CARCINOMA OF THE LIVER AND PANCREAS

Epidemiology

Liver cancer is the sixth most common cancer worldwide in terms of numbers of cases (626,000 or 5.7% of new cancer cases) but because of the very poor prognosis, the number of deaths is almost the same (598,000). It is therefore the third most common cause of death from cancer. Survival rates are 3% to 5% in cancer registries for the United States and developing countries.

CARCINOMA OF THE LIVER

CARCINOMA OF THE LIVER

HEPATOCELLUAR CARCINOMA

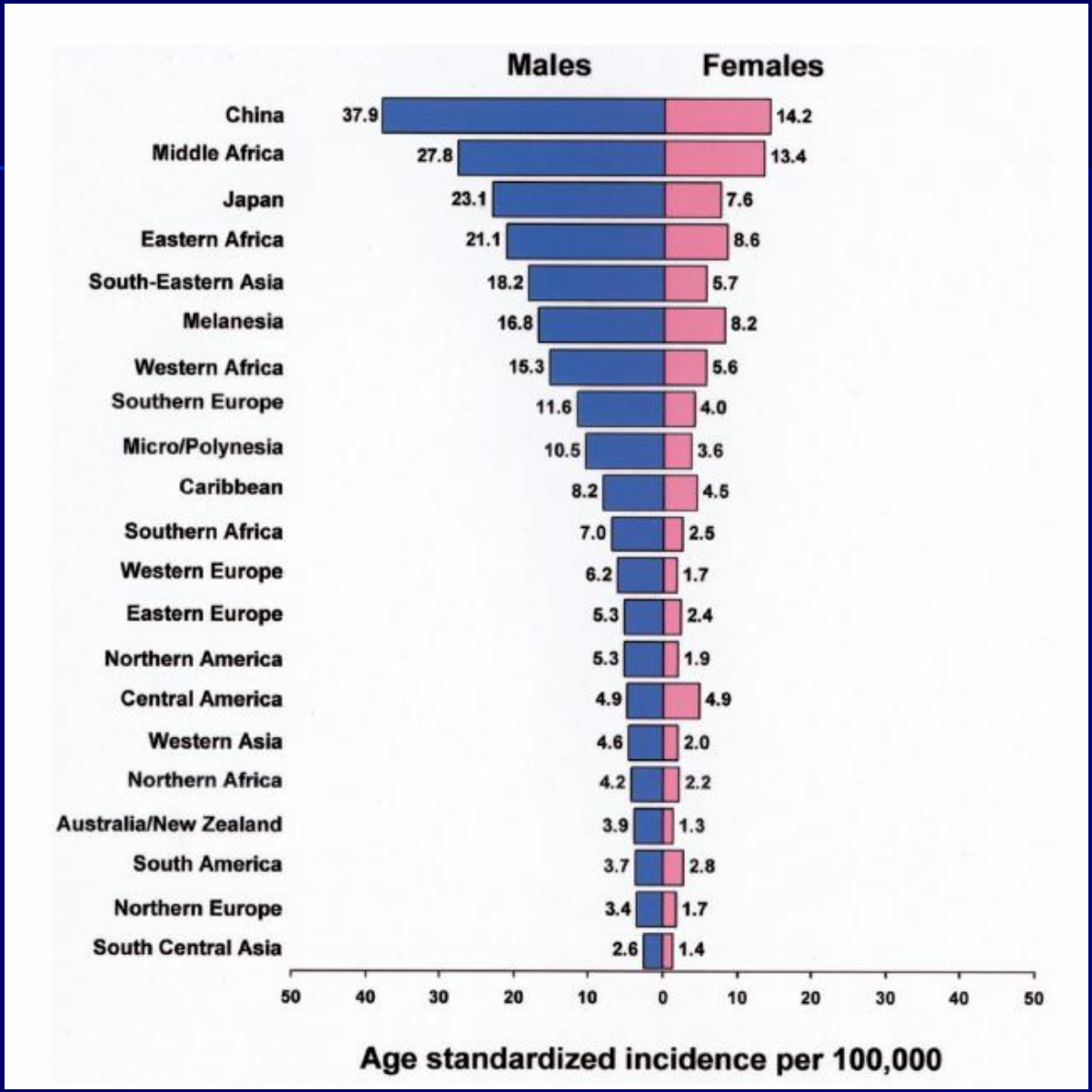
CHOLANGIO-CARCINOMA

Metastatic carcinoma

Epidemiology

Worldwide, the major risk factors for liver cancer are infection with the hepatitis B and C viruses, both of which increase the risk of liver cancer some 20-fold. Because hepatitis B virus (HBV) is more prevalent, the distribution of infection worldwide largely explains the patterns of liver cancer. The exception is Japan, where chronic infection with HBV is low, but where the generations most at risk of liver cancer have a relatively high rate of infection with hepatitis C virus. More than 75% of cases worldwide, and 85% of cases in developing countries, are caused by these two viruses.

Epidemiology



Epidemiology

TABLE 1 Incidence and Mortality by Sex and Cancer Site Worldwide, 2002

	INCIDENCE						MORTALITY					
	MALES			FEMALES			MALES			FEMALES		
	Cases	ASR (World)	Cumulative risk (age 0–64)	Cases	ASR (World)	Cumulative risk (age 0–64)	Deaths	ASR (World)	Cumulative risk (age 0–64)	Deaths	ASR (World)	Cumulative risk (age 0–64)
Oral cavity	175,916	6.3	0.4	98,373	3.2	0.2	80,736	2.9	0.2	46,723	1.5	0.1
Nasopharynx	55,796	1.9	0.1	24,247	0.8	0.1	34,913	1.2	0.1	15,419	0.5	0.0
Other pharynx	106,219	3.8	0.3	24,077	0.8	0.1	67,964	2.5	0.2	16,029	0.5	0.0
Esophagus	315,394	11.5	0.6	146,723	4.7	0.3	261,162	9.6	0.5	124,730	3.9	0.2
Stomach	603,419	22	1.2	330,518	10.3	0.5	446,052	16.3	0.8	254,297	7.9	0.4
Colon/rectum	550,465	20.1	0.9	472,687	14.6	0.7	278,446	10.2	0.4	250,532	7.6	0.3
Liver	442,119	15.7	1.0	184,043	5.8	0.3	416,882	14.9	0.9	181,439	5.7	0.3
Pancreas	124,841	4.6	0.2	107,465	3.3	0.1	119,544	4.4	0.2	107,479	3.3	0.1
Larynx	139,230	5.1	0.3	20,011	0.6	0	78,629	2.9	0.2	11,327	0.4	0.0
Lung	965,241	35.5	1.7	386,891	12.1	0.6	848,132	31.2	1.4	330,786	10.3	0.5
Melanoma of skin	79,043	2.8	0.2	81,134	2.6	0.2	21,952	0.8	0.0	18,829	0.6	0.0
Kaposi sarcoma*												
Breast				1,151,298	37.4	2.6				410,712	13.2	0.9
Cervix uteri				493,243	16.2	1.3				273,505	9.0	0.7
Corpus uteri				198,783	6.5	0.4				50,327	1.6	0.1
Ovary				204,499	6.6	0.5				124,860	4.0	0.2
Prostate	679,023	25.3	0.8				221,002	8.2	0.1			
Testis	48,613	1.5	0.1				8,878	0.3	0.0			
Kidney	129,223	4.7	0.3	79,257	2.5	0.1	62,696	2.3	0.1	39,199	1.2	0.1
Bladder	273,858	10.1	0.4	82,699	2.5	0.1	108,310	4.0	0.1	36,699	1.1	0.0
Brain, nervous system	108,221	3.7	0.2	81,264	2.6	0.2	80,034	2.8	0.2	61,616	2.0	0.1
Thyroid	37,424	1.3	0.1	103,589	3.3	0.2	11,297	0.4	0.0	24,078	0.8	0.0
Non-Hodgkin lymphoma	175,123	6.1	0.3	125,448	3.9	0.2	98,865	3.5	0.2	72,955	2.3	0.1
Hodgkin disease	38,218	1.2	0.1	24,111	0.8	0.1	14,460	0.5	0.0	8,352	0.3	0.0
Multiple myeloma	46,512	1.7	0.1	39,192	1.2	0.1	32,696	1.2	0.1	29,839	0.9	0.0
Leukemia	171,037	5.9	0.3	129,485	4.1	0.2	125,142	4.3	0.2	97,364	3.1	0.2
All sites but skin	5,801,839	209.6	10.3	5,060,657	161.5	9.5	3,795,991	137.7	6.4	2,927,896	92.1	4.9

*Africa only.

Cancer statistic

TABLE 2 Estimated Age-adjusted Survival (%) from 11 Cancer Types, by Country/Area

	DEVELOPED AREAS					DEVELOPING AREAS				
	United States	Eastern Europe	Western Europe	Japan	All developed areas	South America	India	Thailand	Sub-Saharan Africa	All developing areas
Esophagus (male)	14	6	18	25	15	7	13	13	4	17
Esophagus (female)	8	2	14	15	8	5	14	10	5	16
Stomach (male)	44	15	30	54	35	25	14	12	7	21
Stomach (female)	33	16	24	51	31	24	14	14	5	20
Colon/rectum (male)	66	35	56	65	56	50	28	37	13	39
Colon/rectum (female)	65	36	53	58	54	50	31	37	14	39
Liver (male)	20	≈0	≈0	9	6	≈0	4	3	2	5
Liver (female)	0	≈0	≈0	12	0	≈0	9	3	1	3
Lung (male)	21	9	9	15	13	8	12	5	4	12
Lung (female)	26	10	14	22	20	1	11	5	5	12
Kaposi sarcoma (male)									11	
Kaposi sarcoma (female)									12	
Breast	81	58	74	75	73	67	46	62	32	57
Cervix uteri	70	51	66	65	61	55	42	58	21	41
Corpus uteri	89	69	83	79	82	70	59	67	61	67
Prostate	87	44	72	55	76	62	35	36	21	45
Leukemia (male)	43	29	43	25	40	24	19	15	14	19
Leukemia (female)	45	29	45	29	39	24	19	15	17	19

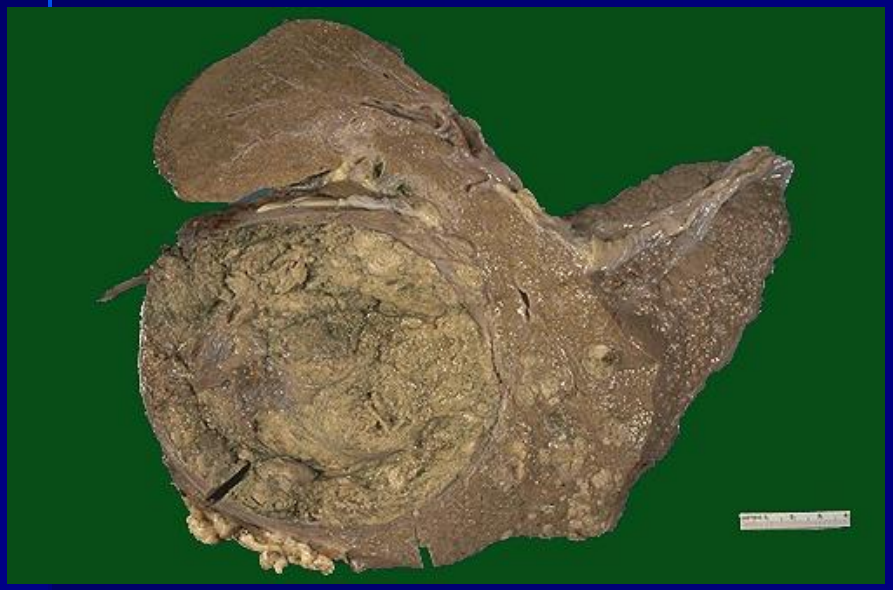
Hepatocellular carcinoma
Overview, Causes, & Risk Factors

- Hepatocellular carcinoma accounts for most liver cancers. This type of cancer occurs more often in men than women. It is usually seen in people ages 50 - 60.
- The disease is more common in parts of Africa and Asia than in North or South America and Europe.
- Hepatocellular carcinoma is not the same as metastatic liver cancerHepatocellular carcinoma is not the same as metastatic liver cancer, which starts in another organ (such as the breast or colon) and spreads to the liver.
- In most cases, the cause of liver cancer is usually scarring of the liver (cirrhosisIn most cases, the cause of liver cancer is usually scarring of the liver (cirrhosis). Cirrhosis may be caused by:
- Alcohol abuse (the most common cause in the U.S.)
- Certain autoimmune diseasesCertain autoimmune diseases of the liver
- Diseases that cause long-term inflammation of the liver
- Hepatitis BHepatitis B or CHepatitis BHepatitis B or C virus infection
- Too much iron in the body (hemochromatosisToo much iron in the body (hemochromatosis)
- Patients with hepatitis B or C are at risk for liver cancer, even if they do not have cirrhosis.

Pathogenesis

Hepatocellular carcinoma, like any other cancer, develops when there is a mutation to the cellular machinery that causes the cell to replicate at a higher rate and/or results in the cell avoiding apoptosis Hepatocellular carcinoma, like any other cancer, develops when there is a mutation to the cellular machinery that causes the cell to replicate at a higher rate and/or results in the cell avoiding apoptosis. In particular, chronic infections of hepatitis B Hepatocellular carcinoma, like any other cancer, develops when there is a mutation to the cellular machinery that causes the cell to replicate at a higher rate and/or results in the cell avoiding apoptosis. In particular, chronic infections of hepatitis B and/or C Hepatocellular carcinoma, like any other cancer, develops when there is a mutation to the cellular machinery that causes the cell to replicate at a higher rate and/or results in the cell avoiding apoptosis. In particular, chronic infections of hepatitis B and/or C can aid the development of hepatocellular carcinoma by repeatedly causing the body's own immune system to attack the liver cells Hepatocellular carcinoma, like any other cancer, develops when there is a mutation to the cellular machinery that causes the cell to replicate at a higher rate and/or results in the cell avoiding apoptosis. In particular, chronic infections of hepatitis B and/or C can aid the development of hepatocellular carcinoma by repeatedly causing the body's own immune system to attack the liver cells, some of which are infected by the virus, others merely bystanders. While this constant cycle of damage followed by repair can lead to mistakes during repair which in turn lead to

Hepatocellular carcinoma

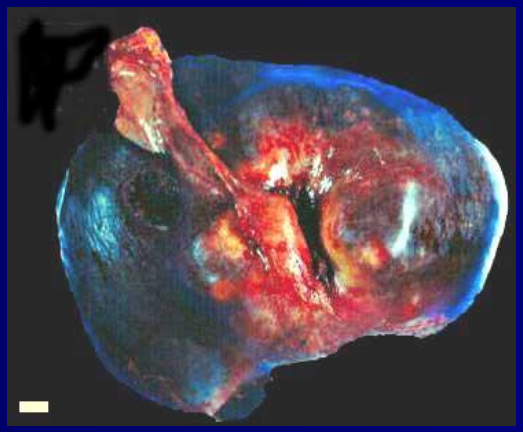


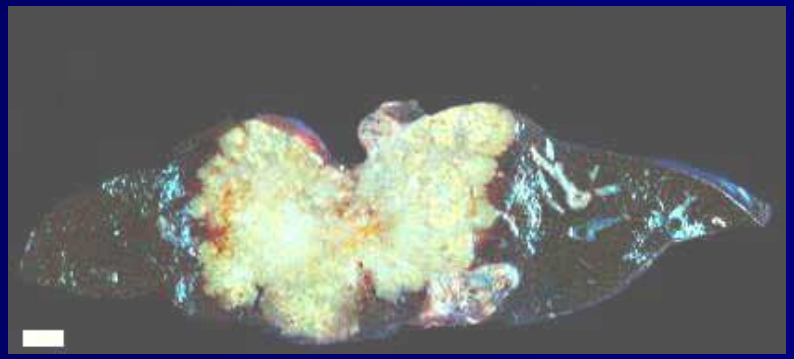
- Here is an hepatocellular carcinoma. Such liver cancers arise in the setting of cirrhosis. Worldwide, viral hepatitis is the most common cause, but in the U.S., chronic alcoholism is the most common cause. The neoplasm is large and bulky and has a greenish cast because it contains bile. To the right of the main mass are smaller satellite nodules.

Hepatocellular carcinoma

- Here is another hepatocellular carcinoma with a greenish yellow hue. One clue to the presence of such a neoplasm is an elevated serum alpha-fetoprotein. Such masses may also focally obstruct the biliary tract and lead to an elevated alkaline phosphatase.

CHOLANGIOCARCINOMA OF THE LIVER





- **Clinical summary: 29 year old female with 1 month history of epigastric pain and tenderness. CAT scan revealed a hepatic mass.**
- **<u>Figure legend:</u>**
- **Operative procedure: Resection of a segment of the liver.**
  Tumor location: Liver.
  Tumor size: 9.0 cm in largest diameter.
  Tumor characteristics: Well-circumscribed, tan to tan-yellow mass with foci of necrosis.

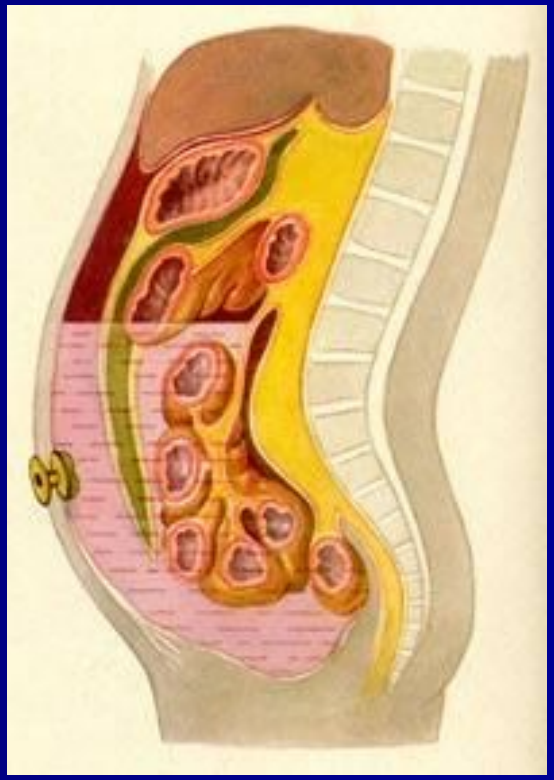
Metastatic adenocarcinoma, liver, gross

Here are liver metastases from an adenocarcinoma primary in the colon, one of the most common primary sites for metastatic adenocarcinoma to the liver.

Hepatocellular carcinoma

- **Early findings:**
  - **Anorexia**
  - **Vomiting**
  - **Right upper quadrant pain**
  - **Jaundice**
  - **Palpable abdominal mass**
  - **Weight loss**
  - **Hepatic bruit**
  - **Fever**
- **Rare findings:**
  - **Ascites**
  - **Tumor emboli**
  - **Hepatic or portal vein obstruction**
  - **Gynecomastia**
  - **Acquired porphyria**
  - **Feminization**

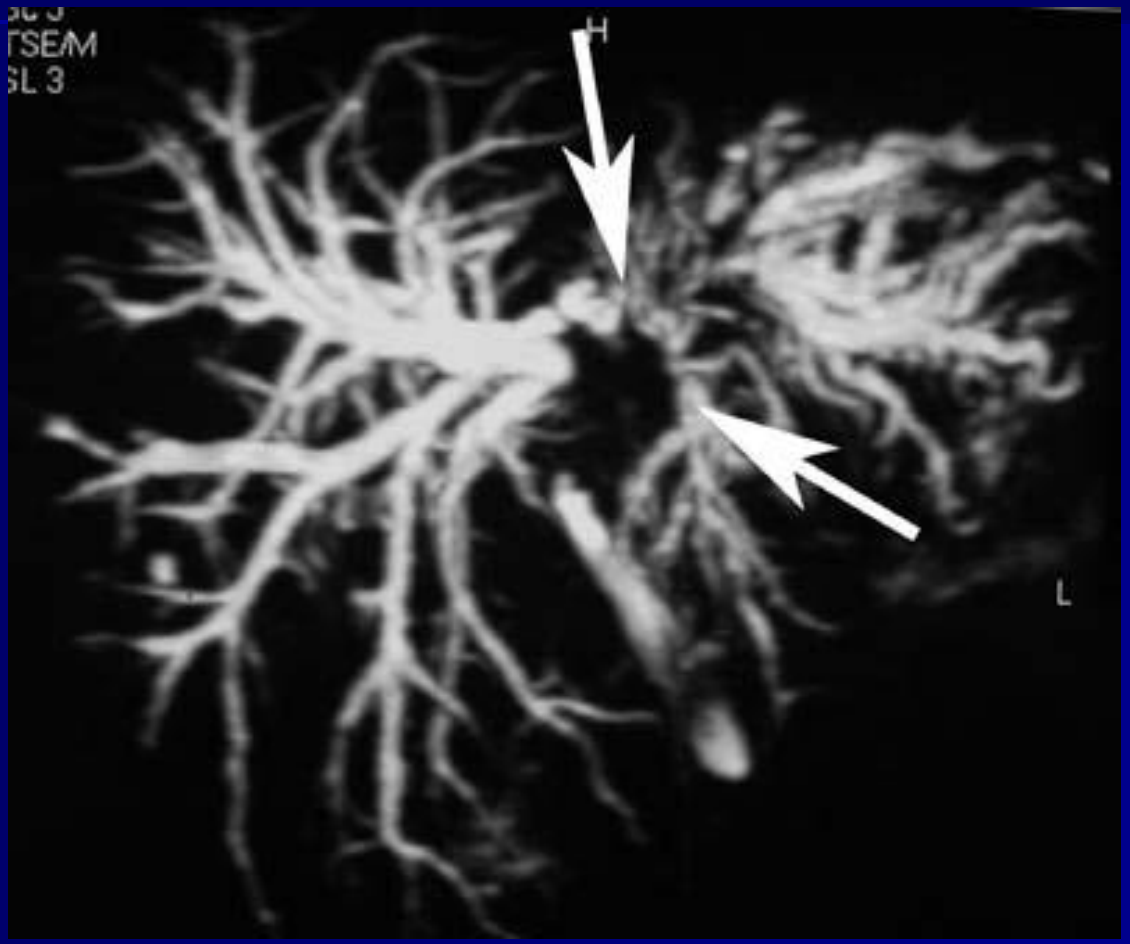
Ascites



hepatocellular carcinoma

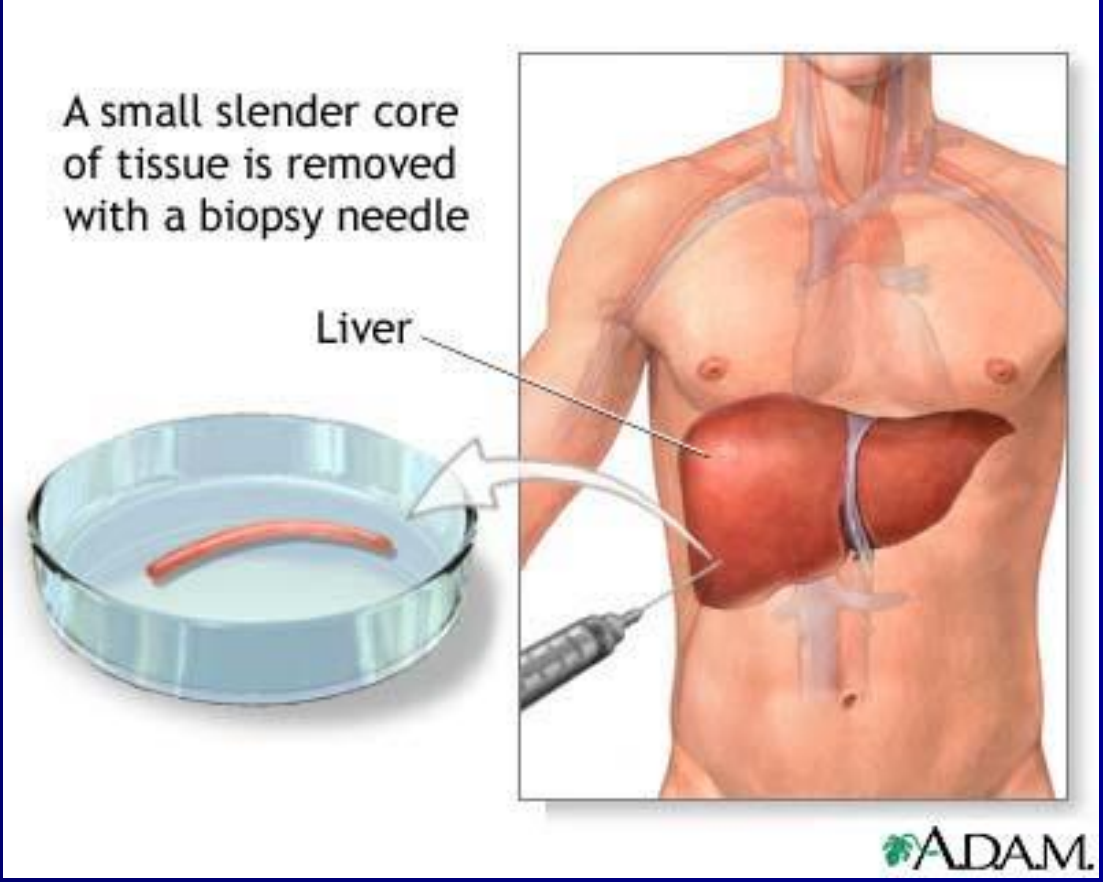
- 57-year-old man with cirrhosis due to hematochromatosis and false-positive findings on CT arterioportography and digital subtraction angiography. CT arterioportogram shows nodular perfusion defect (*arrow*) in segment V lateral to gallbladder. Lesion was interpreted as hepatocellular carcinoma.

CHOLANGIOCARCINOMA OF THE LIVER

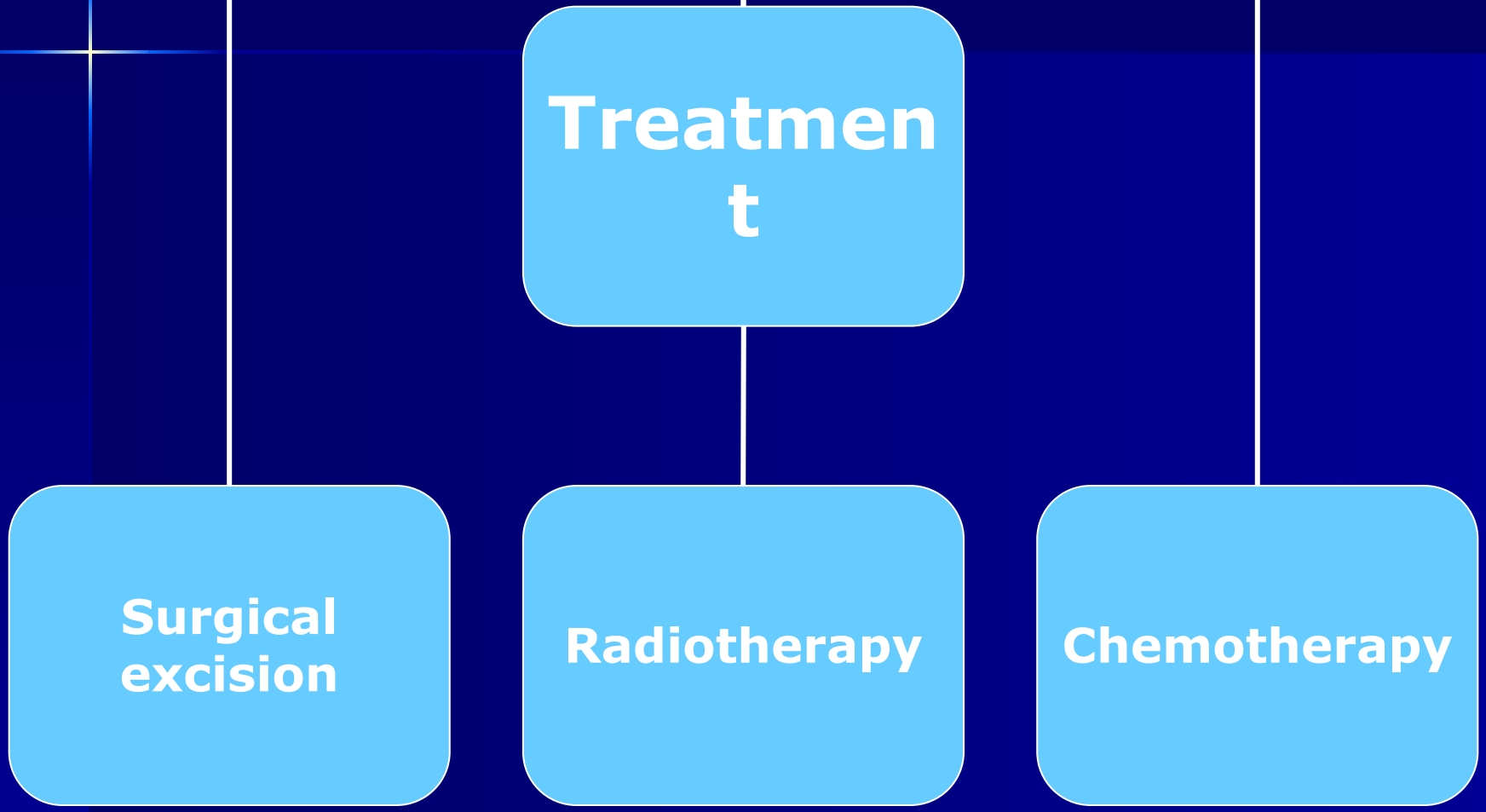


MRCP (Magnetic Resonance Cholangiopancreatography)

Needle biopsy



CARCINOMA OF THE LIVER



hemihepatectomy

- Left lobe liver tumor
- After resection of left lobe liver tumor

epidemiology

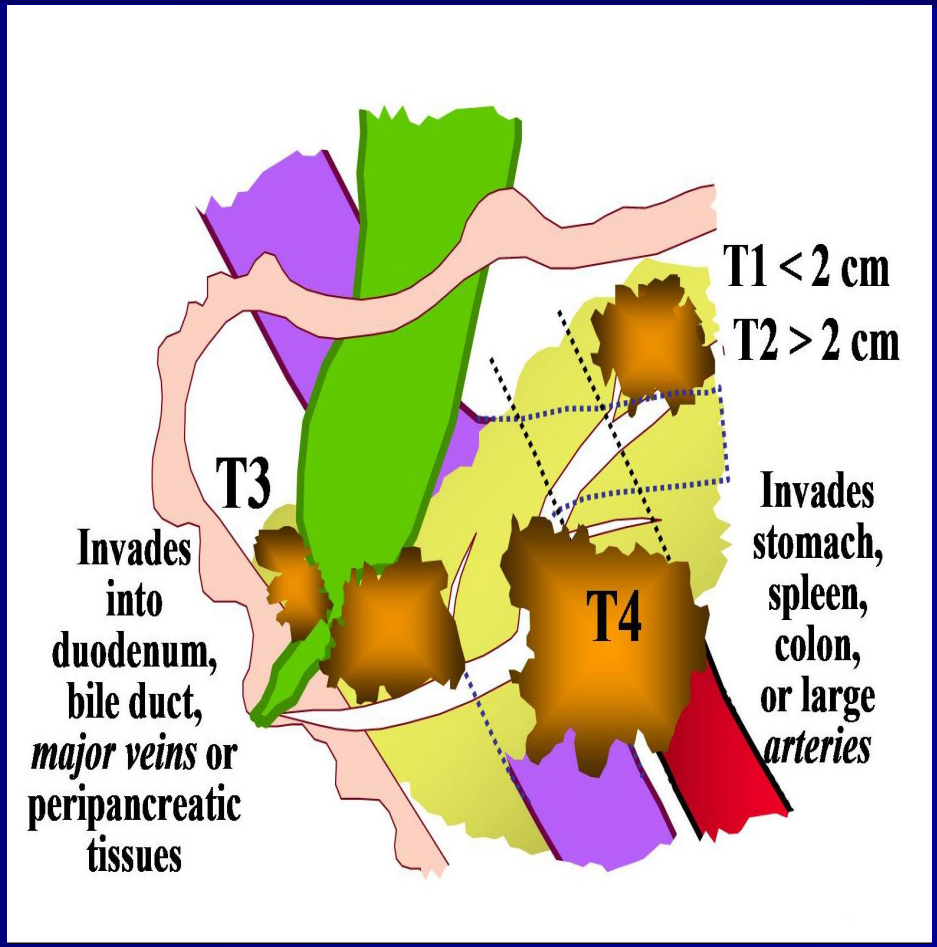
Pancreatic cancer is responsible for 227,000 deaths per year, and is the eighth most common cause of death from cancer in both sexes combined, a relative position higher than for incidence (thirteenth) because of the very poor prognosis (the M/I ratio is 98%). The sex ratio is close to one. Most cases and deaths (61%) occur in developed countries, where incidence and mortality rates are between 7 and 9 per 100,000 in men and 4.5 and 6 per 100,000 in women, with lower rates in developing countries. This probably reflects diagnostic capacity rather than etiology. Among the developing countries, the highest rates are observed in Central and South America. Little is known of the etiology of this cancer, although tobacco smoking increases the risk

Pancreatic carcinoma

- Pancreatic carcinoma is the second commonest tumour of the digestive system
- The incidence is increasing in the Western world
- It is uncommon less than 45 years of age
- More than 80% of cases occur between 60 and 80 years of age
- Male : female ratio is 2 : 1
- Most tumours are adenocarcinomas
- More than 80% occur in the head of the pancreas
- Overall 5-year survival less than 5%
- Prognosis of ampullary tumours is much better

Primary Tumor (T)

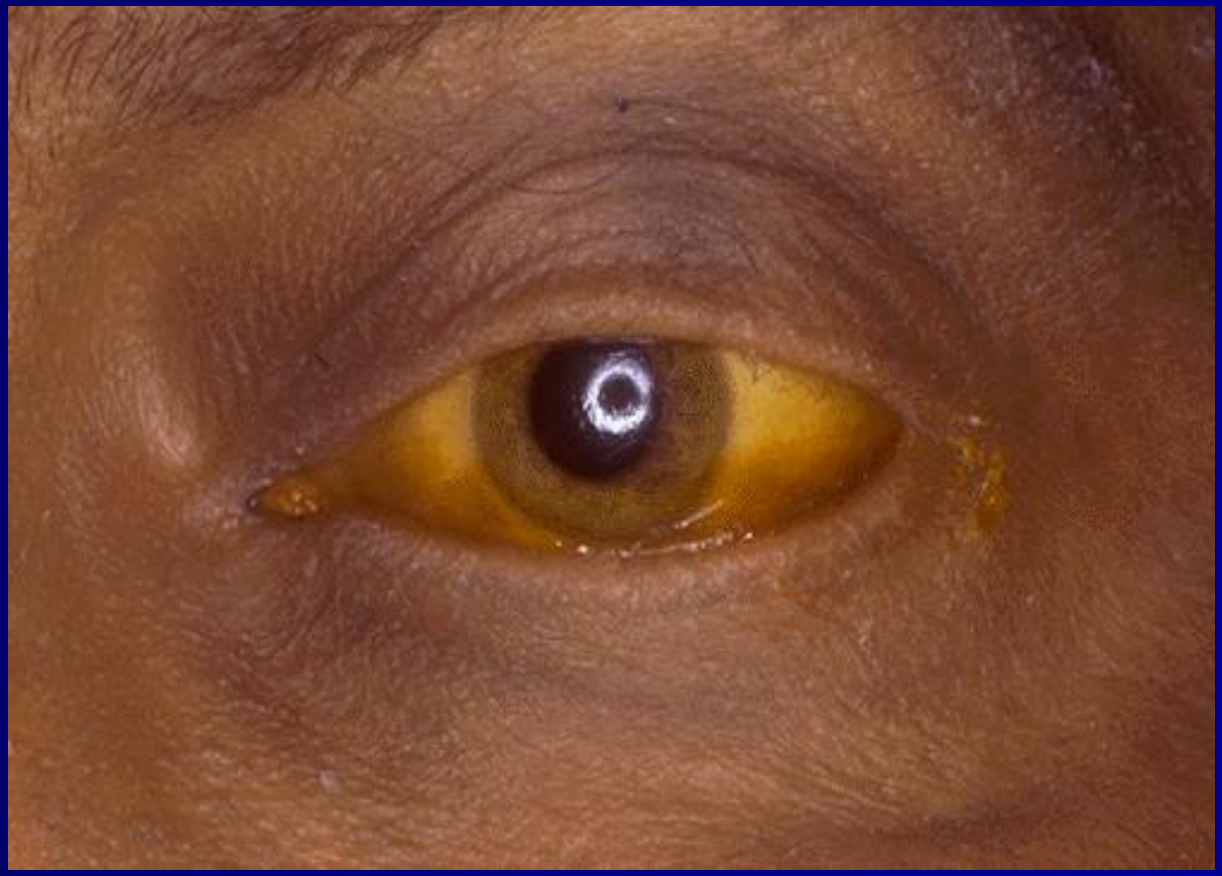
- TX Primary tumor cannot be assessed.
- T0 No evidence of primary tumor.
- Tis Carcinoma *in situ.*
- T1 Tumor limited to the pancreas, ≤2 cm in greatest dimension.
- T2 Tumor limited to the pancreas, >2 cm in greatest dimension.
- T3 Tumor extends beyond the pancreas but without involvement of the celiac axis or the superior mesenteric artery.
- T4 Tumor involves the celiac axis or the superior mesenteric artery (unresectable primary tumor).



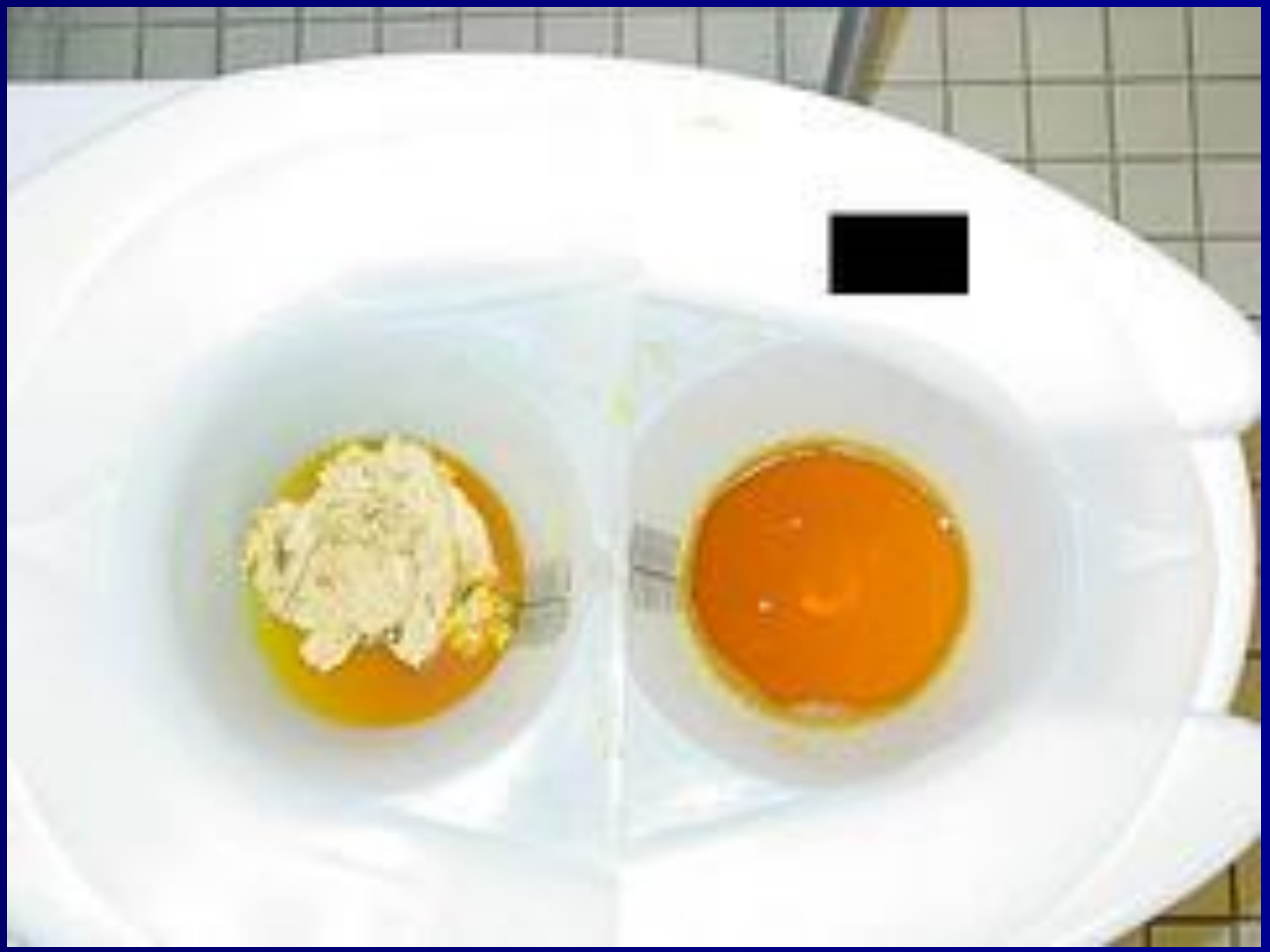
Pancreatic cancer. Signs and symptoms

- **Presentation**
- Pancreatic cancer is sometimes called a "silent killer" because early pancreatic cancer often does not cause symptoms, and the later symptoms are usually nonspecific and varied. Therefore, pancreatic cancer is often not diagnosed until it is advanced. Common symptoms include:
- Pain in the upper abdomen that typically radiates to the back (seen in carcinoma of the body or tail of the pancreas)
- Loss of appetite and/or nausea and vomiting
- Significant weight loss
- Painless jaundicePainless jaundice (yellow skin/eyes, dark urine) when a cancer of the head of the pancreas (about 60% of cases) obstructs the common bile ductPainless jaundice (yellow skin/eyes, dark urine) when a cancer of the head of the pancreas (about 60% of cases) obstructs the common bile duct as it runs through the pancreas. This may also cause pale-colored stool and steatorrhea.
- Trousseau signTrousseau sign, in which blood clots form spontaneously in the portal blood vessels, the deep veins of the extremities, or the superficial veins anywhere on the body, is sometimes associated with pancreatic cancer.
- Diabetes mellitus, or elevated blood sugar levels. Many patients with pancreatic cancer develop diabetes months to even years before they are diagnosed with pancreatic cancer, suggesting new onset diabetes in an elderly individual may be an early warning sign of pancreatic cancer.
- Clinical depression has been reported in association with pancreatic cancer, sometimes presenting before the cancer is diagnosed. However, the mechanism for this association is not known.

jaundice



Pale stool and dark urine in Obstructive Jaundice



Pancreatic cancer

Mass in pancreatic tail, liver nodules, ascites.

Resectional surgery

- Resection is the only hope of cure
- Only 15% tumours are deemed resectable
- Resectability assessed by:
  - Tumour size (<4 cm)
  - Invasion of SMA or portal vein
  - Presence of ascites, nodal, peritoneal or liver metastases
- Pre-operative biliary drainage of unproven benefit
- Has not been shown to reduce post-operative morbidity or mortality

Whipple's operation