periampullary cancer resectability and a margin-negative resection in 98% and 86% of patients, respectively. • For patients with pancreatic adenocarcinoma (n=85), preoperative 3D-CT resulted in a resectability rate and a margin-negative resection rate of 79% and 73%, respectively. 	2
8. Aube C, Delorme B, Yzet T, et al. MR cholangiopancreatography versus endoscopic sonography in suspected common bile duct lithiasis: a prospective, comparative study. <i>AJR</i> 2005; 184(1):55-62.	9	47	To compare diagnostic accuracy of MRCP and endoscopic sonography for the diagnosis of common bile duct stones in patients with a mild to moderate clinical suspicion of common bile duct stones.	The sensitivity and specificity of MRCP were, respectively, 90.5% and 87.5% for etiologic diagnosis and 87.5% and 96.6% for the detection of common bile duct stones. The corresponding values for endoscopic sonography were 86.4% and 91.3% for etiologic diagnosis and 93.8% and 96.6% for visualization of choledocholithiasis.	2
9. Chan YL, Chan AC, Lam WW, et al. Choledocholithiasis: comparison of MR cholangiography and endoscopic retrograde cholangiography. <i>Radiology</i> 1996; 200(1):85-89.	9	47	Prospective comparison of MR cholangiography and endoscopic retrograde cholangiography (ERC) in the diagnosis of choledocholithiasis.	<ul style="list-style-type: none"> • MR cholangiography showed common duct dilatation in 28/29 patients with dilatation shown at ERC. • MR cholangiography helped correctly identify 18/19 patients with choledocholithiasis and 22/26 patients without choledocholithiasis. • Sensitivity with MR cholangiography was 95%, specificity was 85%, PPV was 82%, and NPV was 96%. Non-breath-hold MR cholangiography is as accurate for the evaluation of choledocholithiasis as ERC. 	2

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10. Fulcher AS, Turner MA, Capps GW, Zfass AM, Baker KM. Half-Fourier RARE MR cholangiopancreatography: experience in 300 subjects. <i>Radiology</i> 1998; 207(1):21-32.	10	300	To determine prospectively the clinical applications and diagnostic accuracy of half-Fourier rapid acquisition with relaxation enhancement (RARE) MRCP in a large patient population.	<ul style="list-style-type: none"> • MRCP yielded an accuracy of 100% in determining the presence of pancreaticobiliary disease, the presence and level of biliary obstruction, and obstruction due to bile duct calculi. • The accuracy of MRCP and MRI in determining the presence and level of malignant obstruction was 98.2%. • Half-Fourier RARE MRCP enables accurate evaluation of pancreaticobiliary disease and obviates ERCP in some patients. 	2
11. Sharma SK, Larson KA, Adler Z, Goldfarb MA. Role of endoscopic retrograde cholangiopancreatography in the management of suspected choledocholithiasis. <i>Surg Endosc</i> 2003; 17(6):868-871.	10	200	To determine role of ERCP in the management of suspected choledocholithiasis.	If multiple indications for ERCP were present, the diagnostic yield was 85.6%. With only one indication, diagnostic yield decreased to 25%. MRCP may be a more appropriate initial evaluation of suspected CBD pathology in many patients.	2
12. Shanmugam V, Beattie GC, Yule SR, Reid W, Loudon MA. Is magnetic resonance cholangiopancreatography the new gold standard in biliary imaging? <i>Br J Radiol</i> 2005; 78(934):888-893.	10	374	Retrospective cohort study to assess the predictive value of MRCP in the diagnosis of biliary pathology.	Of the 221 patients with full comparative data available, the MRCP showed a sensitivity of 97.98% and specificity of 84.4%. MRCP is highly sensitive and specific for choledocholithiasis and avoids the need for invasive imaging in most patients with suspected choledocholithiasis.	2
13. Soto JA, Yucel EK, Barish MA, Chuttani R, Ferrucci JT. MR cholangiopancreatography after unsuccessful or incomplete ERCP. <i>Radiology</i> 1996; 199(1):91-98.	10	37	To assess the value of MRCP in patients in whom ERCP was unsuccessful or inadequate.	MRCP was successful in all 37. MRCP plays an important role in the care of patients in whom ERCP is unsuccessful or incomplete and when technical difficulties can be anticipated.	3
14. Varghese JC, Farrell MA, Courtney G, Osborne H, Murray FE, Lee MJ. Role of MR cholangiopancreatography in patients with failed or inadequate ERCP. <i>AJR</i> 1999; 173(6):1527-1533.	10	58	To determine the accuracy of MRCP in patients with failed or inadequate ERCP.	MRCP was successful in 57 of 58. Sensitivity 97.1%, specificity 100%, accuracy 98.2%.	2

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15. Hintze RE, Abou-Rebyeh H, Adler A, Veltzke-Schlieker W, Felix R, Wiedenmann B. Magnetic resonance cholangiopancreatography-guided unilateral endoscopic stent placement for Klatskin tumors. <i>Gastrointest Endosc</i> 2001; 53(1):40-46.	10	35	To determine the outcome of replacing ERC with MRCP to reduce ERC related complications. Patients thought to have a Klatskin tumor underwent clinical evaluation, laboratory, and noninvasive imaging studies before ERC.	<ul style="list-style-type: none"> Unilateral stents bilirubin levels decreased from 18.9 ±6.3 mg/dL to 3.2 ± 2.3 mg/dL and jaundice resolved in 86%. After first stent deployment, post-ERC bacterial cholangitis occurred in 6% (2/35) of patients. MRCP-guided endoscopic unilateral stent placement could reduce ERC-related complications caused by initial stent deployment. 	3
16. Schwartz LH, Coakley FV, Sun Y, Blumgart LH, Fong Y, Panicek DM. Neoplastic pancreaticobiliary duct obstruction: evaluation with breath-hold MR cholangiopancreatography. <i>AJR</i> 1998; 170(6):1491-1495.	10	32	To investigate the use of breath-hold single-shot fast spin-echo MRCP in assessing pancreaticobiliary duct obstruction.	Isolated bile duct obstruction was classified as lobar (n=5), hilar (n=12), or distal (n=3). These levels of obstruction were correctly identified in 27 (84%) and 28 (88%) of the 32 cases. The site of the underlying tumor was identified in 27 (84%) and 29 (91%). Good interobserver agreement was reached for both level of obstruction (kappa=.70) and identification of tumor site (kappa=.75).	3
17. Yeh TS, Jan YY, Tseng JH, et al. Malignant perihilar biliary obstruction: magnetic resonance cholangiopancreatographic findings. <i>Am J Gastroenterol</i> 2000; 95(2):432-440.	9	40	To determine efficacy of MRCP in the evaluation of malignant perihilar biliary obstructions, with reference to ERCP.	<ul style="list-style-type: none"> MRCP successful in 40. ERCP successful in 38. Both MRCP and ERCP were very effective in detecting the presence of biliary obstructions (40/ 40 vs 38/38, p=1.0). MRCP was superior in its investigation of anatomical extent (34/40 vs 24/38, p =0.015) and the cause of the jaundice (31/0 vs 22/38, p=.023) compared to ERCP. The performance of MRCP is promising for the interpretation of cholangiocarcinoma (22/6) and gallbladder carcinoma (5/5 but is relatively ineffective for the interpretation of icteric HCC (2/4) and metastasis (2/5). 	2
18. Freeman ML, Overby C. Selective MRCP and CT-targeted drainage of malignant hilar biliary obstruction with self-expanding metallic stents. <i>Gastrointest Endosc</i> 2003; 58(1):41-49.	10	35	Prospective study of patients undergoing attempted palliative ERCP for malignant hilar biliary obstruction. To evaluate outcomes of selective MRCP and CT-targeted drainage with self-expanding metallic stents.	Initial intervention guided by CT and/or MRCP successful in 27 (71%). Unilateral metallic stent placement by using MRCP and/or CT to selectively target drainage provides safe and effective palliation in most patients with malignant hilar biliary obstruction.	3

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19. Siegel JH, Snady H. The significance of endoscopically placed prostheses in the management of biliary obstruction due to carcinoma of the pancreas: results of nonoperative decompression in 277 patients. <i>Am J Gastroenterol</i> 1986; 81(8):634-641.	3a	277	To report the authors experience with internal biliary stent placement in consecutive patients with carcinoma of the pancreas.	Nonsurgical decompression should be the primary treatment considering the short mean survival of patients with unresectable malignant biliary obstruction.	2
20. Agarwal B, Abu-Hamda E, Molke KL, Correa AM, Ho L. Endoscopic ultrasound-guided fine needle aspiration and multidetector spiral CT in the diagnosis of pancreatic cancer. <i>Am J Gastroenterol</i> 2004; 99(5):844-850.	9	81	Retrospective study of patients to evaluate the use of EUS fine needle aspiration (FNA) in conjunction with spiral CT for suspected pancreatic cancer.	<ul style="list-style-type: none"> • Accuracy of Spiral CT 74%, EUS 94%, EUS-FNA 88%. • Accuracy of EUS and EUS-FNA for pancreatic tumors in patients without an identifiable mass on spiral CT was 92% (n=23/25, CI 74%-99%). • NPV of EUS-FNA was 22% (n=2/9, CI 3%-60%) in patients with obstructive jaundice and biliary stricture. • In patients without obstructive jaundice at initial presentation, EUS-FNA was highly accurate (accuracy 97%, n=33/34, CI 85%-100%) and was reliable for ruling out malignancy (NPV 89%, n=8/9, CI 52%-100%). 	2
21. Cannon ME, Carpenter SL, Elta GH, et al. EUS compared with CT, magnetic resonance imaging, and angiography and the influence of biliary stenting on staging accuracy of ampullary neoplasms. <i>Gastrointest Endosc</i> 1999; 50(1):27-33.	9	50	To assess the accuracy of ampullary tumor staging with CT, EUS, and MRI in patients with and without endobiliary stents.	<ul style="list-style-type: none"> • EUS was more accurate than CT and MRI in the assessment of the T stage of ampullary neoplasms (EUS 78%, CT 24%, MRI 46%). • No significant difference in N stage accuracy was noted between the 3 imaging modalities (EUS 68%, CT 59%, MRI 77%). • EUS T stage accuracy was reduced from 84% to 72% in the presence of a transpapillary endobiliary stent. 	2
22. Eloubeidi MA, Chen VK, Jhala NC, et al. Endoscopic ultrasound-guided fine needle aspiration biopsy of suspected cholangiocarcinoma. <i>Clin Gastroenterol Hepatol</i> 2004; 2(3):209-213.	10	28	Prospective study of patients to evaluate the accuracy of EUS-FNA and its impact on patient management in suspected cholangiocarcinoma.	<ul style="list-style-type: none"> • The sensitivity, specificity, PPV, NPV, and accuracy are 86%, 100%, 100%, 57%, and 88%, respectively. • EUS-FNA had a positive impact on patient management in 84% of patients: preventing surgery for tissue diagnosis in patients with inoperable disease (n=10), facilitating surgery in patients with unidentifiable cancer by other modalities (n=8), and avoiding surgery in benign disease (n=4). 	3

* See Last Page for Key

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23. Harrison JL, Millikan KW, Prinz RA, Zaidi S. Endoscopic ultrasound for diagnosis and staging of pancreatic tumors. <i>Am Surg</i> 1999; 65(7):659-664; discussion 664-655.	9	19	Review records of patients to determine the sensitivity of EUS for diagnosis and staging of pancreatic tumors. Patients had preoperative abdominal CT scans.	Accuracy of EUS for diagnosis of pancreatic tumor was 17/19. Node status correctly predicted in 9/12. Accuracy of tumor staging by EUS was 9/12. Absence of vascular invasion accurately predicted in 13/14. EUS is more sensitive than CT in detecting pancreatic masses and is more accurate than CT in locally staging pancreatic tumors.	3
24. NIH state-of-the-science statement on endoscopic retrograde cholangiopancreatography (ERCP) for diagnosis and therapy. <i>NIH Consens State Sci Statements</i> 2002; 19(1):1-26.	15	N/A	To provide guidelines and utility of ERCP based on scientific evidence from a review of published peer-reviewed literature and presentations by experts.	For diagnosis of choledocholithiasis, MRCP, EUS and ERCP have comparable sensitivity and specificity. ERCP is evolving into a predominantly therapeutic procedure with the emergence of newer diagnostic imaging technologies.	1
25. American College of Radiology. <i>Manual on Contrast Media</i> . Available at: http://www.acr.org/SecondaryMainMenuCategories/quality_safety/contrast_manual.aspx	15	N/A	Guidance document on contrast media to assist radiologists in recognizing and managing risks associated with the use of contrast media.	N/A	3

Evidence Table Key

Study Type Key

Numbers 1-7 are for studies of therapies while numbers 8-15 are used to describe studies of diagnostics.

1. Randomized Controlled Trial — Treatment
2. Controlled Trial
3. Observation Study
 - a. Cohort
 - b. Cross-sectional
 - c. Case-control
4. Clinical Series
5. Case reviews
6. Anecdotes
7. Reviews

8. Randomized Controlled Trial — Diagnostic
9. Comparative Assessment
10. Clinical Assessment
11. Quantitative Review
12. Qualitative Review
13. Descriptive Study
14. Case Report
15. Other (Described in text)

Strength of Evidence Key

- Category 1 - The conclusions of the study are valid and strongly supported by study design, analysis and results.
- Category 2 - The conclusions of the study are likely valid, but study design does not permit certainty.
- Category 3 - The conclusions of the study may be valid but the evidence supporting the conclusions is inconclusive or equivocal.
- Category 4 - The conclusions of the study may not be valid because the evidence may not be reliable given the study design or analysis.