



Protocol for the Examination of Specimens From Patients With Carcinoma of the Intrahepatic Bile Ducts

Version: 4.2.0.0

Protocol Posting Date: June 2021

CAP Laboratory Accreditation Program Protocol Required Use Date: March 2022

The changes included in this current protocol version affect accreditation requirements. The new deadline for implementing this protocol version is reflected in the above accreditation date.

For accreditation purposes, this protocol should be used for the following procedures AND tumor types:

Procedure	Description
Resection	Includes specimens designated hepatic resection, partial or total
Tumor Type	Description
Carcinoma	Invasive carcinomas including combined hepatocellular-cholangiocarcinoma, small cell and large cell (poorly differentiated) neuroendocrine carcinoma

This protocol is NOT required for accreditation purposes for the following:

Procedure
Biopsy
Primary resection specimen with no residual cancer (eg, following neoadjuvant therapy)
Cytologic specimens

The following tumor types should NOT be reported using this protocol:

Tumor Type
Intraductal papillary neoplasm without associated invasive carcinoma
Mucinous cystic neoplasm without associated invasive carcinoma
Well-differentiated neuroendocrine tumors of liver
Hepatocellular carcinoma and fibrolamellar carcinoma (consider the Hepatocellular Carcinoma protocol)
Lymphoma (consider the Hodgkin or non-Hodgkin Lymphoma protocols)
Sarcoma (consider the Soft Tissue protocol)

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With guidance from the CAP Cancer and CAP Pathology Electronic Reporting Committees.

* Denotes primary author.

Accreditation Requirements

This protocol can be utilized for a variety of procedures and tumor types for clinical care purposes. For accreditation purposes, only the definitive primary cancer resection specimen is required to have the core and conditional data elements reported in a synoptic format.

- Core data elements are required in reports to adequately describe appropriate malignancies. For accreditation purposes, essential data elements must be reported in all instances, even if the response is “not applicable” or “cannot be determined.”
- Conditional data elements are only required to be reported if applicable as delineated in the protocol. For instance, the total number of lymph nodes examined must be reported, but only if nodes are present in the specimen.
- Optional data elements are identified with “+” and although not required for CAP accreditation purposes, may be considered for reporting as determined by local practice standards.

The use of this protocol is not required for recurrent tumors or for metastatic tumors that are resected at a different time than the primary tumor. Use of this protocol is also not required for pathology reviews performed at a second institution (ie, secondary consultation, second opinion, or review of outside case at second institution).

Synoptic Reporting

All core and conditionally required data elements outlined on the surgical case summary from this cancer protocol must be displayed in synoptic report format. Synoptic format is defined as:

- Data element: followed by its answer (response), outline format without the paired Data element: Response format is NOT considered synoptic.
- The data element should be represented in the report as it is listed in the case summary. The response for any data element may be modified from those listed in the case summary, including “Cannot be determined” if appropriate.
- Each diagnostic parameter pair (Data element: Response) is listed on a separate line or in a tabular format to achieve visual separation. The following exceptions are allowed to be listed on one line:
 - Anatomic site or specimen, laterality, and procedure
 - Pathologic Stage Classification (pTNM) elements
 - Negative margins, as long as all negative margins are specifically enumerated where applicable
- The synoptic portion of the report can appear in the diagnosis section of the pathology report, at the end of the report or in a separate section, but all Data element: Responses must be listed together in one location

Organizations and pathologists may choose to list the required elements in any order, use additional methods in order to enhance or achieve visual separation, or add optional items within the synoptic report. The report may have required elements in a summary format elsewhere in the report IN ADDITION TO but not as replacement for the synoptic report ie, all required elements must be in the synoptic portion of the report in the format defined above.

Summary of Changes

v 4.2.0.0

- General Reformatting
- Added New Histologic Type Cholangiocarcinoma, NOS
- Revised Margins Section
- Revised Lymph Nodes Section
- Added Distant Metastasis Section
- Removed pTX and pNX Staging Classification

Reporting Template

Protocol Posting Date: June 2021

Select a single response unless otherwise indicated.

CASE SUMMARY: (INTRAHEPATIC BILE DUCTS)

Standard(s): AJCC-UICC 8

Intrahepatic bile ducts

SPECIMEN (Note [A](#))

Procedure

- Wedge resection
 Partial hepatectomy
 Total hepatectomy
 Other (specify): _____
 Not specified

TUMOR

Histologic Type (Note [B](#))

- Large duct intrahepatic cholangiocarcinoma
 Small duct intrahepatic cholangiocarcinoma
 Cholangiocarcinoma NOS
 Combined hepatocellular-cholangiocarcinoma
 Intraductal papillary neoplasm with an associated invasive carcinoma
 Mucinous cystic neoplasm with an associated invasive carcinoma
 Undifferentiated carcinoma
 Large cell neuroendocrine carcinoma
 Small cell neuroendocrine carcinoma
 Mixed neuroendocrine-non-neuroendocrine neoplasm (MiNEN)
 Other histologic type not listed (specify): _____

+Histologic Type Comment: _____

Histologic Grade (Note [C](#))

- G1, well differentiated
 G2, moderately differentiated
 G3, poorly differentiated
 Other (specify): _____
 GX, cannot be assessed: _____
 Not applicable

Tumor Focality (Note [D](#))

- Solitary tumor (specify location): _____
 Multiple tumors (specify locations): _____

Tumor Size

- Greatest dimension in Centimeters (cm): _____ cm
+Additional Dimension in Centimeters (cm): ____ x ____ cm
 Cannot be determined (explain): _____

Tumor Extent (select all that apply)

- Confined to intrahepatic bile ducts (carcinoma in situ / high-grade dysplasia)
 Confined to hepatic parenchyma
 Involves visceral peritoneal surface
 Directly invades gallbladder
 Directly invades adjacent structure(s) and organ(s) other than gallbladder (specify):

 Cannot be determined: _____
 No evidence of primary tumor

+Tumor Growth Pattern (Note E)

- Mass-forming
 Periductal infiltrating
 Mixed mass-forming and periductal infiltrating
 Other (specify): _____
 Cannot be determined: _____

Lymphovascular Invasion

- Not identified
 Present
 Cannot be determined: _____

+Perineural Invasion

- Not identified
 Present
 Cannot be determined: _____

+Tumor Comment: _____**MARGINS (Note E)****Margin Status for Invasive Carcinoma**

- All margins negative for invasive carcinoma

+Closest Margin(s) to Invasive Carcinoma (select all that apply)

- Hepatic parenchymal: _____
 Bile duct: _____
 Other (specify): _____
 Cannot be determined: _____

+Distance from Invasive Carcinoma to Closest Margin*Specify in Centimeters (cm)*

- Exact distance in cm: _____ cm
 Greater than 1 cm

Specify in Millimeters (mm)

- Exact distance in mm: _____ mm
 Greater than 10 mm

Other

- Other (specify): _____
 Cannot be determined: _____
 Not applicable

Invasive carcinoma present at margin

Margin(s) Involved by Invasive Carcinoma (select all that apply)

- Hepatic parenchymal: _____
- Bile duct: _____
- Other (specify): _____
- Cannot be determined (explain): _____
- Other (specify): _____
- Cannot be determined (explain): _____
- Not applicable

Margin Status for High-Grade Intraepithelial Neoplasia (select all that apply)

- All margins negative for high-grade intraepithelial neoplasia
- High-grade intraepithelial neoplasia present at bile duct margin
- Other (specify): _____
- Cannot be determined (explain): _____
- Not applicable

+Margin Comment: _____

REGIONAL LYMPH NODES

Regional Lymph Node Status

- Not applicable (no regional lymph nodes submitted or found)
- Regional lymph nodes present
 - All regional lymph nodes negative for tumor
 - Tumor present in regional lymph node(s)

Number of Lymph Nodes with Tumor

- Exact number (specify): _____
- At least (specify): _____
- Other (specify): _____
- Cannot be determined (explain): _____
- Other (specify): _____
- Cannot be determined (explain): _____

Number of Lymph Nodes Examined

- Exact number (specify): _____
- At least (specify): _____
- Other (specify): _____
- Cannot be determined (explain): _____

+Regional Lymph Node Comment: _____

DISTANT METASTASIS

Distant Site(s) Involved, if applicable (select all that apply)

- Not applicable
- Non-regional lymph node(s): _____
- Liver: _____
- Other (specify): _____
- Cannot be determined: _____

PATHOLOGIC STAGE CLASSIFICATION (pTNM, AJCC 8th Edition) (Note G)

Reporting of pT, pN, and (when applicable) pM categories is based on information available to the pathologist at the time the report is issued. As per the AJCC (Chapter 1, 8th Ed.) it is the managing physician's responsibility to establish the final pathologic stage based upon all pertinent information, including but potentially not limited to this pathology report.

TNM Descriptors (select all that apply)

- Not applicable
 m (multiple primary tumors)
 r (recurrent)
 y (post-treatment)

pT Category

- pT not assigned (cannot be determined based on available pathological information)
 pT0: No evidence of primary tumor
 pTis: Carcinoma in situ (intraductal tumor)
pT1: Solitary tumor without vascular invasion, less than or equal to 5 cm or greater than 5 cm
 pT1a: Solitary tumor less than or equal to 5 cm without vascular invasion
 pT1b: Solitary tumor greater than 5 cm without vascular invasion
 pT1 (subcategory cannot be determined)
 pT2: Solitary tumor with intrahepatic vascular invasion or multiple tumors, with or without vascular invasion
 pT3: Tumor perforating the visceral peritoneum
 pT4: Tumor involving local extrahepatic structures by direct invasion

pN Category (Note H)

- pN not assigned (no nodes submitted or found)
 pN not assigned (cannot be determined based on available pathological information)
 pN0: No regional lymph node metastasis
 pN1: Regional lymph node metastasis present

pM Category (required only if confirmed pathologically)

- Not applicable - pM cannot be determined from the submitted specimen(s)
 pM1: Distant metastasis

ADDITIONAL FINDINGS (Note I)**+Additional Findings (select all that apply)**

- None identified
 Fibrosis (specify extent with name of scheme and scale used for assessing stage of fibrosis):

 Cirrhosis
 Primary sclerosing cholangitis
 Biliary stones
 Chronic hepatitis (specify type): _____
 Other (specify): _____

SPECIAL STUDIES

+Ancillary Studies (specify): _____

COMMENTS

Comment(s): _____

RETIRED

Explanatory Notes

A. Application

This protocol applies only to hepatic resection specimens containing intrahepatic cholangiocarcinoma, combined hepatocellular-cholangiocarcinoma and primary high grade neuroendocrine carcinomas. Hepatocellular carcinomas and carcinomas arising in the perihilar bile ducts are staged using separate TNM systems.¹

Anatomically, the intrahepatic bile ducts extend from the periphery of the liver to the second-order bile ducts (Figure 1). The perihilar bile ducts extend from the hepatic duct bifurcation to include the extrahepatic biliary tree proximal to the origin of the cystic duct. The distal extrahepatic bile duct extends from the junction of the cystic duct-common hepatic duct to the ampulla of Vater.¹

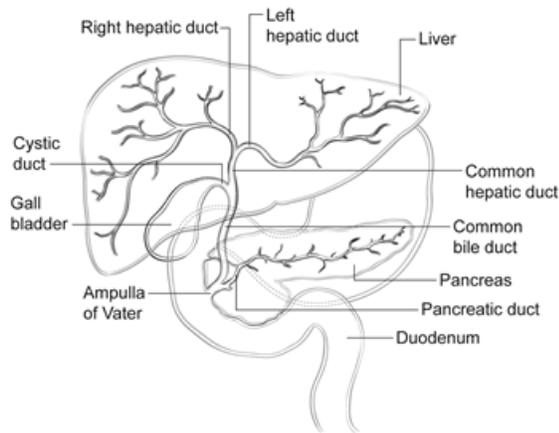


Figure 1. Anatomy of the intrahepatic and extrahepatic biliary system

References

1. Amin MB, Edge SB, Greene FL, et al, eds. AJCC Cancer Staging Manual. 8th ed. New York, NY: Springer; 2017.

B. Histologic Type

The protocol recommends the following modified classification of the World Health Organization (WHO).¹ In the United States, approximately 30% of the primary malignant tumors of the liver are biliary carcinomas.¹

For intrahepatic cholangiocarcinoma iCCA, origin in large duct versus small duct correlates with several clinicopathologic correlations.¹ Large duct iCCA tend to form hilar masses, present with obstructive cholestasis and share risk factors with extrahepatic bile duct adenocarcinomas. Small duct iCCA form peripheral liver masses, present with larger tumors and share risk factors with hepatocellular carcinomas.

Combined or mixed hepatocellular-cholangiocarcinoma should show histologic evidence of both hepatocellular and biliary differentiation by morphology, and supported by immunohistochemistry.¹ Hepatocellular markers with high sensitivity and specificity such as arginase-1 should be included in the panel (in addition to markers like Hep Par 1),² and a cholangiocarcinoma component should not be diagnosed based solely on immunoreactivity with markers like CK7, CK19,

and/or MOC31, which can be positive in a subset of HCC, especially in variants like scirrhous HCC.³ Discrete gland formation with or without mucin, positive staining of these areas with CK7, CK19, and/or MOC31, and negative results in these areas with hepatocellular markers is the most reliable evidence of a cholangiocarcinoma component. The proportion of each component can be provided. The size of the entire tumor is used for staging. The demographics and clinical features of combined HCC-cholangiocarcinoma such as age, sex, viral hepatitis status, and cirrhosis tend to resemble that of HCC,^{4,5} while some studies have reported molecular changes similar to cholangiocarcinoma.⁶ Many studies show that combined HCC-cholangiocarcinoma is more aggressive compared to classical HCC and has a higher recurrence rate after liver transplantation.^{7,8} Carcinosarcoma is mentioned as a histologic type in the AJCC 8th edition.

References

1. WHO Classification of Tumours Editorial Board. Digestive system tumours. Lyon (France): International Agency for Research on Cancer; 2019. (WHO classification of tumours series, 5th ed.; vol. 1)
2. Nguyen T, Phillips D, Jain D, et al. Comparison of 5 Immunohistochemical Markers of Hepatocellular Differentiation for the Diagnosis of Hepatocellular Carcinoma. *Arch Pathol Lab Med.* 2015;139(8):1028-1034.
3. Krings G, Ramachandran R, Jain D, et al. Immunohistochemical pitfalls and the importance of glypican 3 and arginase in the diagnosis of scirrhous hepatocellular carcinoma. *Mod Pathol.* 2013;26(6):782-791.
4. Yano Y, Yamamoto J, Kosuge T, et al. Combined hepatocellular and cholangiocarcinoma: a clinicopathologic study of 26 resected cases. *Jpn J Clin Oncol.* 2003;33:283-287.
5. Tang D, Nagano H, Nakamura M, et al. Clinical and pathological features of Allen's type C classification of resected combined hepatocellular and cholangiocarcinoma: a comparative study with hepatocellular carcinoma and cholangiocellular carcinoma. *J Gastrointest Surg.* 2006;10:987-998.
6. Cazals-Hatem D, Rebouissou S, Bioulac-Sage P, et al. Clinical and molecular analysis of combined hepatocellular-cholangiocarcinomas. *J Hepatol.* 2004;41(2):292-298.
7. Wu CH, Yong CC, Liew EH, et al. Combined hepatocellular carcinoma and cholangiocarcinoma: diagnosis and prognosis after resection or transplantation. *Transplant Proc.* 2016;48(4):1100-1104.
8. Sapisochin G, Fidelman N, Roberts JP, Yao FY. Mixed hepatocellular cholangiocarcinoma and intrahepatic cholangiocarcinoma in patients undergoing transplantation for hepatocellular carcinoma. *Liver Transpl.* 2011;17(8):934-942.

C. Histologic Grade

For cholangiocarcinomas, definitive criteria for histologic grading have not been established; however, the following quantitative grading system based on the proportion of gland formation within the tumor is suggested:

Grade X	Grade cannot be assessed
Grade 1	Well differentiated (more than 95% of tumor composed of glands)
Grade 2	Moderately differentiated (50% to 95% of tumor composed of glands)
Grade 3	Poorly differentiated (less than 49% of tumor composed of glands)

Undifferentiated category is rarely used and is reserved for tumors that do not show obvious glandular, squamous, or neuroendocrine differentiation on morphology and/or immunohistochemistry. It is more appropriate to categorize these as undifferentiated carcinomas rather than cholangiocarcinoma. This category is not included in the AJCC scheme. There is no separate grading scheme for combined hepatocellular-cholangiocarcinoma; both the components can be separately graded. This grading system is not applicable to poorly differentiated neuroendocrine carcinoma.

D. Tumor Focality

Sections should be prepared from each major tumor nodule, with representative sampling of smaller nodules. For purposes of staging, satellite nodules, multifocal primary cholangiocarcinomas, and intrahepatic metastases are considered to be multiple tumors.¹ In intrahepatic cholangiocarcinoma, multiple tumor deposits have been associated with poorer survival.^{2,3}

References

1. Amin MB, Edge SB, Greene FL, et al, eds. *AJCC Cancer Staging Manual*. 8th ed. New York, NY: Springer; 2017
2. Ohtsuka M, Ito H, Kimura F, et al. Results of surgical treatment for intrahepatic cholangiocarcinoma and clinicopathological factors influencing survival. *Br J Surg*. 2002;89(12):1525-1531.
3. Sano T, Shimada K, Sakamoto Y, Ojima H, Esaki M, Kosuge T. Prognosis of perihilar carcinoma: hilar bile duct cancer versus intrahepatic cholangiocarcinoma involving the hepatic hilus. *Ann Surg Oncol*. 2008;15(2):590-599.

E. Tumor Growth Pattern

Three tumor growth patterns of intrahepatic cholangiocarcinoma are described: the mass-forming type, the periductal infiltrating type, and mixed mass-forming/periductal-infiltrating type. Mass-forming intrahepatic cholangiocarcinoma (60% of cases) forms a well-demarcated nodule growing in a radial pattern and invading the adjacent liver parenchyma (Figure 2). In contrast, the periductal-infiltrating type of cholangiocarcinoma (20% of cases) spreads in a diffuse longitudinal growth pattern along the bile duct. The remaining 20% of cases of intrahepatic cholangiocarcinoma grow in a mixed mass-forming/periductal-infiltrating pattern. Earlier studies suggested a poor outcome for diffuse periductal-infiltrating type, while some recent studies have suggested a relatively favorable prognosis.^{1,2,3,4}

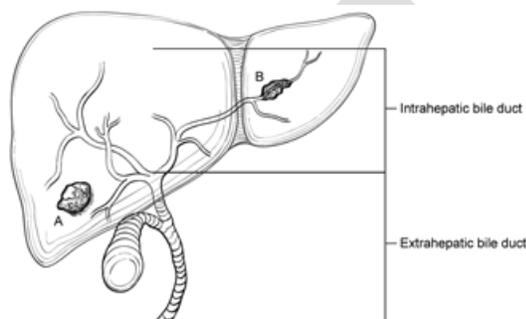


Figure 2. Tumor growth pattern in intrahepatic cholangiocarcinoma. From Amin MB et al.⁵ Used with permission of the American Joint Committee on Cancer (AJCC), Chicago, Illinois. The original source for this material is the *AJCC Cancer Staging Manual*, 8th edition (2017), published by Springer Science and Business Media LLC, www.springerlink.com.

References

1. Hirohashi K, Uenishi T, Kubo S, et al. Macroscopic types of intrahepatic cholangiocarcinoma: clinicopathologic features and surgical outcomes. *Hepatogastroenterology*. 2002;49(44):326-329.
2. Shimada K, Sano T, Sakamoto Y, Esaki M, Kosuge T, Ojima H. Surgical outcomes of the mass-forming plus periductal infiltrating types of intrahepatic cholangiocarcinoma: a comparative study with the typical mass-forming type of intrahepatic cholangiocarcinoma. *World J Surg*. 2007;31(10):2016-2022.
3. Imai K, Yamamoto M, Ariizumi S. Surgery for periductal infiltrating type intrahepatic cholangiocarcinoma without hilar invasion provides a better outcome than for mass-forming type

intrahepatic cholangiocarcinoma without hilar invasion. *Hepatogastroenterology*. 2010;57(104):1333-1336.

4. Uno M, Shimada K, Yamamoto Y, et al. Periductal infiltrating type of intrahepatic cholangiocarcinoma: a rare macroscopic type without any apparent mass. *Surg Today*. 2012;42(12):1189-1194.
5. Amin MB, Edge SB, Greene FL, et al, eds. *AJCC Cancer Staging Manual*. 8th ed. New York, NY: Springer; 2017.

F. Margins

The evaluation of margins for total or partial hepatectomy specimens depends on the method and extent of resection. It is recommended that the surgeon be consulted to determine the critical foci within the margins that require microscopic evaluation. The transection margin of a partial hepatectomy may be large, rendering it impractical for complete examination. In this setting, grossly positive margins should be microscopically confirmed and documented. If the margins are grossly free of tumor, judicious sampling of the cut surface in the region closest to the nearest identified tumor nodule is indicated. In selected cases, adequate random sampling of the cut surface may be sufficient. The histologic examination of the bile ducts at the cut margin is recommended to evaluate the lining epithelium for in situ carcinoma or dysplasia. If the neoplasm is found near the surgical margin, the distance from the margin should be reported. For multiple tumors, the distance from the nearest tumor should be reported.

G. Pathologic Stage Classification

According to AJCC/UICC convention, the designation “T” refers to a primary tumor that has not been previously treated. The symbol “p” refers to the pathologic classification of the TNM, as opposed to the clinical classification, and is based on gross and microscopic examination. pT entails a resection of the primary tumor or biopsy adequate to evaluate the highest pT category, pN entails removal of nodes adequate to validate lymph node metastasis, and pM implies microscopic examination of distant lesions. Clinical classification (cTNM) is usually carried out by the referring physician before treatment during initial evaluation of the patient or when pathologic classification is not possible.

Pathologic staging is usually performed after surgical resection of the primary tumor. Pathologic staging depends on pathologic documentation of the anatomic extent of disease, whether or not the primary tumor has been completely removed. If a biopsied tumor is not resected for any reason (eg, when technically infeasible) and if the highest T and N categories or the M1 category of the tumor can be confirmed microscopically, the criteria for pathologic classification and staging have been satisfied without total removal of the primary cancer.

TNM Descriptors

For identification of special cases of TNM or pTNM classifications, the “m” suffix and “y,” “r,” and “a” prefixes are used. Although they do not affect the stage grouping, they indicate cases needing separate analysis.

The “m” suffix indicates the presence of multiple primary tumors in a single site and is recorded in parentheses: pT(m)NM.

The “y” prefix indicates those cases in which classification is performed during or after initial multimodality therapy (ie, neoadjuvant chemotherapy, radiation therapy, or both chemotherapy and radiation therapy). The cTNM or pTNM category is identified by a “y” prefix. The ycTNM or ypTNM categorizes the extent of tumor actually present at the time of that examination. The “y” categorization is not an estimate of tumor before multimodality therapy (ie, before initiation of neoadjuvant therapy).

The “r” prefix indicates a recurrent tumor when staged after a documented disease-free interval and is identified by the “r” prefix: rTNM.

The “a” prefix designates the stage determined at autopsy: aTNM.

T Category Considerations

T includes high-grade biliary intraepithelial neoplasia (BillN-3), intraductal papillary neoplasm with high-grade dysplasia, and mucinous cystic neoplasm with high-grade dysplasia. For intraepithelial lesions, a 3-tier biliary intraepithelial neoplasia classification has been proposed.¹

The T categories are based on size, vascular invasion and extrahepatic spread. For invasive carcinoma associated with intraductal papillary neoplasms and mucinous cystic neoplasms, only the size of the invasive component should be used to determine the T category. The synoptic report is not required for intraductal papillary neoplasms and mucinous cystic neoplasms in the absence of an invasive component. For invasive carcinoma associated with intraductal papillary neoplasms and mucinous cystic neoplasms, only the size of the invasive component should be used to determine the T category. The invasive portion in these cases can be multifocal. The size of the largest focus as well as cumulative size of all invasive carcinoma foci should be included in the report. Till further data becomes available, the T category should be determined based on size of the largest invasive focus. Vascular invasion includes either gross or microscopic involvement of vessels. Major vascular invasion is defined as invasion of the branches of the main portal vein or hepatic artery (first and second order branches) or as invasion of 1 or more of the 3 hepatic veins (right, middle or left).

Direct invasion of visceral peritoneum is considered as T3, while adjacent organs, including colon, duodenum, stomach, common bile duct, portal lymph nodes, abdominal wall, and diaphragm, is considered as T4 disease. Due to inconsistent criteria for defining tumors with periductal growth pattern and its unclear association with outcome, this growth pattern is no longer a part of the T classification.

Additional Descriptors

Lymphovascular Invasion Lymphovascular invasion (LVI) indicates whether microscopic lymphovascular invasion is identified in the pathology report. LVI includes lymphatic invasion, vascular invasion, or lymphovascular invasion.

References

1. Zen Y, Adsay NV, Bardadin K, et al. Biliary intraepithelial neoplasia: an international interobserver agreement study and proposal for diagnostic criteria. *Mod Pathol.* 2007;20(6):701-709.

H. Lymph Nodes

Lymph node metastases have consistently been identified as an important predictor of outcome for intrahepatic cholangiocarcinoma.^{1,2,3}

The lymph node involvement pattern for intrahepatic cholangiocarcinomas varies with location in the liver (Figure 3). For carcinomas arising in the right lobe of the liver (segments 5-8), the regional lymph nodes include the hilar (common bile duct, hepatic artery, portal vein, and cystic duct), periduodenal, and peripancreatic lymph nodes. For tumors arising in the left lobe, the regional lymph nodes are the hilar, inferior phrenic and gastrohepatic lymph nodes. Nodal involvement of the celiac, periaortic, or pericaval lymph nodes is considered to be distant metastasis (pM1).¹

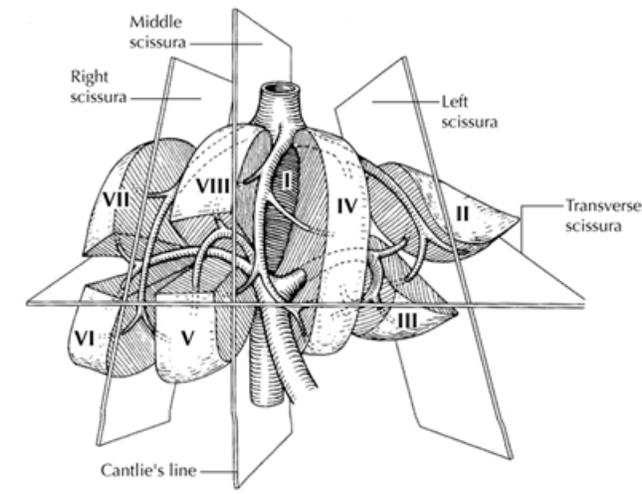


Figure 3. Segmental anatomy of the liver. From Greene et al.⁴ Used with permission of the American Joint Committee on Cancer (AJCC), Chicago, Illinois. The original source for this material is the *AJCC Cancer Staging Atlas* (2006) published by Springer Science and Business Media LLC, www.springerlink.com

References

1. Amin MB, Edge SB, Greene FL, et al, eds. *AJCC Cancer Staging Manual*. 8th ed. New York, NY: Springer; 2017.
2. Ohtsuka M, Ito H, Kimura F, et al. Results of surgical treatment for intrahepatic cholangiocarcinoma and clinicopathological factors influencing survival. *Br J Surg*. 2002;89(12):1525-1531.
3. Mavros MN, Economopoulos KP, Alexiou VG and Pawlik TM (2014). Treatment and prognosis for patients with intrahepatic cholangiocarcinoma: systematic review and meta-analysis. *JAMA Surg*. 149(6):565-574.
4. Greene FL, Compton, CC, Fritz AG, et al, eds. *AJCC Cancer Staging Atlas*. New York, NY: Springer; 2006.

I. Additional Findings

The extent of fibrosis should be reported as cirrhosis or advanced fibrosis have an adverse effect on outcome. The scoring system described by Ishak¹ is recommended by the *AJCC Cancer Staging Manual*, 8th edition,² but other commonly used schemes (Batts-Ludwig, Metavir) can be used. The name of the staging scheme and its scale should be included.

The presence of underlying disease, such as primary sclerosing cholangitis,³ should be included in the pathology report. Biliary parasites and recurrent pyogenic cholangitis may be present along with cholangiocarcinoma in Asian countries. Hepatitis C infection, nonalcoholic fatty liver disease, obesity, and smoking are also risk factors for cholangiocarcinoma.^{4,5}

References

1. Ishak K, Baptista A, Bianchi L, et al. Histologic grading and staging of chronic hepatitis. *J Hepatol*. 1995;22:696-699.
2. Amin MB, Edge SB, Greene FL, et al, eds. *AJCC Cancer Staging Manual*. 8th ed. New York, NY: Springer; 2017.
3. Shaib Y, El-Serag HB. The epidemiology of cholangiocarcinoma. *Semin Liver Dis*. 2004;24(2):115-125.

4. Welzel TM, Graubard BI, El-Serag HB, et al. Risk factors for intrahepatic and extrahepatic cholangiocarcinoma in the United States: a population-based case-control study. *Clin Gastroenterol Hepatol.* 2007;5(10):1221-1228.
5. Ben-Menachem T. Risk factors for cholangiocarcinoma [comment]. *Eur J Gastroenterol Hepatol.* 2007;19(8):615-617.

RETIRED