



# Clinical staging

- Inspection and palpation of the thyroid gland and lymph nodes
- Indirect laryngoscopy to evaluate vocal cord motion
- Radioisotope thyroid scan, CT, MRI, and US for imaging studies
- Needle or open biopsy of the tumor for definite diagnosis



# Pathologic staging

- All available clinical data are combined with pathologic study of the surgically resected specimen for pathologic staging.
- The surgeon's evaluation of gross unresected residual tumor must be included.



# Definition of TNM

- Primary tumor (T)
- Regional lymph nodes (N)
- Distant metastasis (M)



# Primary tumor (T)

- Tx Primary tumor cannot be assessed
- T0 No evidence of primary tumor
- T1 Tumor  $\leq 1$ cm, limited to the thyroid
- T2  $1\text{cm} < \text{tumor} \leq 4\text{cm}$ , limited to the thyroid
- T3 Tumor  $\geq 4\text{cm}$ , limited to the thyroid
- T4 Any size, extending beyond the thyroid



# Regional lymph nodes (N)

- Nx Regional lymph nodes cannot be assessed
- N0 No regional lymph nodes metastasis
- N1 Regional lymph node metastasis
  - N1a ipsilateral cervical lymph nodes
  - N1b bilateral, midline, or contralateral cervical or mediastinal lymph nodes



# Distant metastasis (M)

- Mx Distant metastasis cannot be assessed
- M0 No distant metastasis
- M1 Distant metastasis



# Histopathologic type

- For major types:
  - papillary carcinoma
  - follicular carcinoma
  - medullary carcinoma
  - anaplastic carcinoma

# Papillary or Follicular CA

	< 45y/o	≥ 45y/o
Stage I	T <sub>x</sub> N <sub>x</sub> M <sub>0</sub>	T <sub>1</sub> N <sub>0</sub> M <sub>0</sub>
Stage II	T <sub>x</sub> N <sub>x</sub> M <sub>1</sub>	T <sub>2</sub> N <sub>0</sub> M <sub>0</sub> T <sub>3</sub> N <sub>0</sub> M <sub>0</sub>
Stage III		T <sub>4</sub> N <sub>0</sub> M <sub>0</sub> T <sub>x</sub> N <sub>1</sub> M <sub>0</sub>
Stage IV		T <sub>x</sub> N <sub>x</sub> M <sub>1</sub>



# Medullary CA

Stage I	T1N0M0
stage II	T2N0M0 T3N0M0 T4N0M0
Stage III	TxN1M0
Stage IV	TxNxM1



# Anaplastic CA

- All cases are stage IV

# Cancer staging

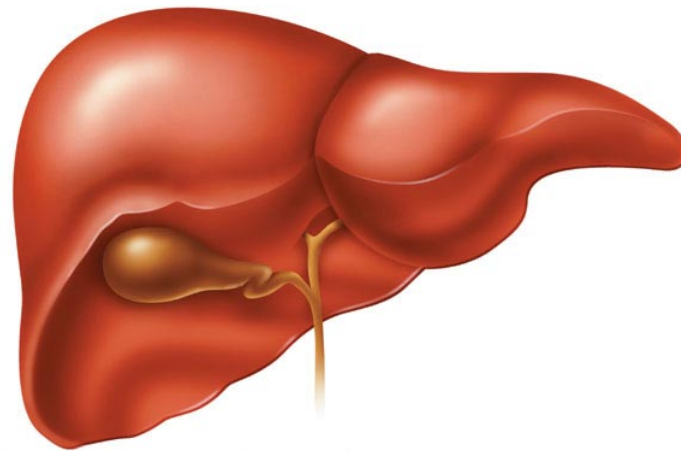


Hepatobiliary system

presented by Intern 廖伯豪

# Liver

(including intrahepatic bile ducts)





# Rules for classification

- T staging is based on tumor number, tumor size, and vascular invasion
- TNM systems does not consider etiologic mechanisms
- Vascular invasion includes either gross or histologic involvement of vessels
- Imaging of the liver is important for staging



# Clinical staging

- Imaging study for tumor size and vascular invasion
- Surgical exploration is usually not carried out due to low possibility of complete resection of the tumor

# TNM staging system





# Primary tumor (T)

- TX primary tumor cannot be assessed
- T0 no evidence of primary tumor
- T1 solitary tumor  $\leq 2\text{cm}$  without vascular invasion
- T2
  - solitary tumor  $\leq 2\text{cm}$  with vascular invasion, or
  - multiple tumors  $\leq 2\text{cm}$  limited to one lobe without vascular invasion, or
  - solitary tumor  $> 2\text{cm}$  without vascular invasion





# Primary tumor (T)

## ■ T3

- solitary tumor  $> 2\text{cm}$  with vascular invasion, or
- multiple tumors  $\leq 2\text{cm}$  limited to one lobe with vascular invasion, or
- multiple tumor  $> 2\text{cm}$  limited to one lobe with or without vascular invasion

## ■ T4

- multiple tumors in more than one lobe or
- tumors involve portal or hepatic veins or invasion of adjacent organs other than gallbladder or perforation of visceral peritoneum



# Regional lymph nodes (N)

- Nx regional lymph nodes cannot be assessed
- N0 no regional lymph node metastasis
- N1 regional lymph node metastasis



# Distant metastasis (M)

- Mx distant metastasis cannot be assessed
- M0 no distant metastasis
- M1 distant metastasis

# Stage group

Stage I	T1N0M0
Stage II	T2N0M0
Stage III A	T3N0M0
Stage III B	T1-3N1M0
Stage IV A	T4N <sub>x</sub> M0
Stage IV B	T <sub>x</sub> N <sub>x</sub> M1



# Histopathologic type

- Hepatocellular carcinoma
- Cholangiocarcinoma
- Bile duct cystadenocarcinoma
- Mixed type



# Histologic grade (G)

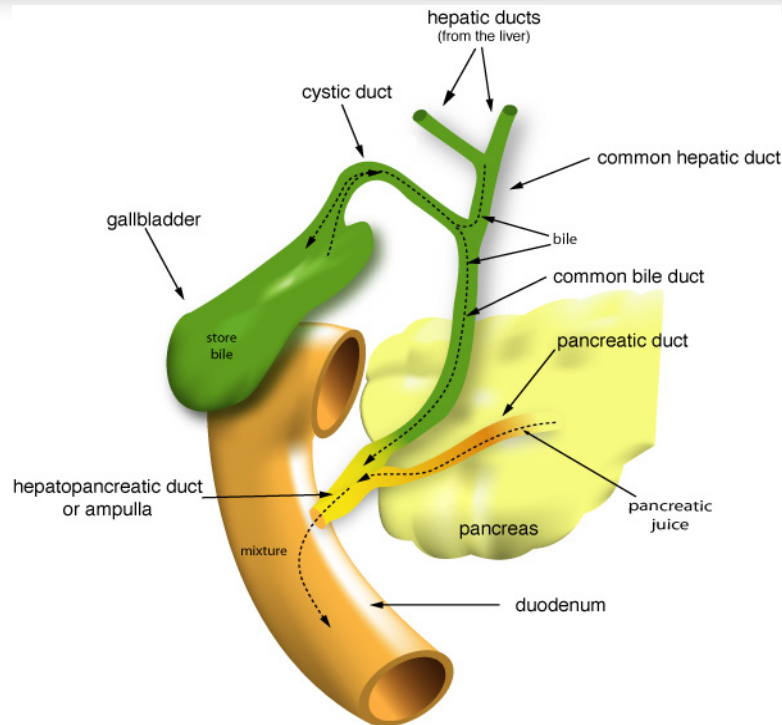
- Gx grade cannot be assessed
- G1 well differentiated
- G2 moderately differentiated
- G3 poorly differentiated
- G4 undifferentiated



# Prognostic factors

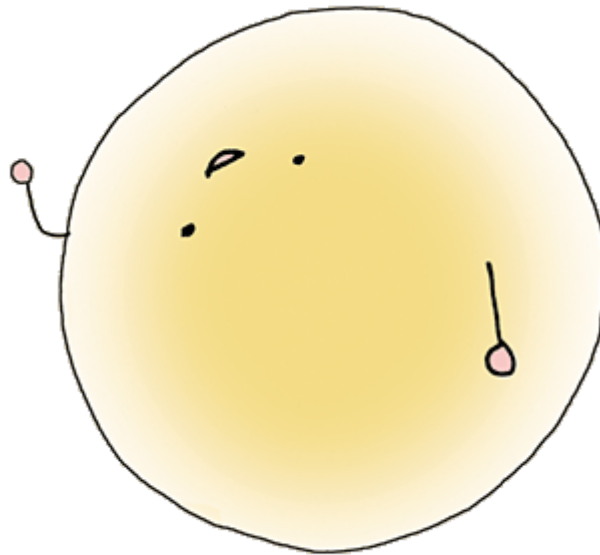
- Preceding liver disease, such as cirrhosis and invasion of portal vein
- positive surgical margins
- portal involvement
- tumor number in the liver
- serum  $\alpha$ -fetoprotein level

# Extrahepatic bile ducts





# TNM staging system





# Primary tumor (T)

- Tx primary tumor cannot be assessed
- T0 no evidence of primary tumor
- Tis carcinoma in situ
- T1
  - T1a subepithelial connective tissue (+)
  - T1b fibromuscular layer (+)
- T2 perifibromuscular connective tissue (+)
- T3 adjacent structures (+): liver, pancreas, duodenum, GB, colon, stomach



# Regional lymph nodes (N)

- Nx regional lymph node cannot be assessed
- N0 no regional lymph node metastasis
- N1
  - cystic duct, pericholedochal or hilar lymph nodes (+)
- N2
  - peripancreatic (head only), periduodenal, periportal, celiac, or sup. Mesenteric or post. Pancreaticoduodenal lymph nodes (+)



# Distant metastasis (M)

- Mx distant metastasis cannot be assessed
- M0 no distant metastasis
- M1 distant metastasis

# Stage grouping

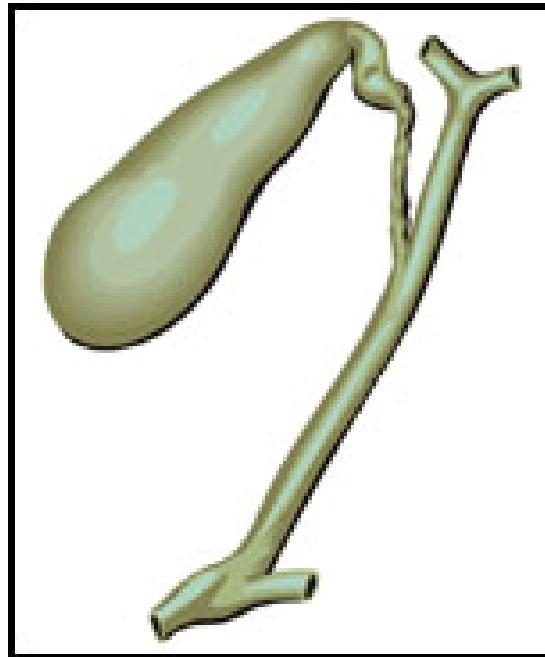
Stage0	T <sub>is</sub> N <sub>0</sub> M <sub>0</sub>
Stage I	T <sub>1</sub> N <sub>0</sub> M <sub>0</sub>
Stage II	T <sub>2</sub> N <sub>0</sub> M <sub>0</sub>
Stage III	T <sub>1-2</sub> N <sub>1-2</sub> M <sub>0</sub>
StageIV <sub>A</sub>	T <sub>3</sub> N <sub>x</sub> M <sub>0</sub>
StageIV <sub>B</sub>	T <sub>x</sub> N <sub>x</sub> M <sub>1</sub>



# Prognostic factors

- Histologic type, histologic grade, blood vessel or lymphatic vessel invasion, and perineural invasion as prognostic factors
- Papillary carcinoma have a more favorable prognosis
- Involvement of surgical margins should be considered an important prognostic factor

# Gallbladder





# Rules for classification

- T staging depends on the depth of tumor penetration into GB wall, hepatic invasion, and the involvement of adjacent organs
- The liver is not considered a metastatic site
- Tumor confined to the GB is classified as T1 or T2
- Lymph nodes must be specifically identified to separate N1 from N2



# TNM staging system





# Primary tumor (T)

- TX primary tumor cannot be assessed
- T0 no evidence of primary tumor
- Tis carcinoma in situ
- T1 tumor invades lamina propria or muscle layer
  - T1a lamina propria
  - T1b muscle layer
- T2
  - tumor invades perimuscular connective tissue; no extension beyond serosa or into liver



# Primary tumor (T)

## ■ T3

- tumor perforates serosa(visceral peritoneum) or
- directly invades one adjacent organ, or both (extension into liver  $\leq 2\text{cm}$ )

## ■ T4

- tumor  $> 2\text{cm}$  extends into liver or
- $\geq 2$  involvement of adjacent organs (stomach, duodenum, colon, pancreas, omentum, extrahepatic bile ducts, any involvement of liver)



# Regional lymph nodes (N)

- Nx regional lymph node cannot be assessed
- N0 no regional lymph node metastasis
- N1
  - metastasis in cystic duct, pericholedochal, or hilar lymph nodes
- N2
  - metastasis in peripancreatic (head only), periduodenal, periportal, celiac, or superior mesenteric lymph nodes



# Distant metastasis (M)

- Mx distant metastasis cannot be assessed
- M0 no distant metastasis
- M1 distant metastasis

# Stage grouping

Stage0	T <sub>is</sub> N <sub>0</sub> M <sub>0</sub>
Stage I	T <sub>1</sub> N <sub>0</sub> M <sub>0</sub>
Stage II	T <sub>2</sub> N <sub>0</sub> M <sub>0</sub>
Stage III	T <sub>1-2</sub> N <sub>1</sub> M <sub>0</sub> T <sub>3</sub> N <sub>0-1</sub> M <sub>0</sub>
Stage IV <sub>A</sub>	T <sub>4</sub> N <sub>0-1</sub> M <sub>0</sub>
Stage IV <sub>B</sub>	T <sub>x</sub> N <sub>2</sub> M <sub>0</sub> T <sub>x</sub> N <sub>x</sub> M <sub>1</sub>



# Histopathologic type

- Adenocarcinoma (98%)
- carcinoma in situ
- papillary carcinoma
- adenocarcinoma, intestinal type
- clear cell adenocarcinoma
- mucinous carcinoma
- signet ring cell carcinoma
- Squamous cell carcinoma
- adenosquamous carcinoma
- small cell carcinoma
- undifferentiated carcinoma
- carcinosarcoma
- other (specify)



# Histologic grade (G)

- Gx grade cannot be assessed
- G1 well differentiated
- G2 moderately differentiated
- G3 poorly differentiated
- G4 undifferentiated

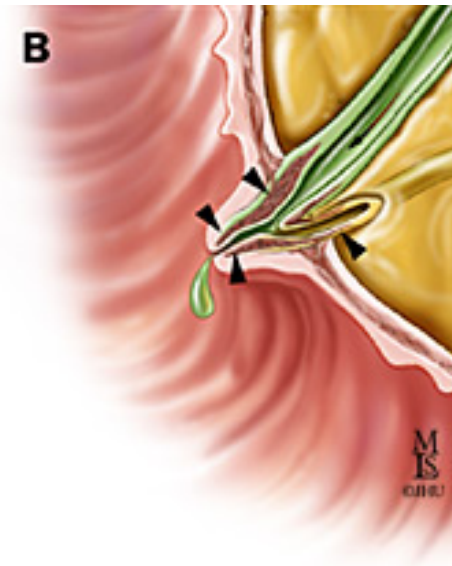
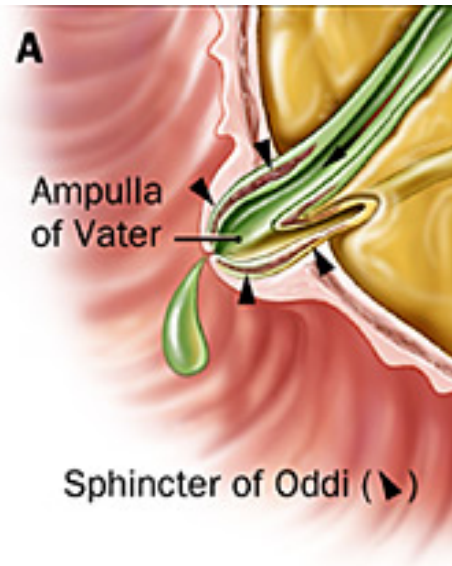




# Prognostic factors

- Histologic type, histologic grade, and vascular invasion
- papillary carcinoma: most favorable prognosis
- unfavorable prognosis: small cell carcinoma and undifferentiated carcinoma
- lymphatic or vascular invasion

# Ampulla of Vater





# Rules for classification

- T staging depends on extension of primary tumor through the ampulla or sphincter of Oddi into duodenal wall or beyond pancreatic head or contiguous soft tissue
- The extent of invasion in “cm” to separate T3 from T4



# Rules for classification

- For T4, adjacent organs include extrahepatic bile ducts and soft tissue
- EUS and CT are effective in pre-operative staging and in evaluating resectability of ampullary carcinoma

# TNM staging system





# Primary tumor (T)

- Tx primary tumor cannot be assessed
- T0 no evidence of primary tumor
- Tis carcinoma in situ
- T1
  - tumor limited to ampulla of Vater or sphincter of Oddi
- T2 duodenal invasion
- T3 pancreatic invasion  $\leq 2\text{cm}$
- T4
  - pancreatic invasion  $> 2\text{cm}$  or invasion of other adjacent organs



# Regional lymph nodes (N)

- Nx regional lymph nodes cannot be assessed
- N0 no regional lymph node metastasis
- N1 regional lymph node metastasis



# Distant metastasis (M)

- Mx distant metastasis cannot be assessed
- M0 no distant metastasis
- M1 distant metastasis



# Stage grouping

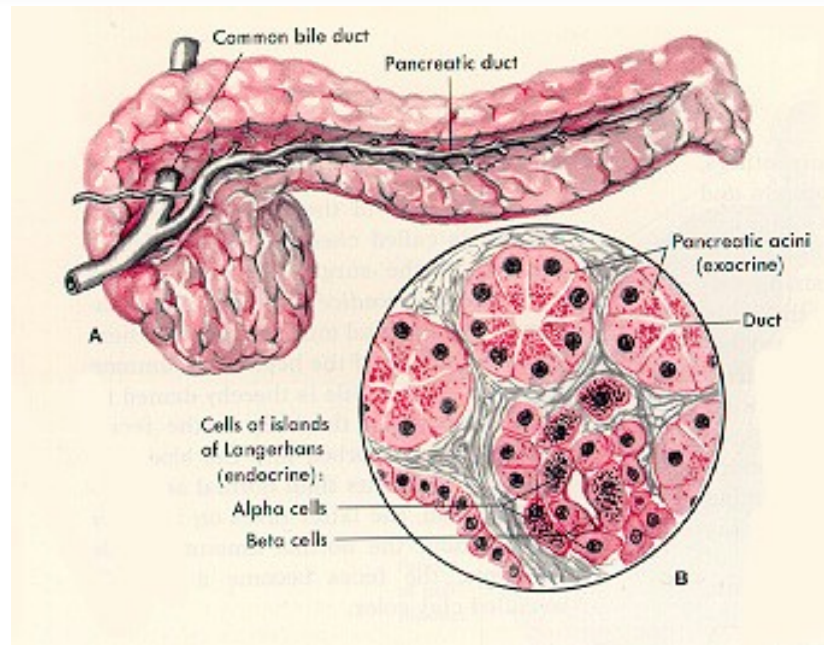
Stage0	T <sub>is</sub> N <sub>0</sub> M <sub>0</sub>
Stage I	T <sub>1</sub> N <sub>0</sub> M <sub>0</sub>
Stage II	T <sub>2-3</sub> N <sub>0</sub> M <sub>0</sub>
Stage III	T <sub>1-3</sub> N <sub>1</sub> M <sub>0</sub>
Stage IV	T <sub>4</sub> N <sub>x</sub> M <sub>0</sub> T <sub>x</sub> N <sub>x</sub> M <sub>1</sub>



# Prognostic factors

- Though tumor size is not part of TNM system, it has prognostic significance
- perineural invasion, ulceration, local extension, and histologic grade
- papillary tumors have a better outcome

# Exocrine pancreas





# Rules for classification

- Imaging studies such as US and CT with cytology and ERCP
- Laparotomy and surgical exploration with biopsy for tumor staging
- Pathologic staging is often based on Whipple procedure
- Extension to liver or peritoneum is defined as M1



# Rules for classification

- Peripancreatic tissues include surrounding retroperitoneal fat, mesentery, mesocolon, greater/lesser omentum, and peritoneum
- Direct invasion of ampulla of Vater should be classified as T3
- For T4, adjacent large vessels include celiac a., SMA, common hepatic a., portal v., SMV, and hepatic v., but not splenic vessels

# TNM staging system



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deguri.com



# Primary tumor (T)

- Tx primary tumor cannot be assessed
- T0 no evidence of primary tumor
- Tis in situ carcinoma
- T1 tumor limited to pancreas  $\leq 2\text{cm}$
- T2 tumor limited to pancreas  $> 2\text{cm}$
- T3 tumor extends into duodenum, bile duct, peripancreatic tissues
- T4 tumor extends into stomach, spleen, colon, adjacent large vessels



# Regional lymph nodes (N)

- Nx regional lymph nodes cannot be assessed
- N0 no regional lymph node metastasis
- N1 regional lymph node metastasis
  - pN1a metastasis in a single regional lymph node
  - pN1b metastasis in a multiple regional lymph node





# Distant metastasis (M)

- Mx distant metastasis cannot be assessed
- M0 no distant metastasis
- M1 distant metastasis

# Stage grouping

Stage0	T <sub>1</sub> S <sub>1</sub> N <sub>0</sub> M <sub>0</sub>
Stage I	T <sub>1</sub> -2N <sub>0</sub> M <sub>0</sub>
Stage II	T <sub>3</sub> N <sub>0</sub> M <sub>0</sub>
Stage III	T <sub>1</sub> -3N <sub>1</sub> M <sub>0</sub>
StageIV <sub>A</sub>	T <sub>4</sub> N <sub>x</sub> M <sub>0</sub>
StageIV <sub>B</sub>	T <sub>x</sub> N <sub>x</sub> M <sub>1</sub>



# Histopathologic type

- Carcinoma in situ
- ductal adenocarcinoma
- mucinous noncystic carcinoma
- signet ring cell carcinoma
- adenosquamous carcinoma
- anaplastic carcinoma
- mixed ductal-endocrine carcinoma
- Osteoclast-like giant cell tumor
- serous cystadenocarcinoma
- mucinous cystadenocarcinoma
- acinar cell carcinoma
- pancreaticoblastoma
- other
- borderline tumors



# Prognostic factors

- Histologic grade, lymphatic vessel invasion, perineural invasion, and capsular infiltration as adverse prognostic factors

Thanks for your attention !

