Choledocal Cysts - Spectrum of Imaging Findings

e-Poster: P-026

Congress: ESGAR 2009

Type: Educational Exhibit

Topic: Diagnostic / Bile Ducts

Authors: I. Santiago[1], J. Maciel[1], R.M.G. Loureiro[2], C. Ruivo[3], M.A. Portilha[3], B.J.A.M. Gonçalves[3], N.J.L. Dias[3], M.A. Cipriano[3], F. Caseiro Alves[3]; [1]Aveiro/PT, [2]Funchal/PT, [3]Coimbra/PT

MeSH:

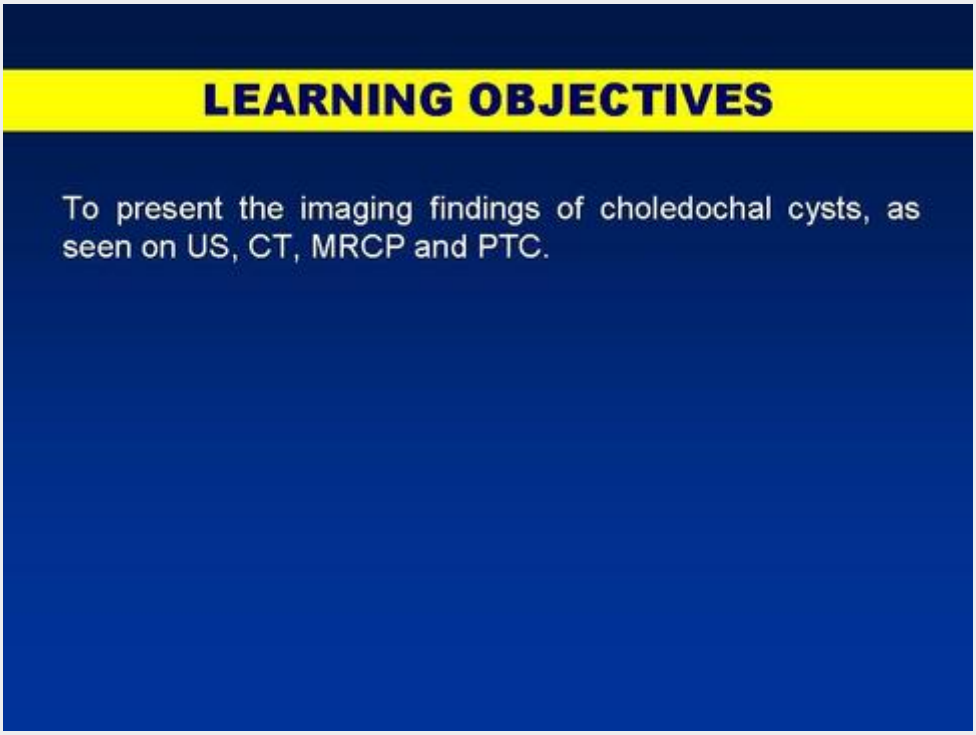
Choledochal Cyst [C06.130.120.127]

Keyword: Choledochal Cysts

1. Learning objectives

Learning Objectives

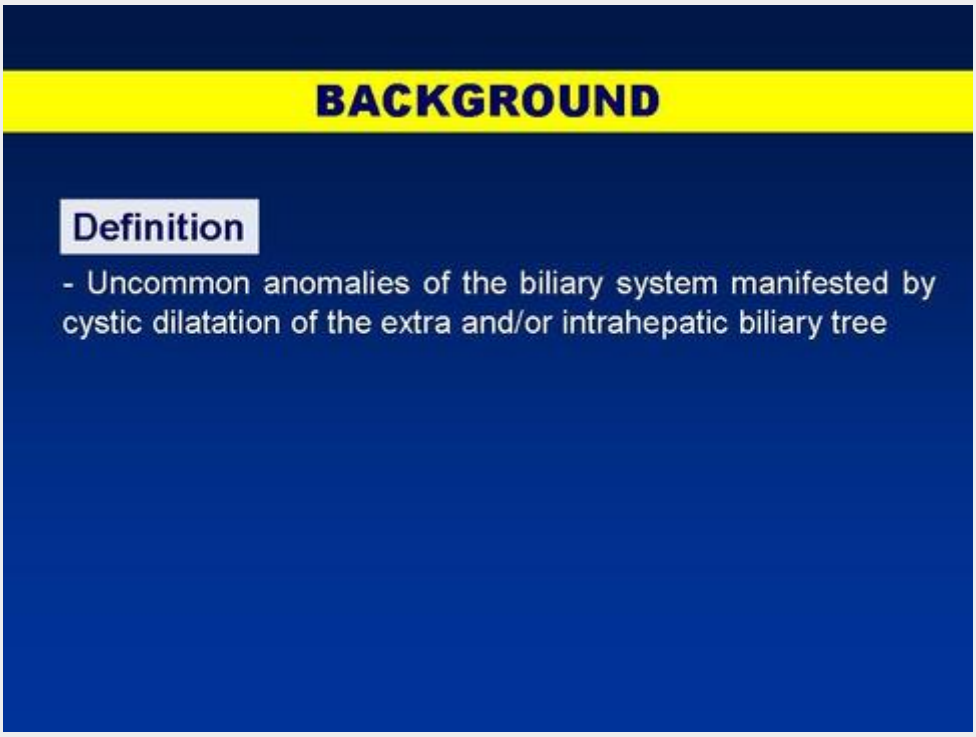
Learning objectives



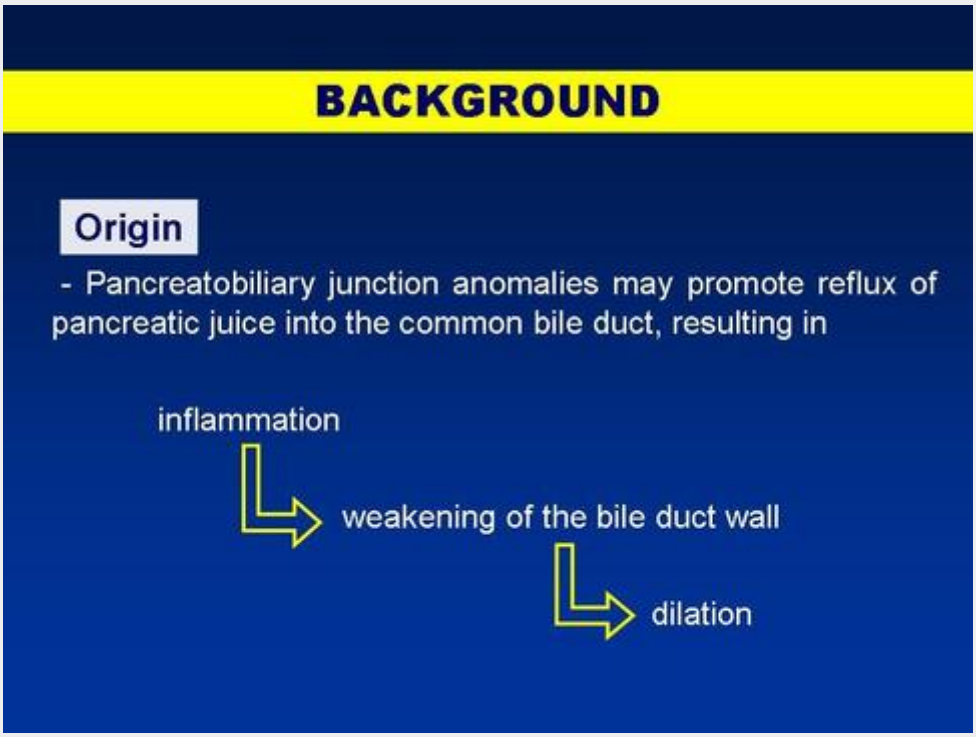
2. Background

Background

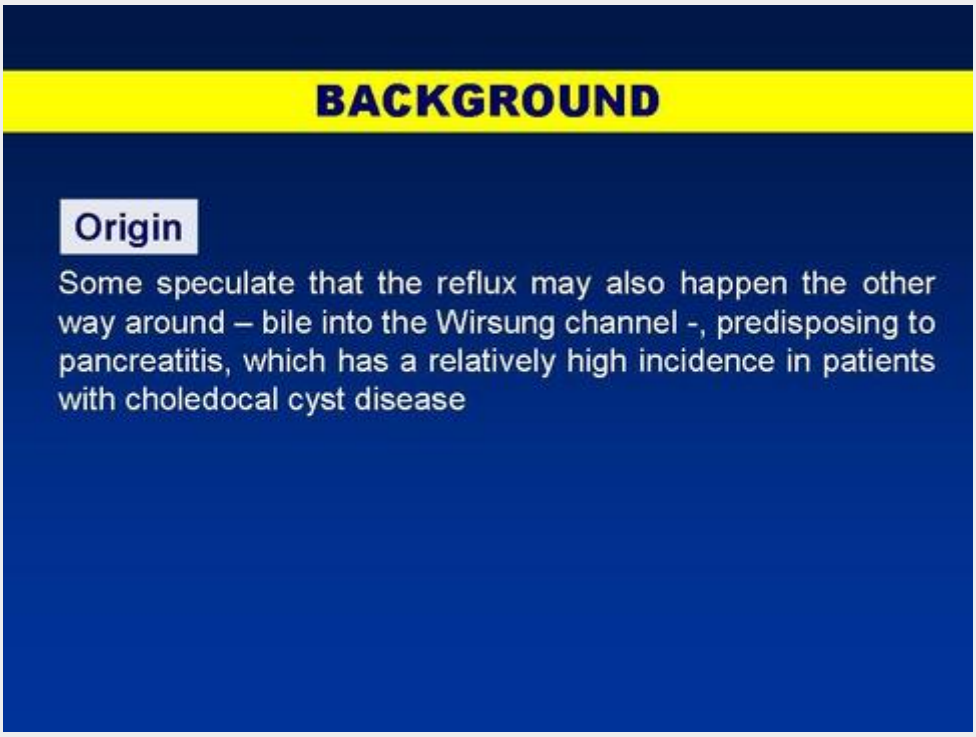
Definition of choledochal cysts



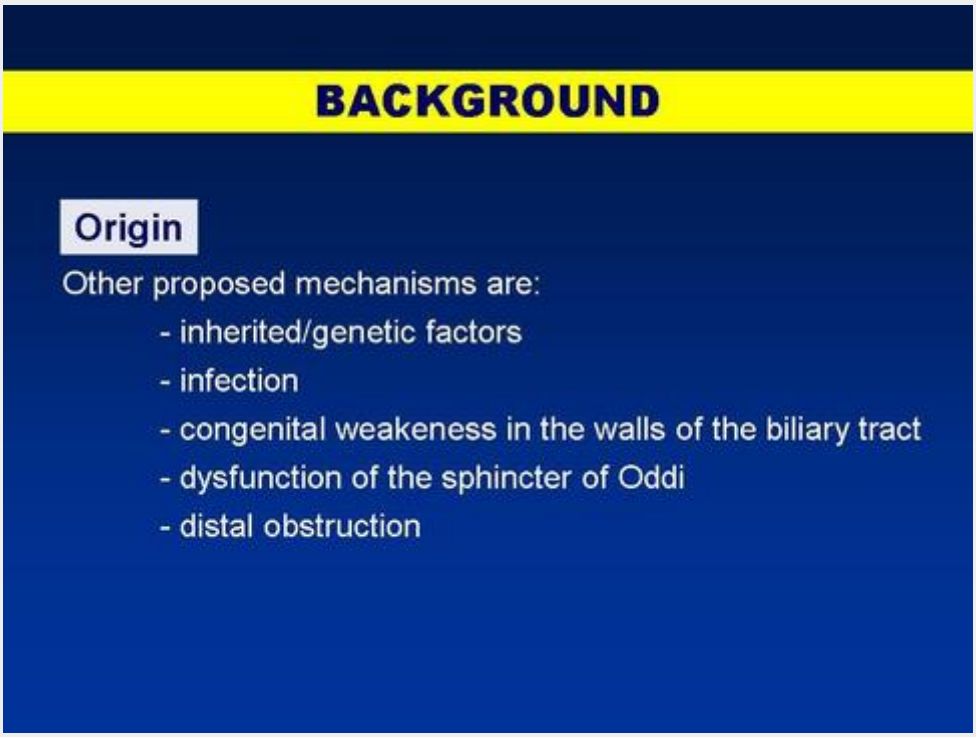
diapositivo4.jpg



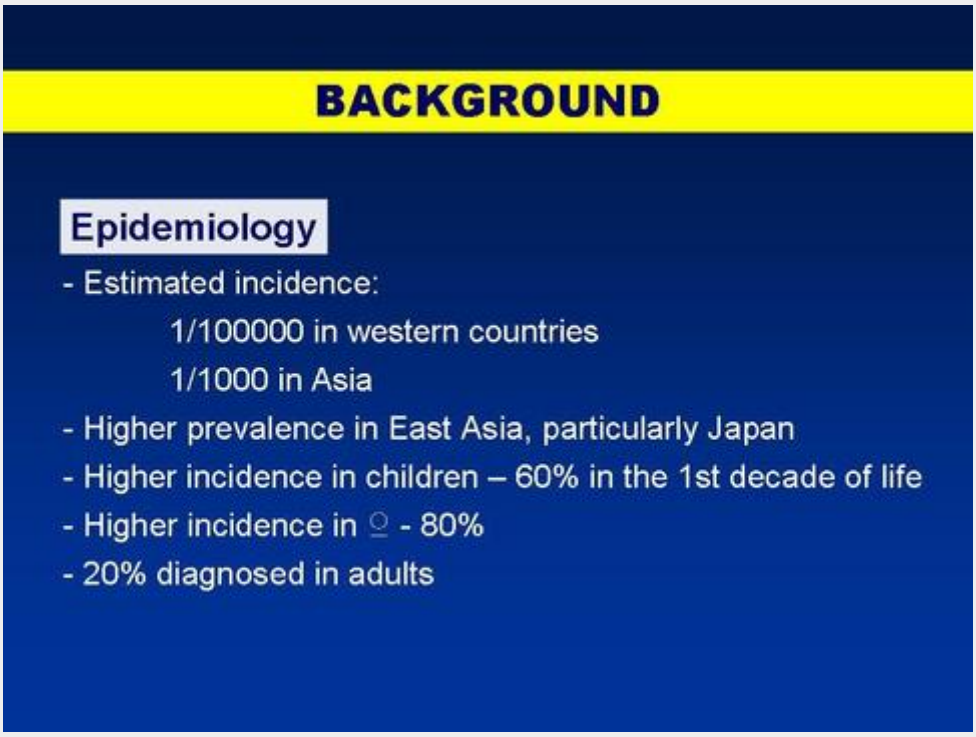
diapositivo5.jpg



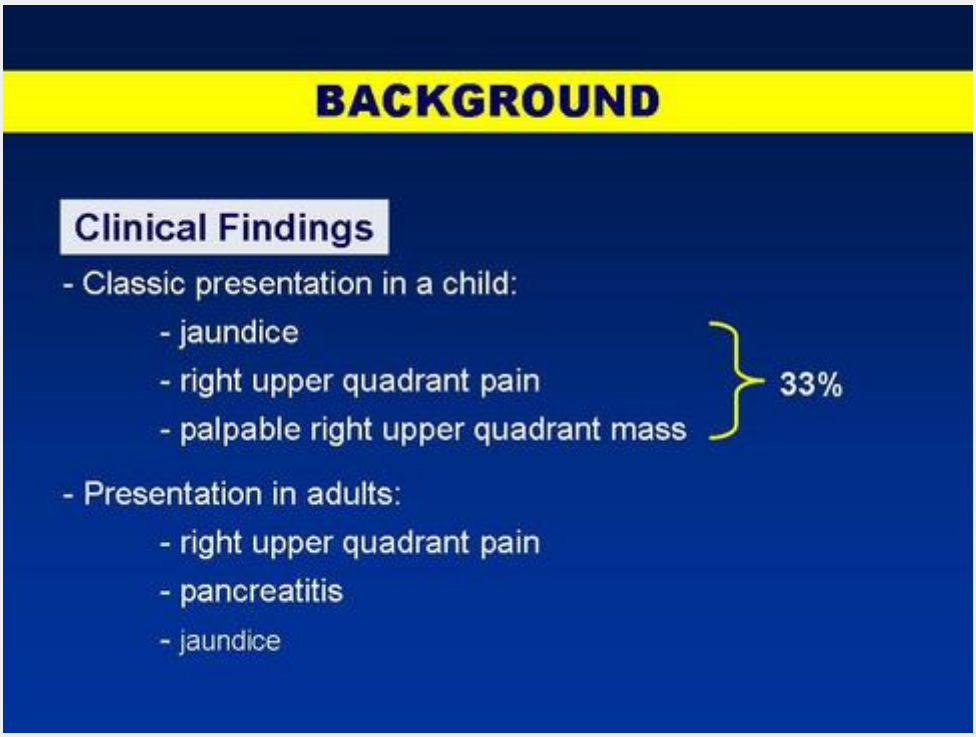
diapositivo6.jpg



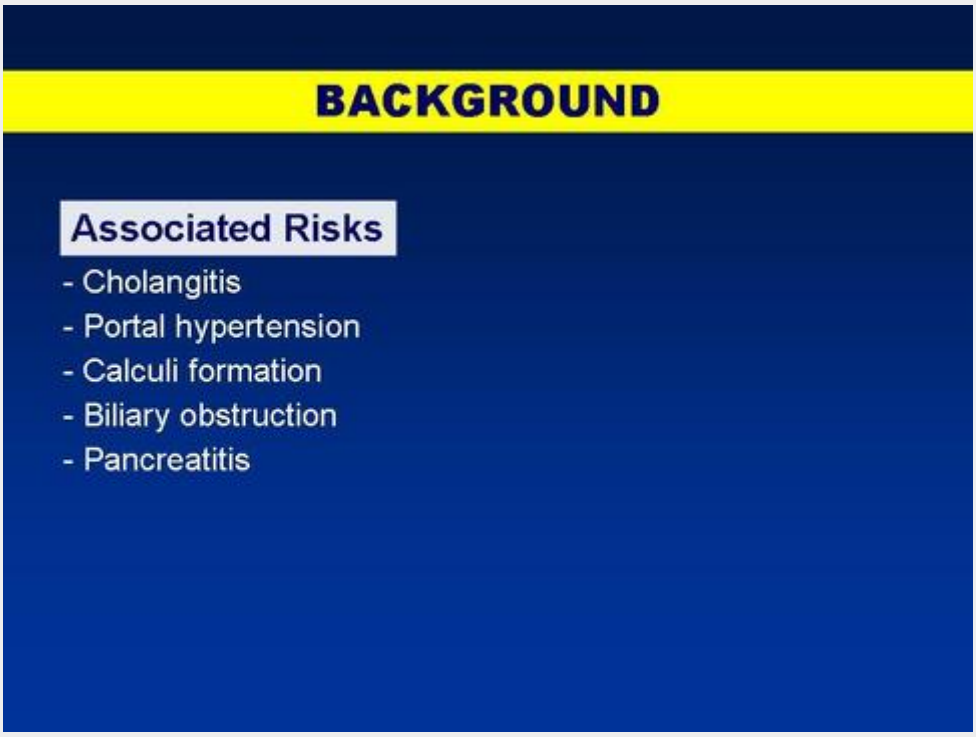
diapositivo7.jpg



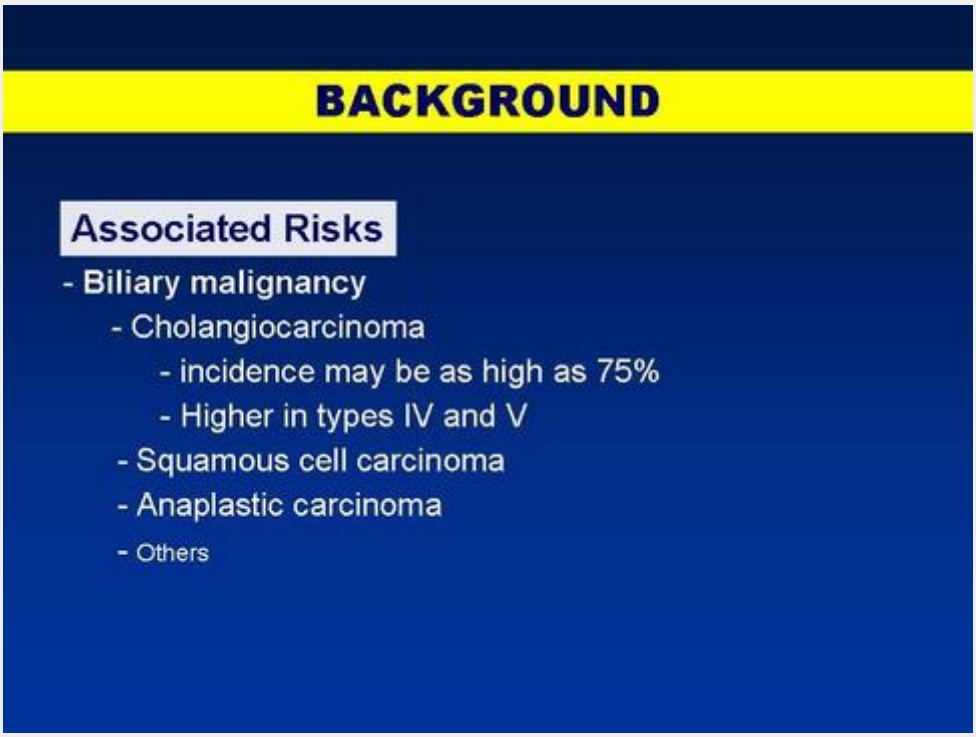
diapositivo8.jpg



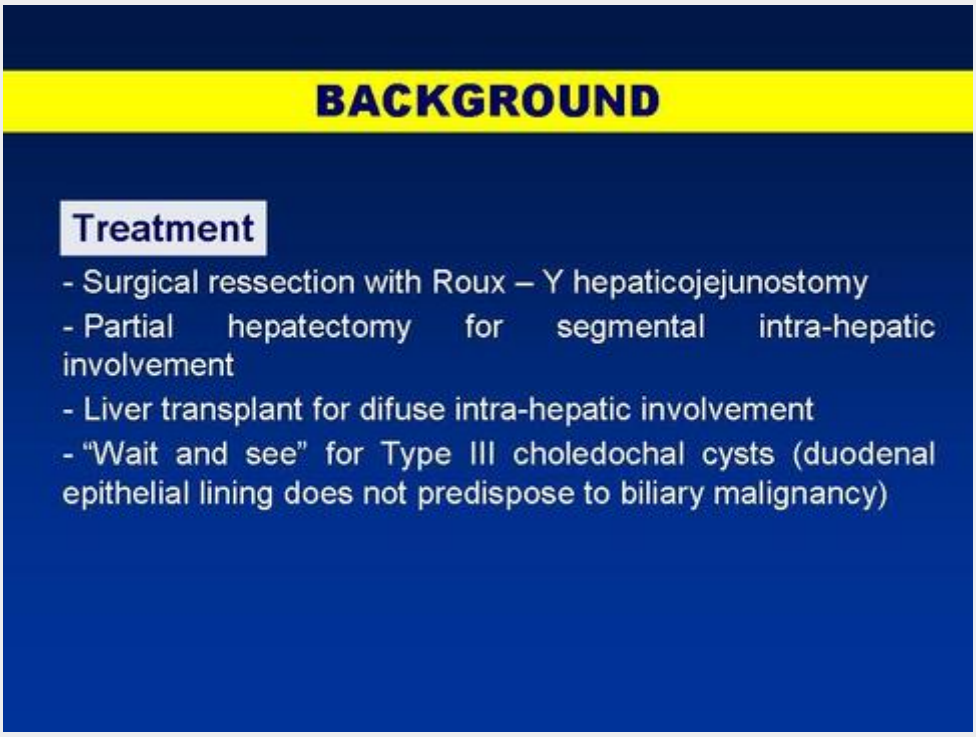
diapositivo9.jpg



diapositivo10.jpg



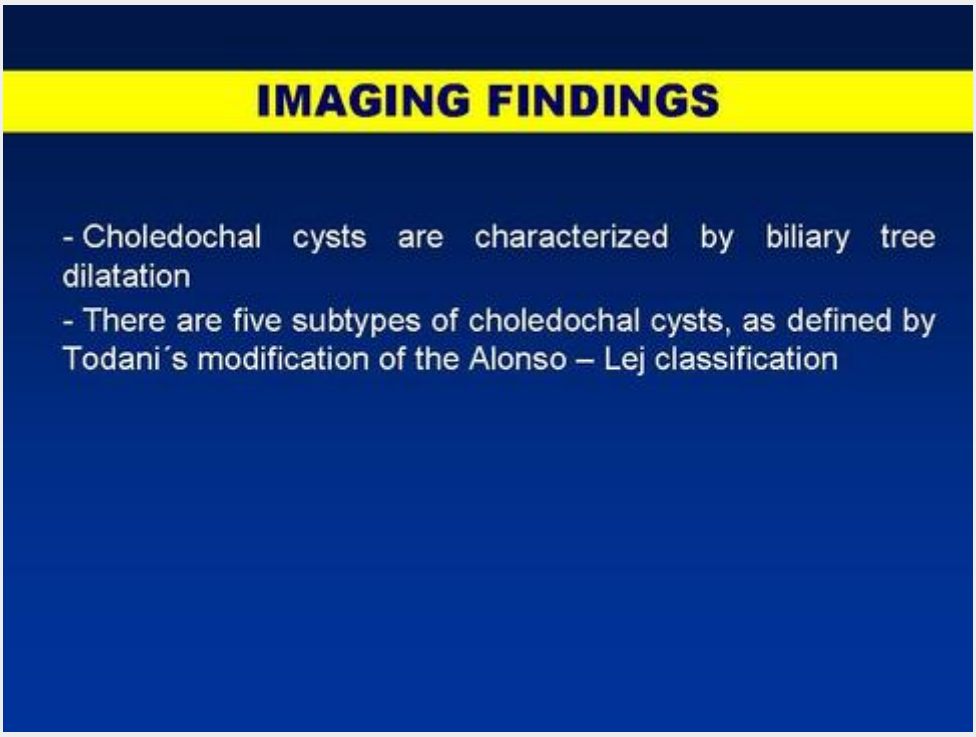
diapositivo11.jpg



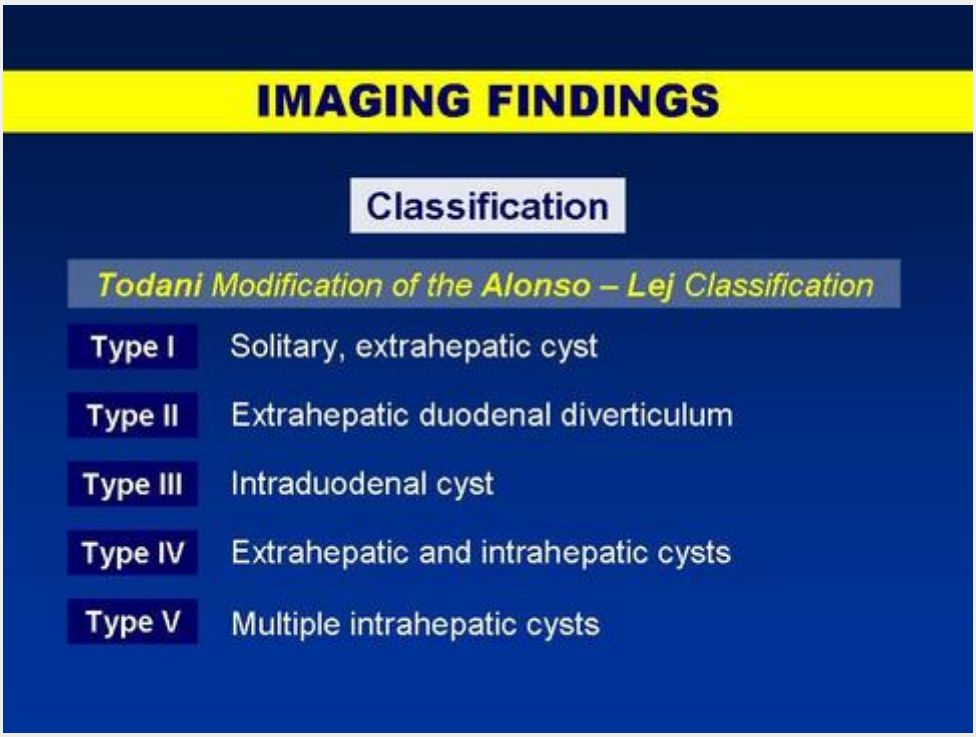
3. Imaging findings OR Procedure details

Imaging Findings

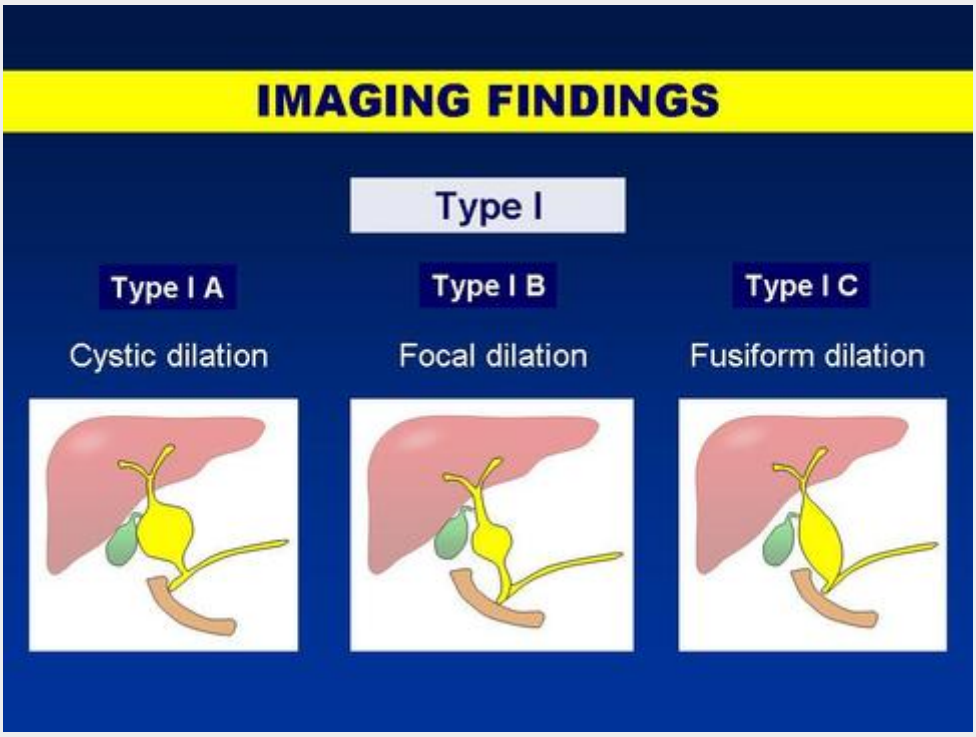
diapositivo12.jpg



diapositivo13.jpg



Type I



diapositivo15.jpg

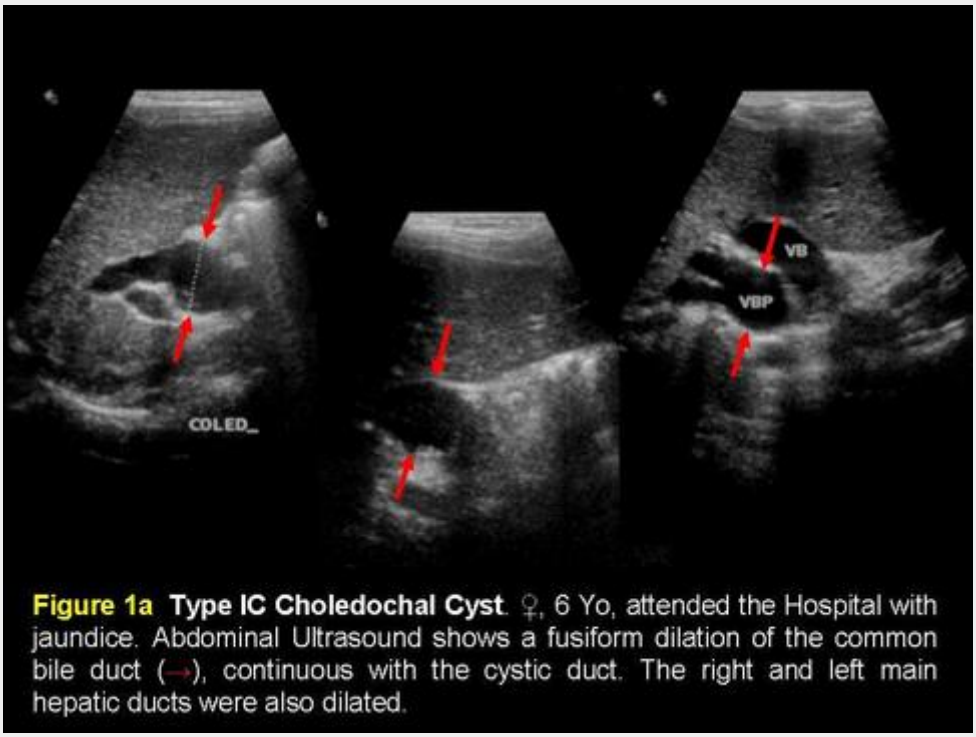


Figure 1a **Type IC Choledochal Cyst**. ♀, 6 Yo, attended the Hospital with jaundice. Abdominal Ultrasound shows a fusiform dilation of the common bile duct (→), continuous with the cystic duct. The right and left main hepatic ducts were also dilated.

diapositivo16.jpg

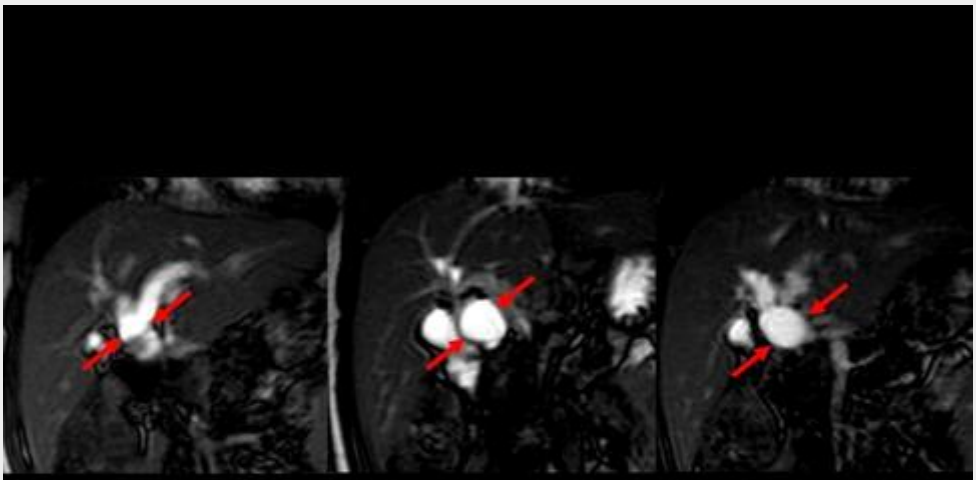


Figure 1b Type IC Choledochal Cyst. Magnetic Ressonance SSFP sequencies show a fusiform dilation of the common hepatic and common bile ducts. The cystic duct drains into the dilated extrahepatic bile duct.

diapositivo17.jpg

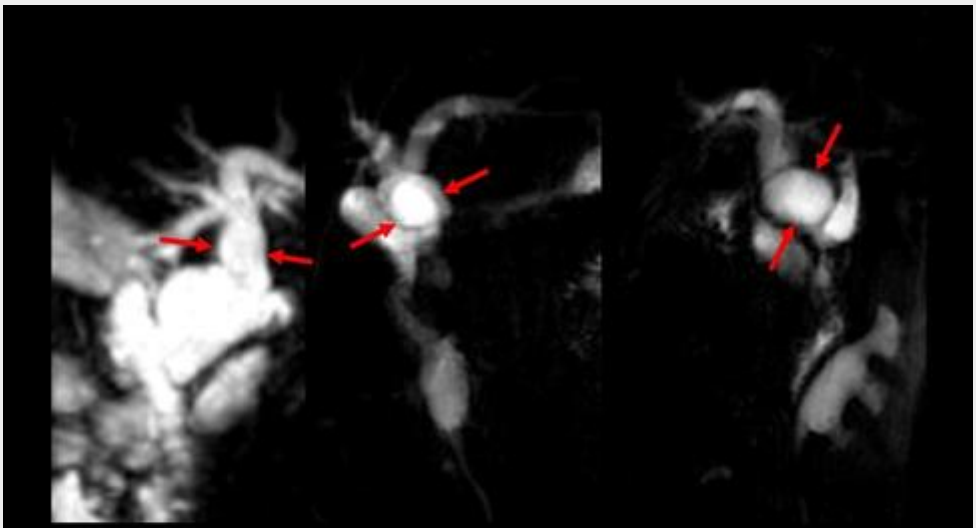


Figure 1c Type IC Choledochal Cyst. MR T2 reformatted images show a fusiform dilation of the common hepatic and common bile ducts. The cystic duct drains to the dilated extrahepatic bile duct. These findings correspond to a Type IC choledochal cyst, according to the Todani classification.

diapositivo18.jpg

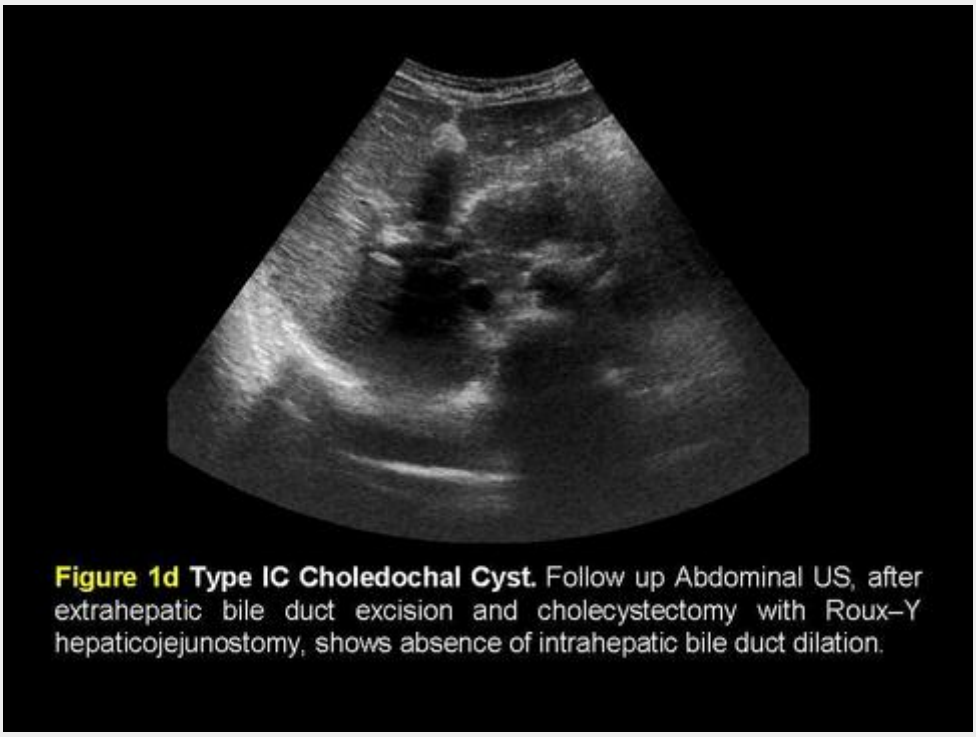


Figure 1d Type IC Choledochal Cyst. Follow up Abdominal US, after extrahepatic bile duct excision and cholecystectomy with Roux–Y hepaticojejunostomy, shows absence of intrahepatic bile duct dilation.

diapositivo19.jpg

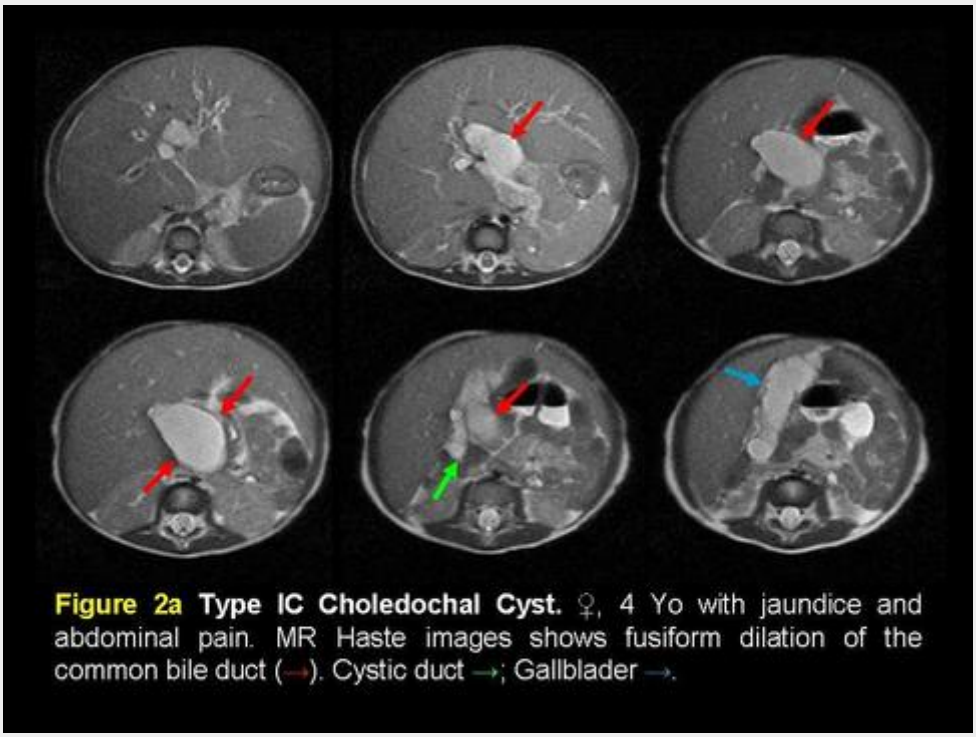


Figure 2a Type IC Choledochal Cyst. ♀, 4 Yo with jaundice and abdominal pain. MR Haste images shows fusiform dilation of the common bile duct (→). Cystic duct →; Gallblader →.

diapositivo20.jpg

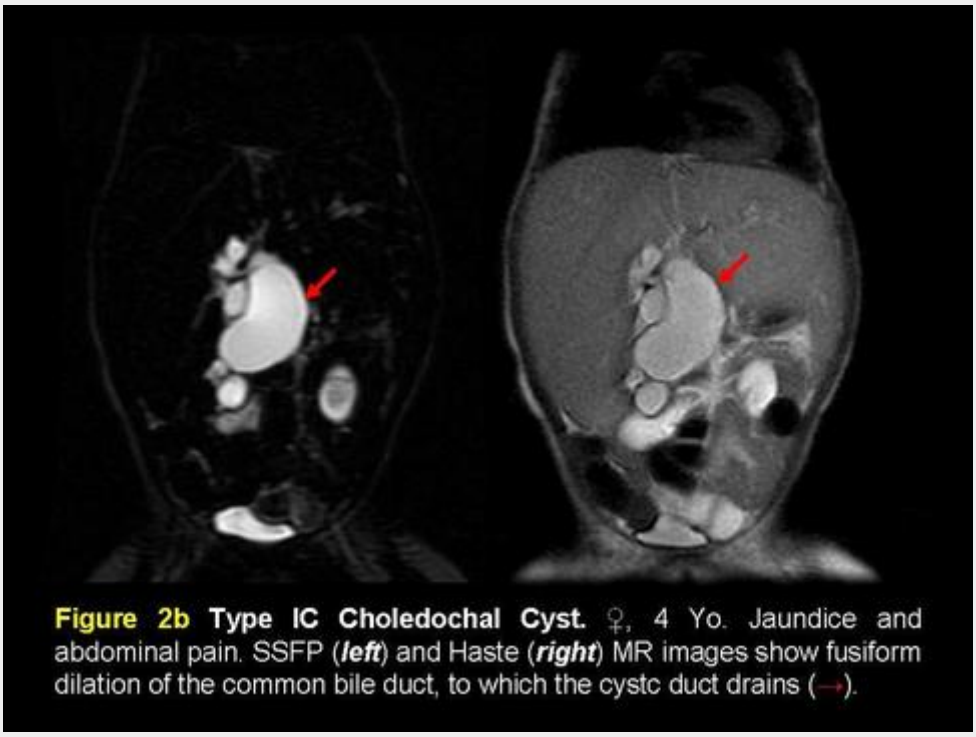


Figure 2b Type IC Choledochal Cyst. ♀, 4 Yo. Jaundice and abdominal pain. SSFP (***left***) and Haste (***right***) MR images show fusiform dilation of the common bile duct, to which the cystc duct drains (→).

Type IC

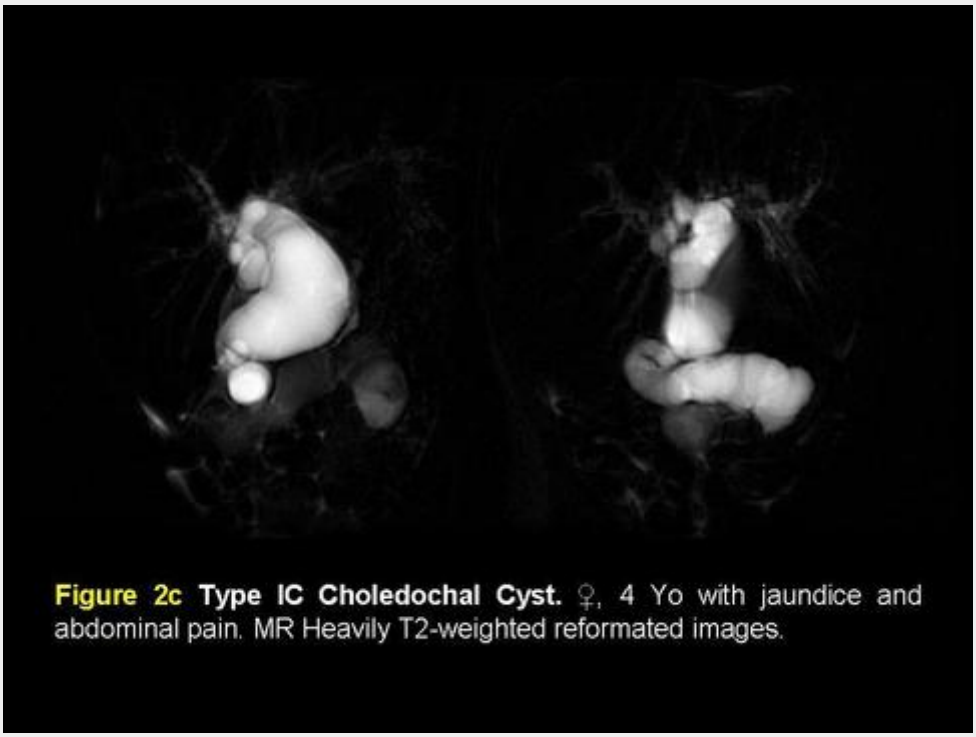
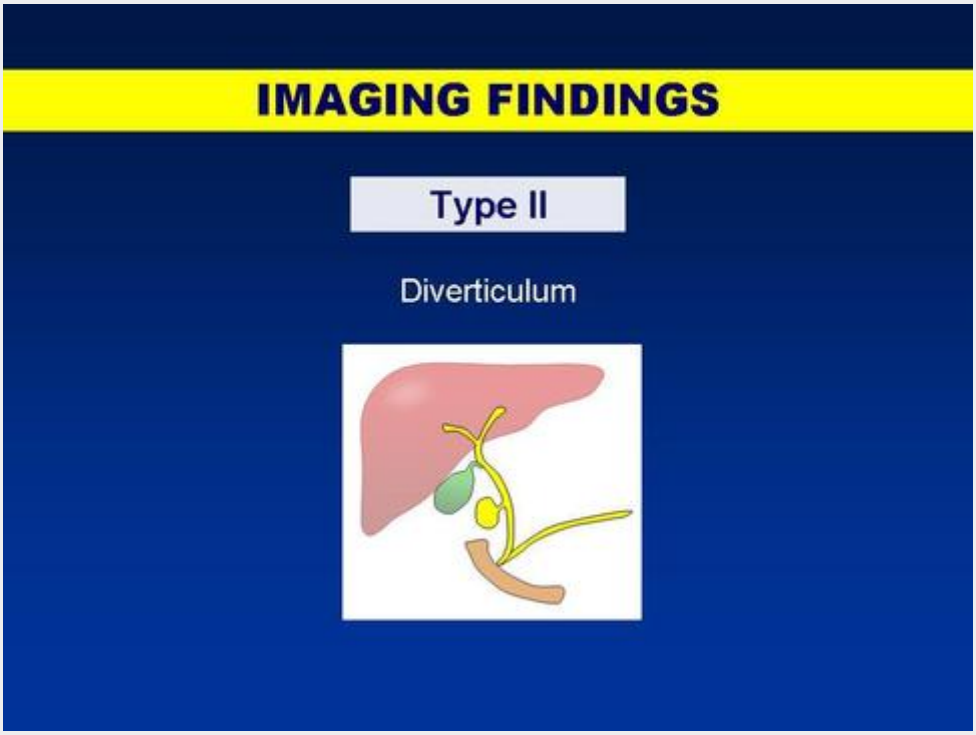


Figure 2c Type IC Choledochal Cyst. ♀, 4 Yo with jaundice and abdominal pain. MR Heavily T2-weighted reformated images.

[Type IC Choledochal Cyst] Video 1 shows a Type IC Choledochal Cyst, as seen on MR Heavily

T2-weighted reformated images.

Type II



diapositivo23.jpg

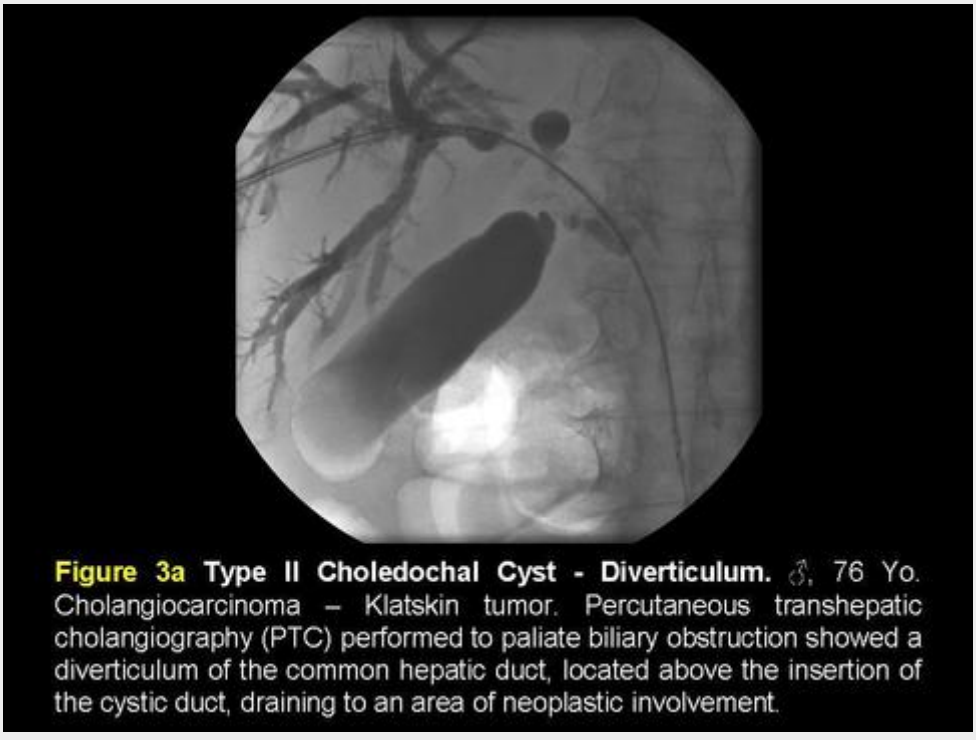
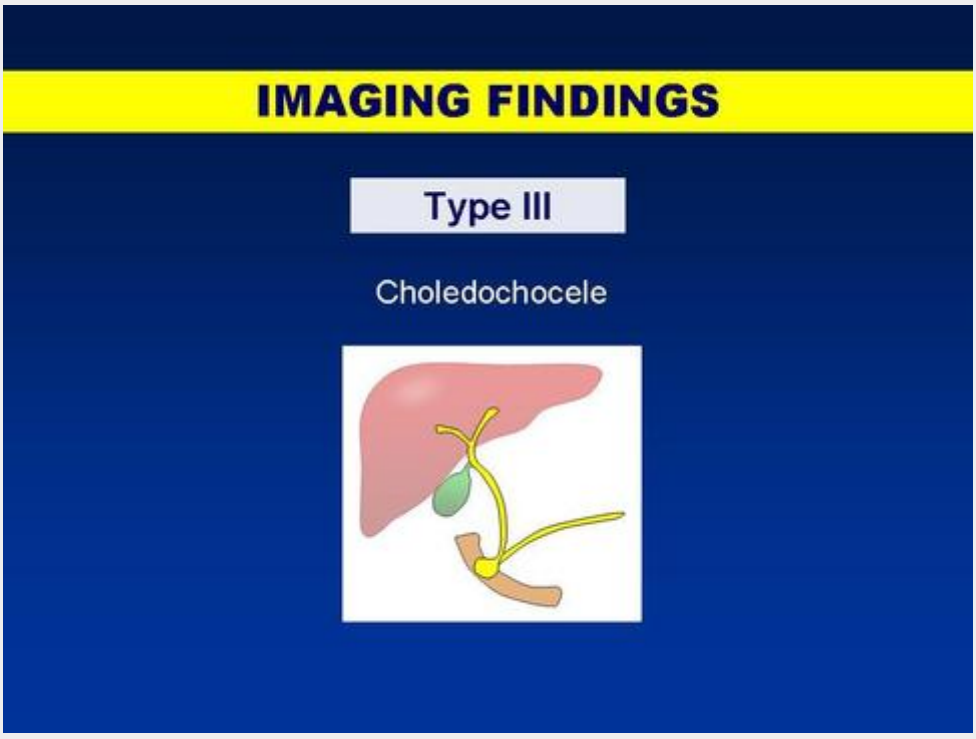


Figure 3a Type II Choledochal Cyst - Diverticulum. ♂, 76 Yo. Cholangiocarcinoma – Klatskin tumor. Percutaneous transhepatic cholangiography (PTC) performed to paliate biliary obstruction showed a diverticulum of the common hepatic duct, located above the insertion of the cystic duct, draining to an area of neoplastic involvement.

Diverticulum

Figure 3b Type II Choledochal Cyst - Diverticulum. Image obtained after stent placement, showing restoration of the bile flux from the right lobe.

Type III



Choledochocele

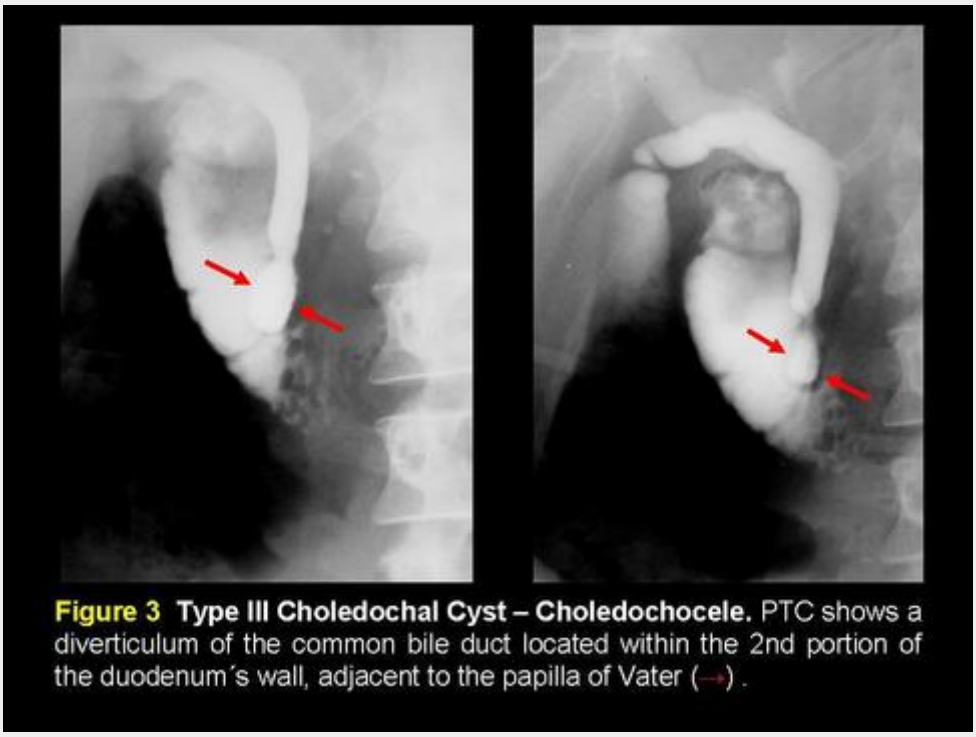
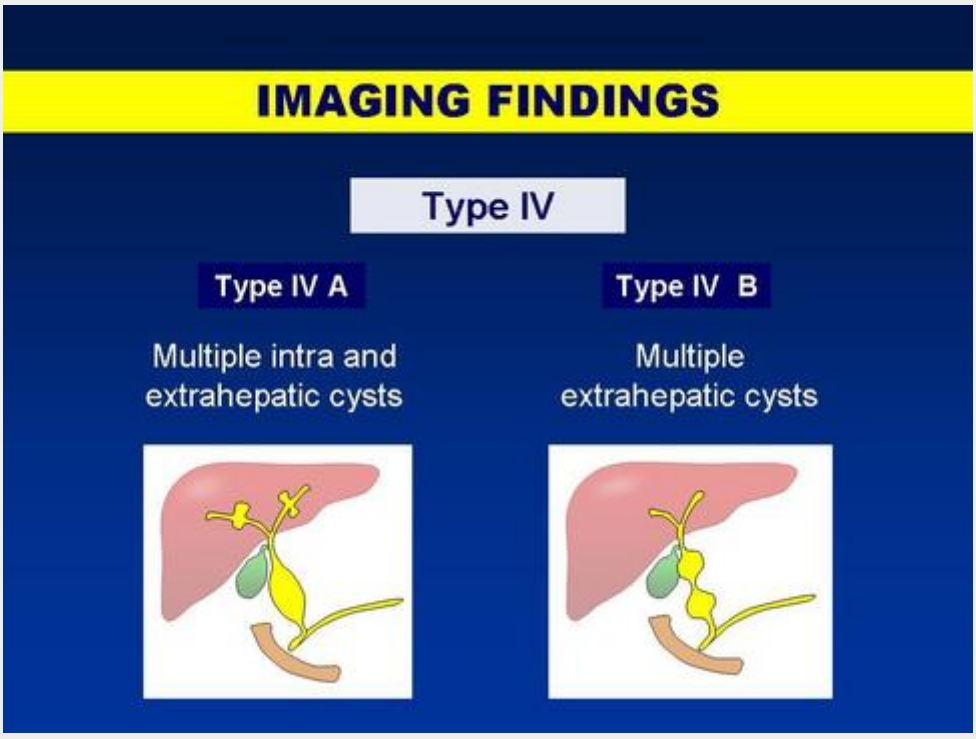


Figure 3 Type III Choledochal Cyst – Choledochocele. PTC shows a diverticulum of the common bile duct located within the 2nd portion of the duodenum´s wall, adjacent to the papilla of Vater (→) .

Type IV



Type IVA

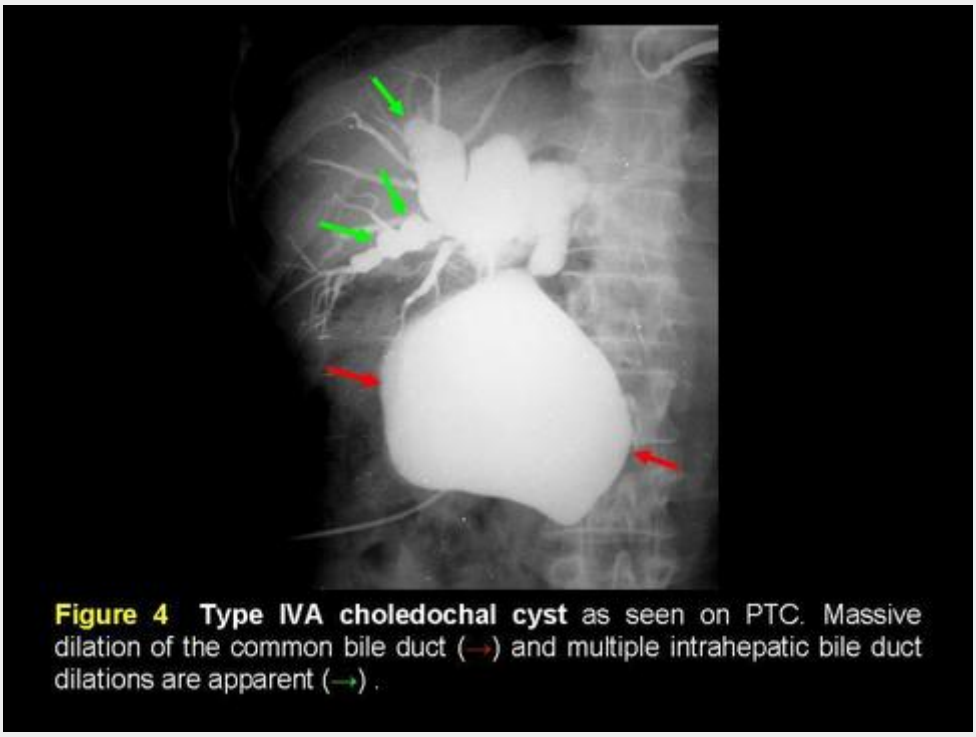
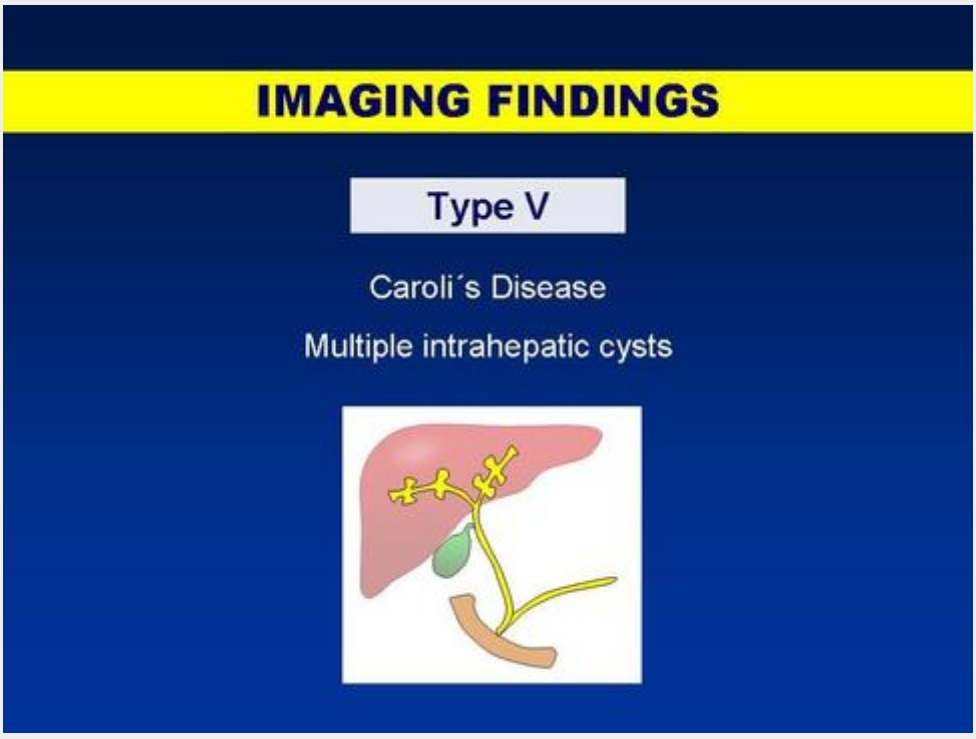
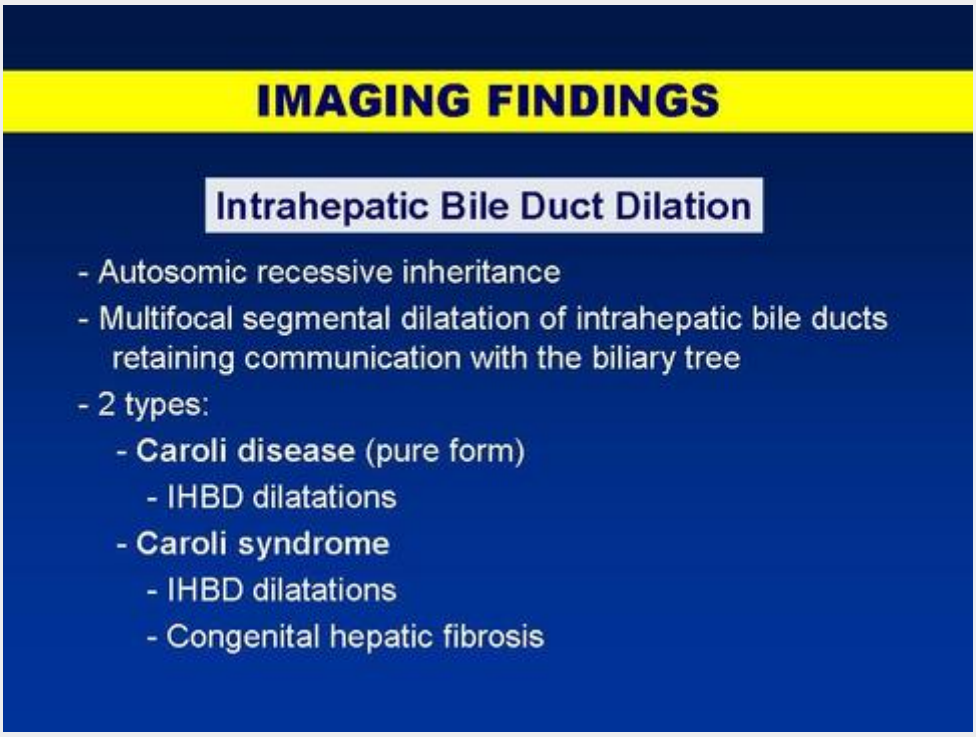


Figure 4 **Type IVA choledochal cyst** as seen on PTC. Massive dilation of the common bile duct (→) and multiple intrahepatic bile duct dilations are apparent (→).

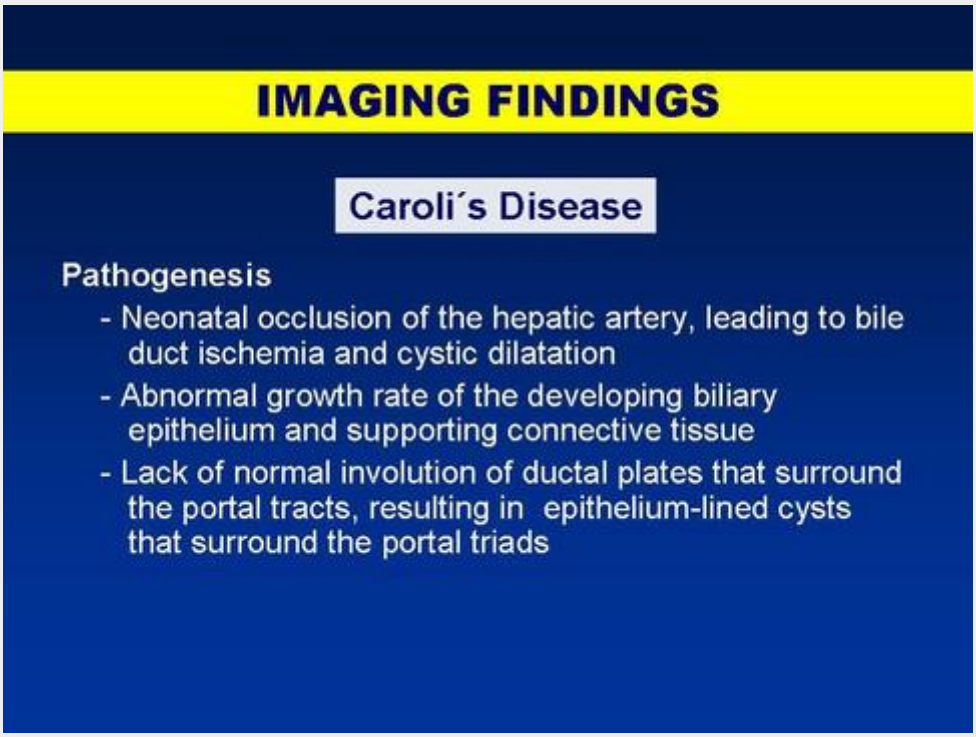
Type V



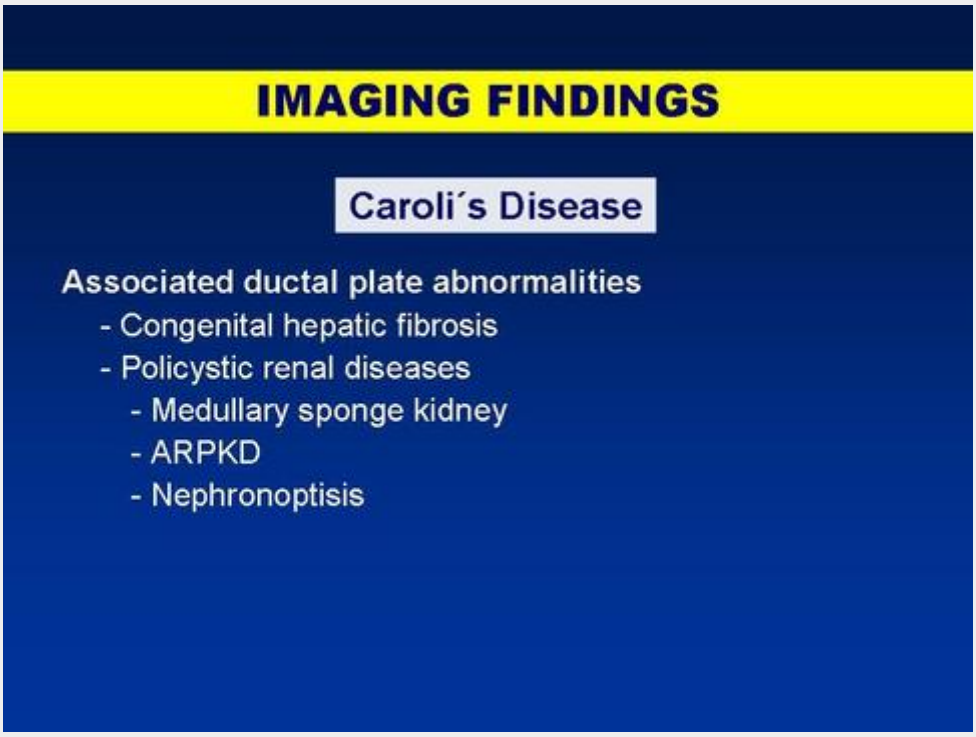
diapositivo30.jpg



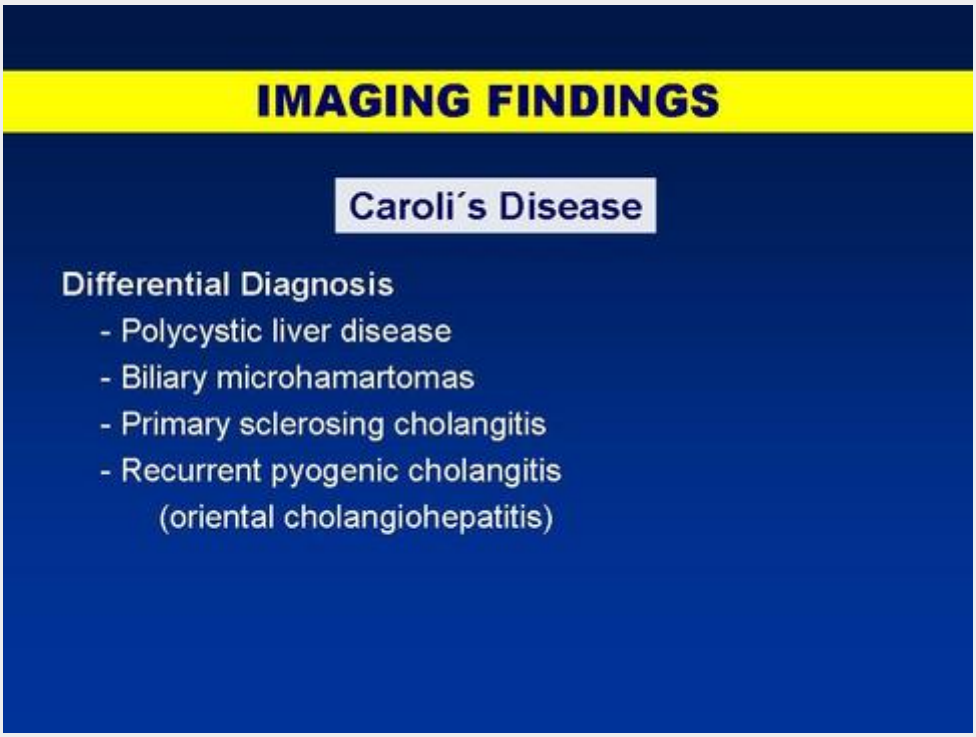
diapositivo31.jpg



diapositivo32.jpg



diapositivo33.jpg



diapositivo34.jpg

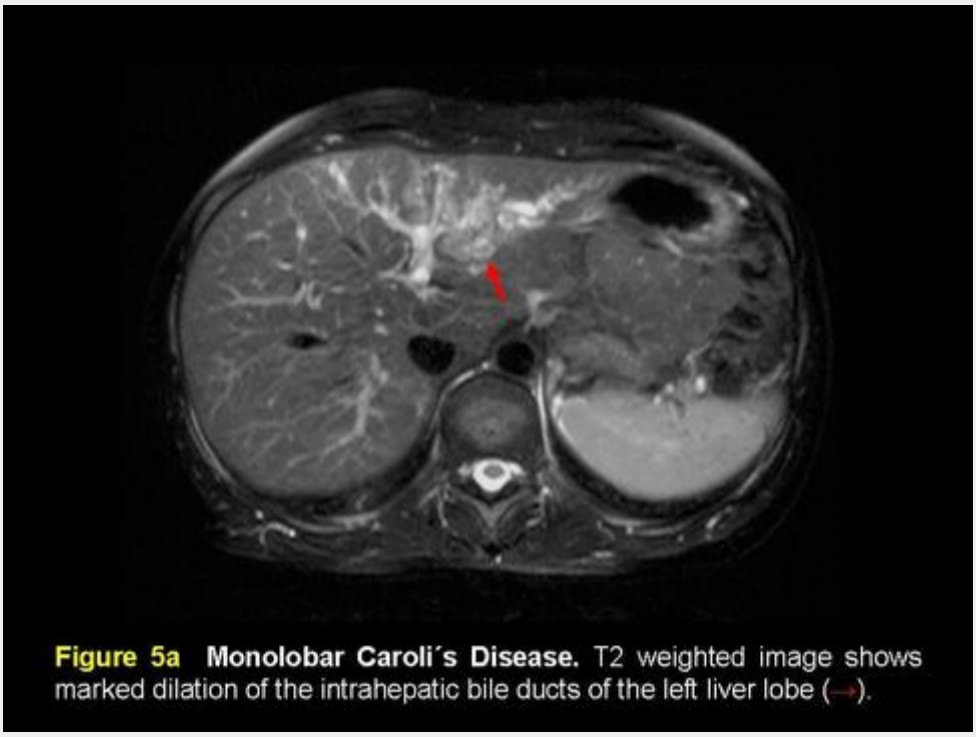


Figure 5a Monolobar Caroli´s Disease. T2 weighted image shows marked dilation of the intrahepatic bile ducts of the left liver lobe (→).

diapositivo35.jpg

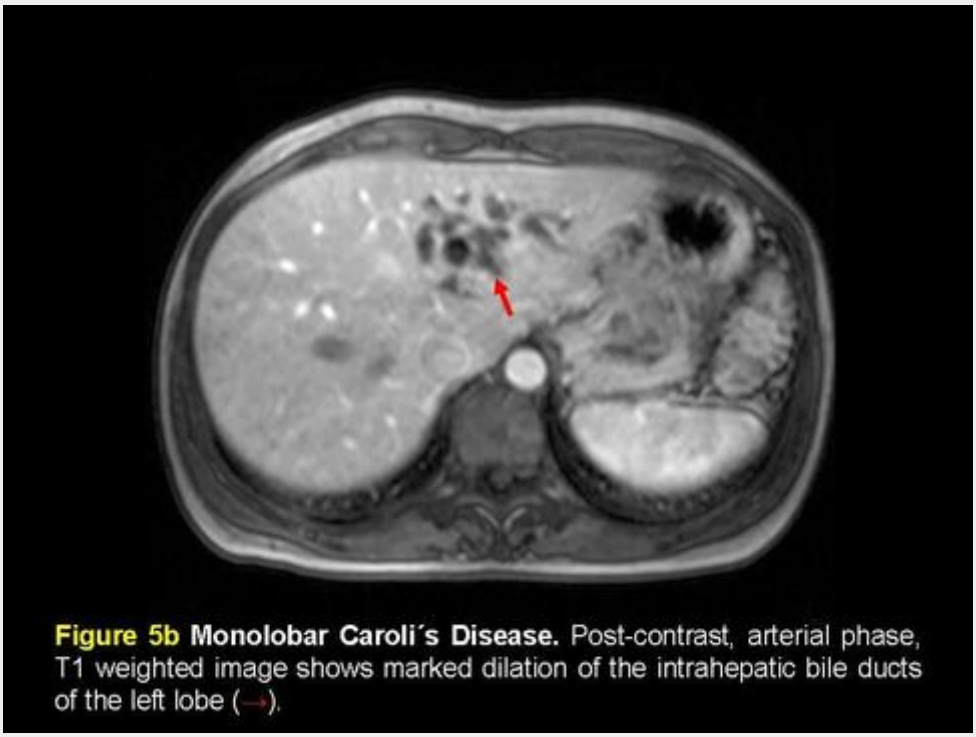


Figure 5b Monolobar Caroli´s Disease. Post-contrast, arterial phase, T1 weighted image shows marked dilation of the intrahepatic bile ducts of the left lobe (→).

diapositivo36.jpg

Figure 5c Monolobar Caroli´s Disease. Heavily T2-weighted image, projection technique, depicting the dilated left lobe intrahepatic bile ducts (→).

diapositivo37.jpg

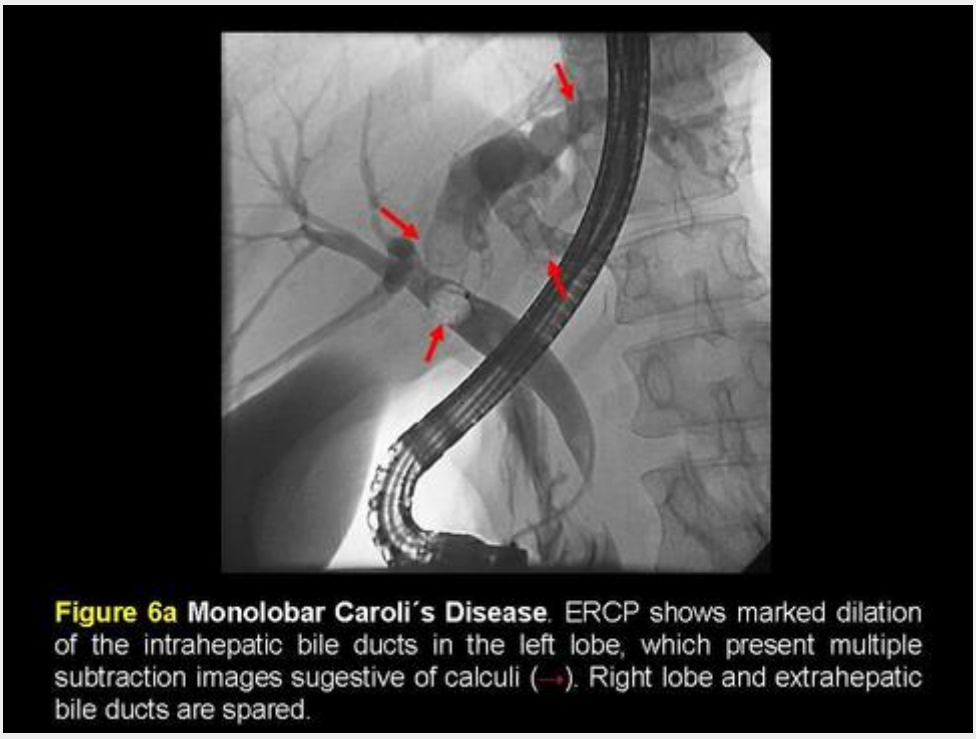


Figure 6a Monolobar Caroli´s Disease. ERCP shows marked dilation of the intrahepatic bile ducts in the left lobe, which present multiple subtraction images sugestive of calculi (→). Right lobe and extrahepatic bile ducts are spared.

Monolobar Caroli´s Disease

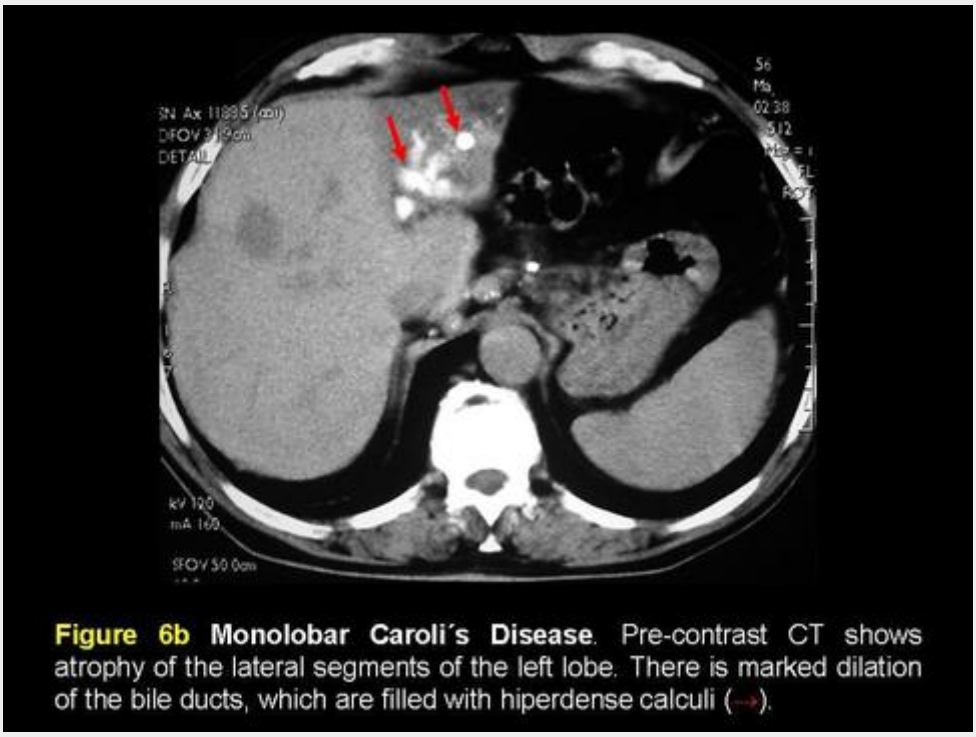


Figure 6b Monolobar Caroli´s Disease. Pre-contrast CT shows atrophy of the lateral segments of the left lobe. There is marked dilation of the bile ducts, which are filled with hiperdense calculi (→).

diapositivo39.jpg

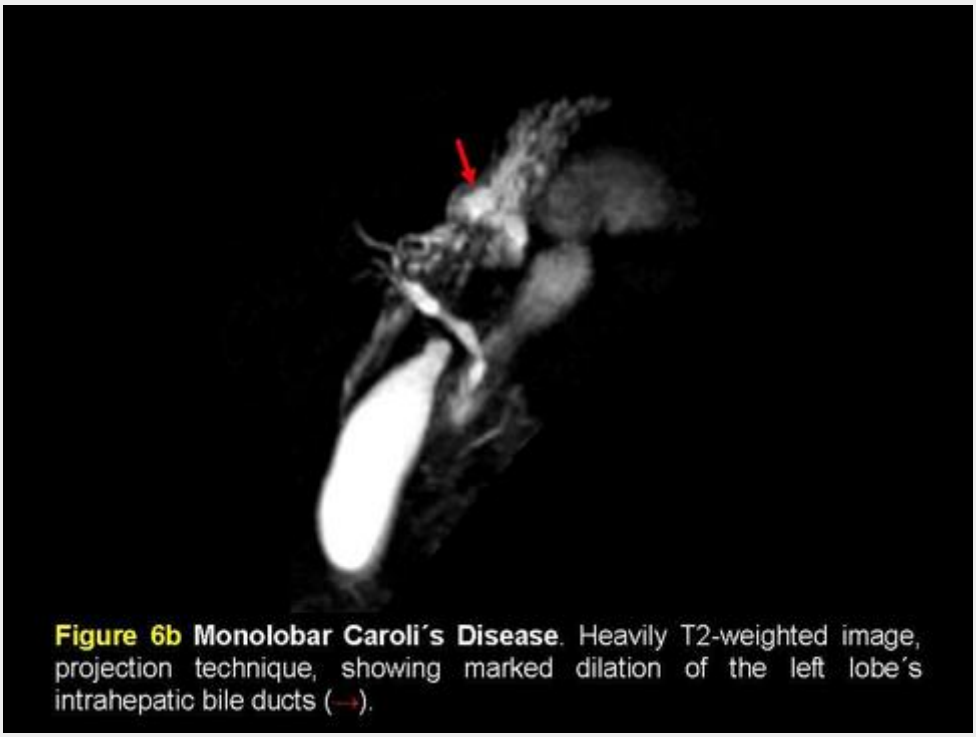


Figure 6b Monolobar Caroli´s Disease. Heavily T2-weighted image, projection technique, showing marked dilation of the left lobe´s intrahepatic bile ducts (→).

Caroli´s Syndrome

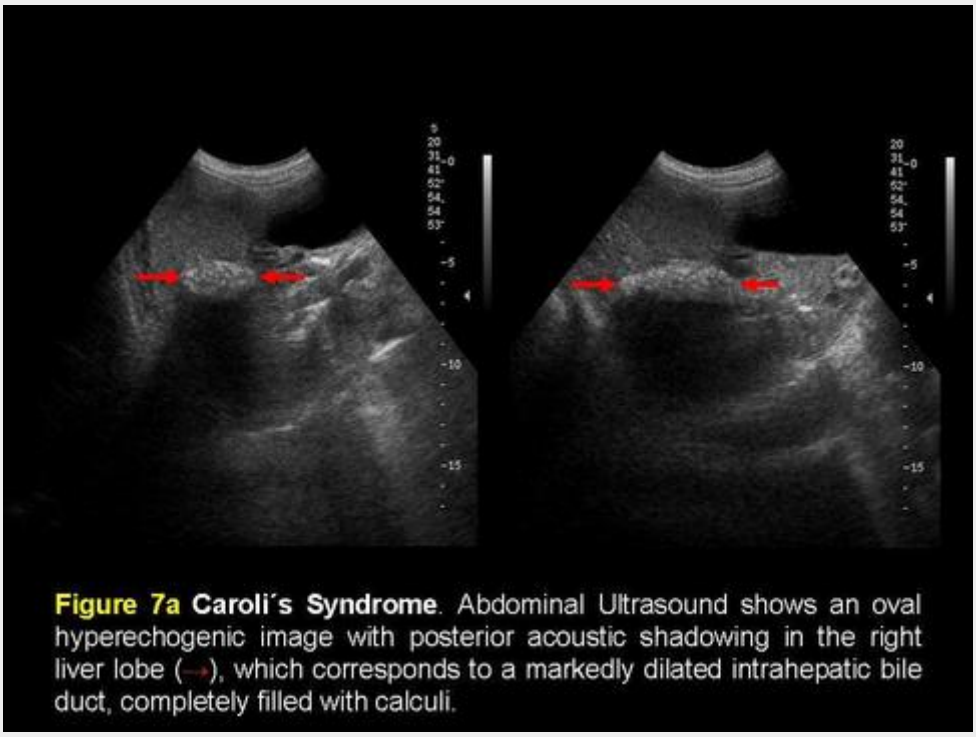


Figure 7a Caroli´s Syndrome. Abdominal Ultrasound shows an oval hyperechogenic image with posterior acoustic shadowing in the right liver lobe (→), which corresponds to a markedly dilated intrahepatic bile duct, completely filled with calculi.

diapositivo41.jpg

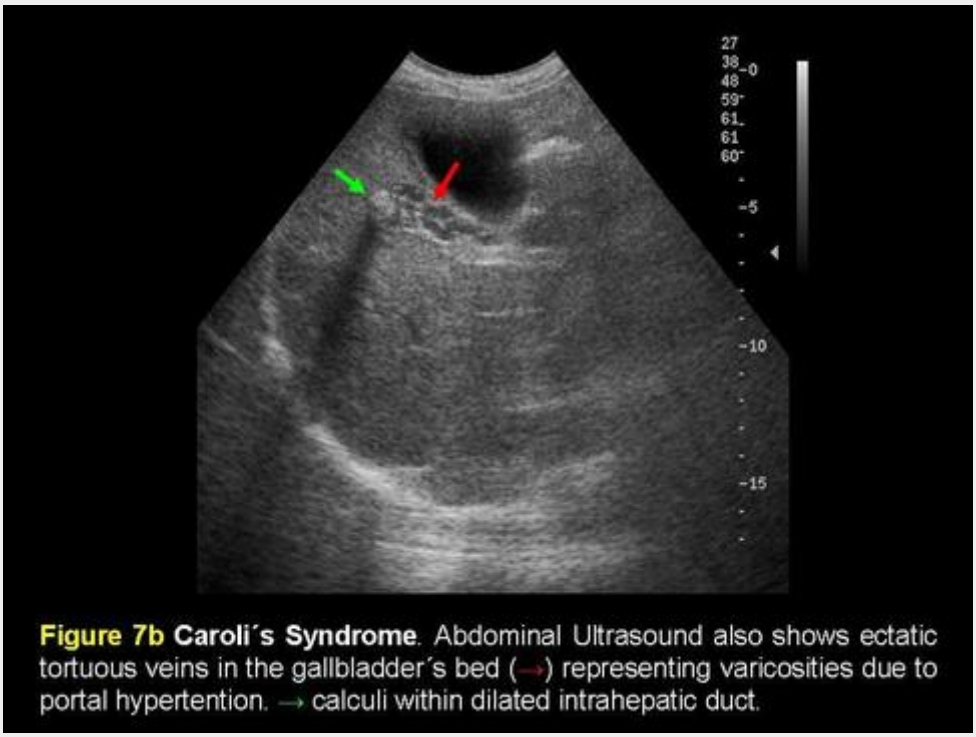


Figure 7b Caroli´s Syndrome. Abdominal Ultrasound also shows ectatic tortuous veins in the gallbladder´s bed (→) representing varicosities due to portal hypertention. → calculi within dilated intrahepatic duct.

diapositivo42.jpg

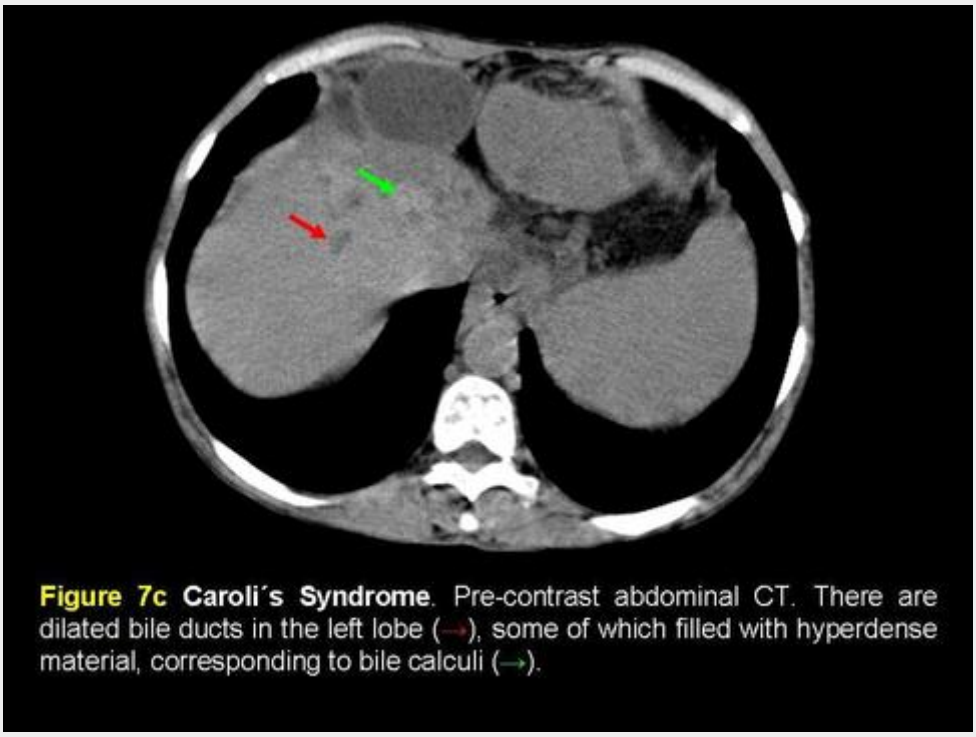


Figure 7c Caroli´s Syndrome. Pre-contrast abdominal CT. There are dilated bile ducts in the left lobe (→), some of which filled with hyperdense material, corresponding to bile calculi (→).

diapositivo43.jpg

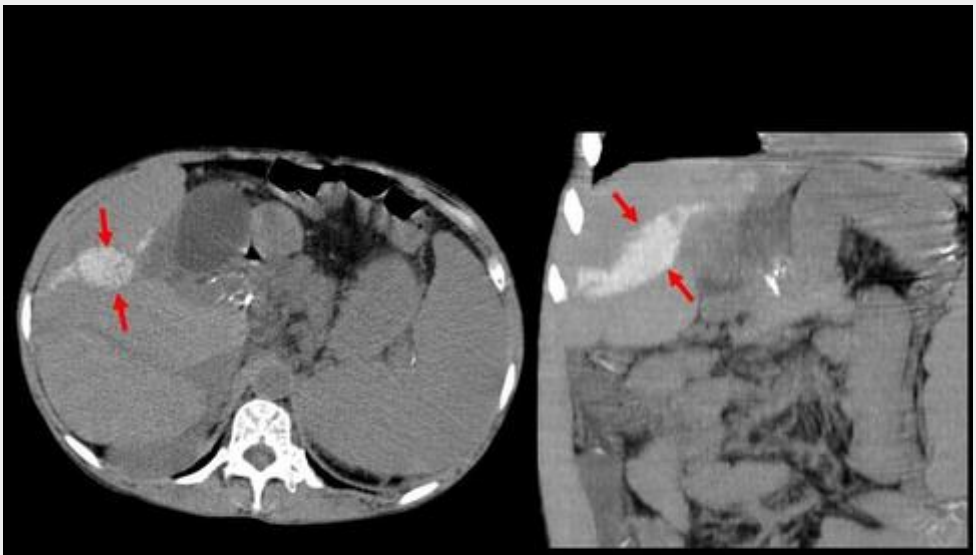


Figure 7d Caroli´s Syndrome. Pre-contrast abdominal CT. Axial (*left*) and oblique reformated (*right*) images. There is a markedly dilated bile duct in the right lobe, completely filled with hyperdense material, corresponding to bile calculi (→).

diapositivo44.jpg

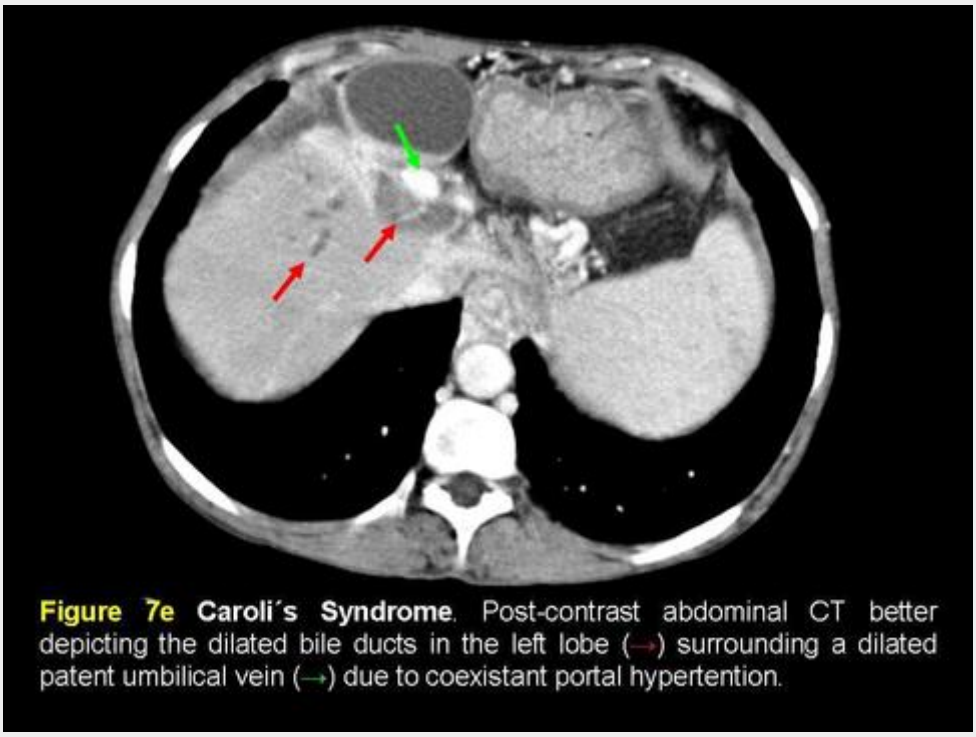


Figure 7e Caroli´s Syndrome. Post-contrast abdominal CT better depicting the dilated bile ducts in the left lobe (→) surrounding a dilated patent umbilical vein (→) due to coexistant portal hypertention.

diapositivo45.jpg

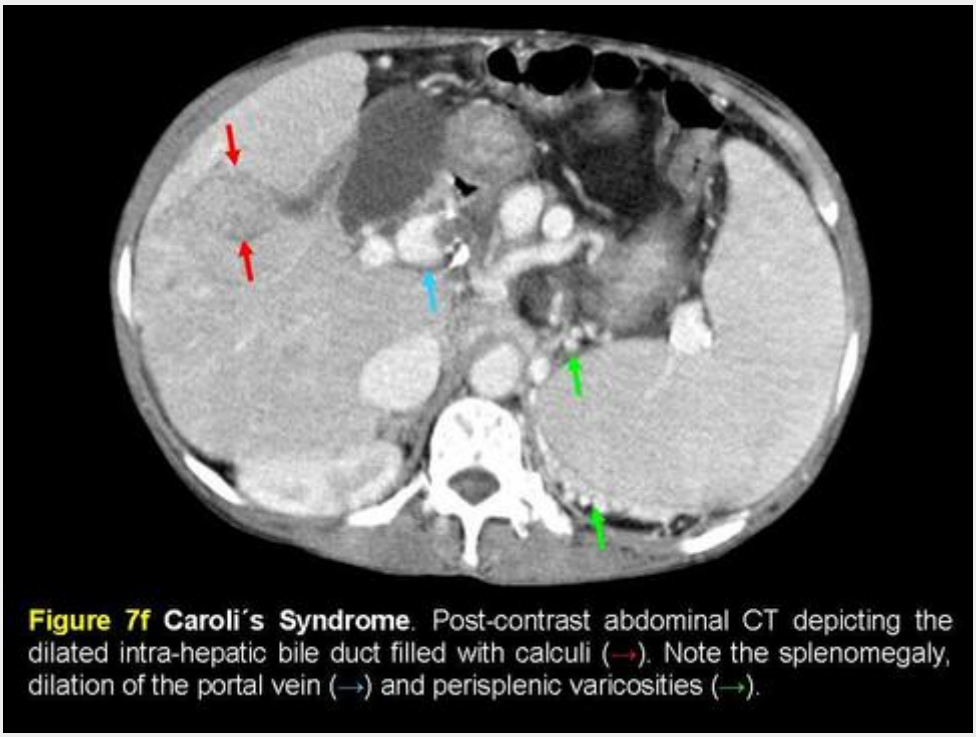


Figure 7f Caroli´s Syndrome. Post-contrast abdominal CT depicting the dilated intra-hepatic bile duct filled with calculi (→). Note the splenomegaly, dilation of the portal vein (→) and perisplenic varicosities (→).

Caroli´s Syndrome

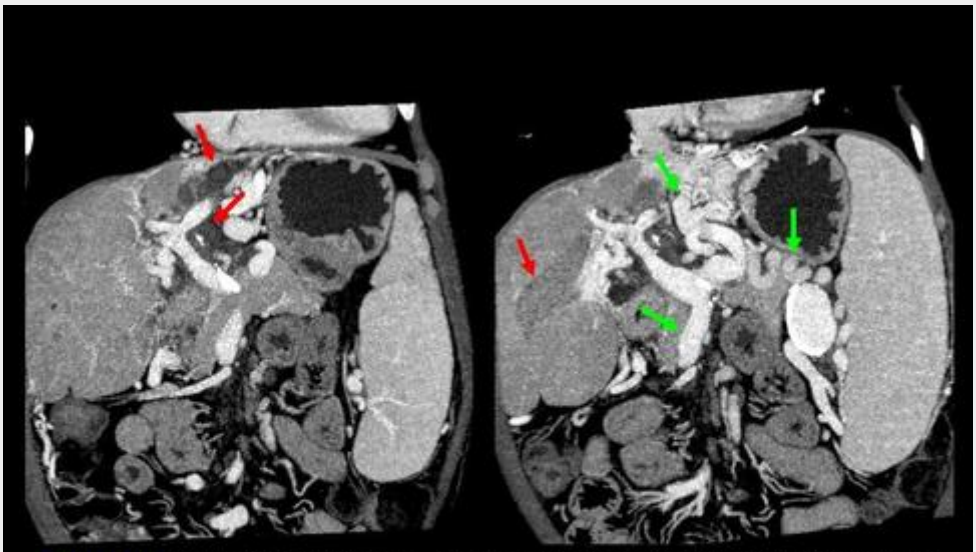


Figure 7g Caroli´s Syndrome. Post-contrast abdominal CT. Reformated oblique MIP images depicting the dilated intra-hepatic bile ducts, some of which filled with calculi (→). Note the splenomegaly and the tortuosity and dilation of the portal, splenic and perigastric veins (→) due to portal hypertension.

diapositivo47.jpg

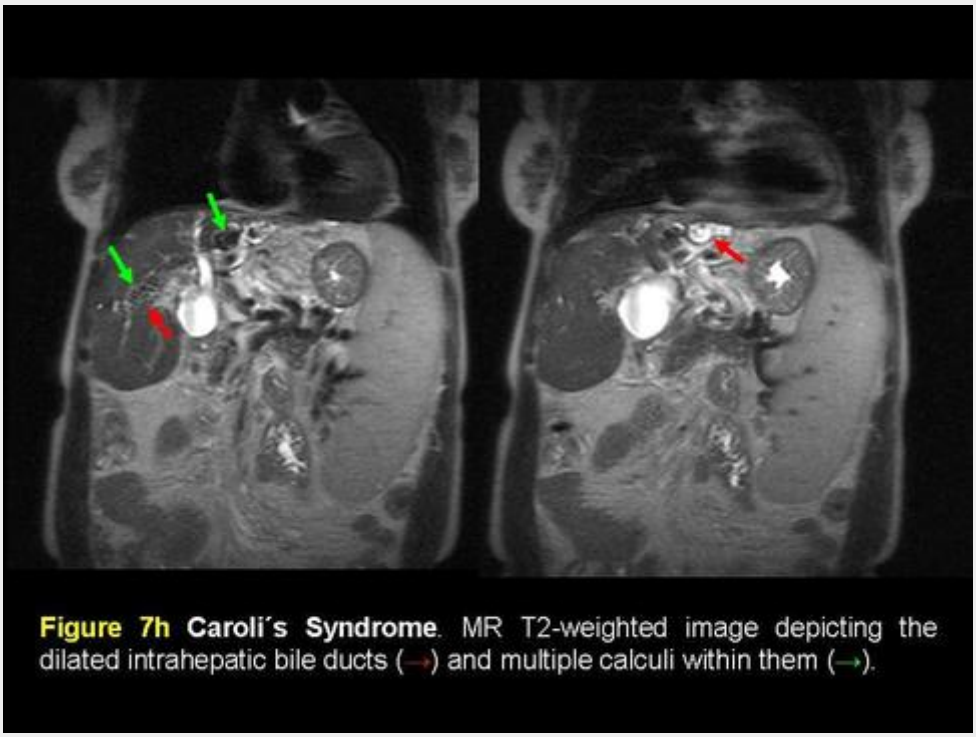


Figure 7h Caroli´s Syndrome. MR T2-weighted image depicting the dilated intrahepatic bile ducts (→) and multiple calculi within them (→).

diapositivo48.jpg

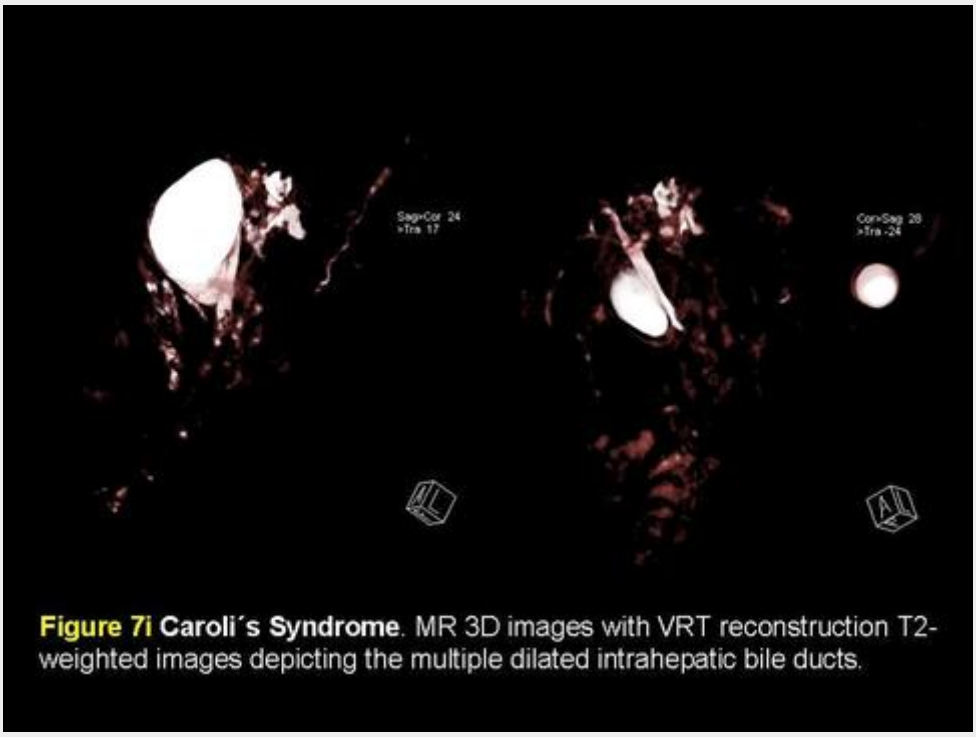
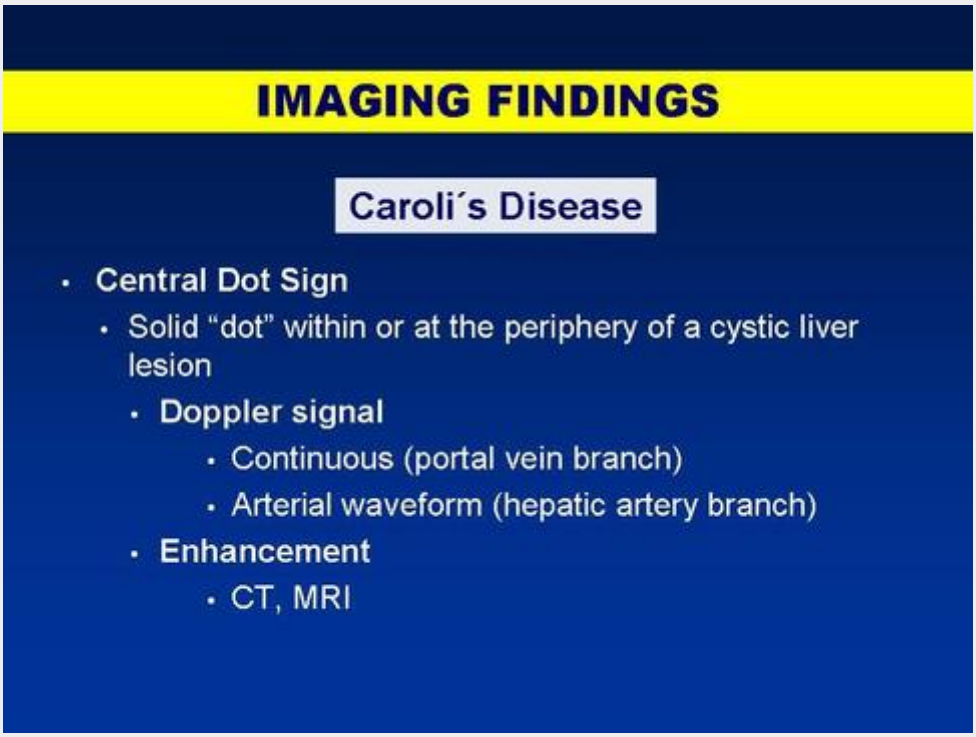


Figure 7i Caroli´s Syndrome. MR 3D images with VRT reconstruction T2-weighted images depicting the multiple dilated intrahepatic bile ducts.

diapositivo50.jpg



diapositivo51.jpg

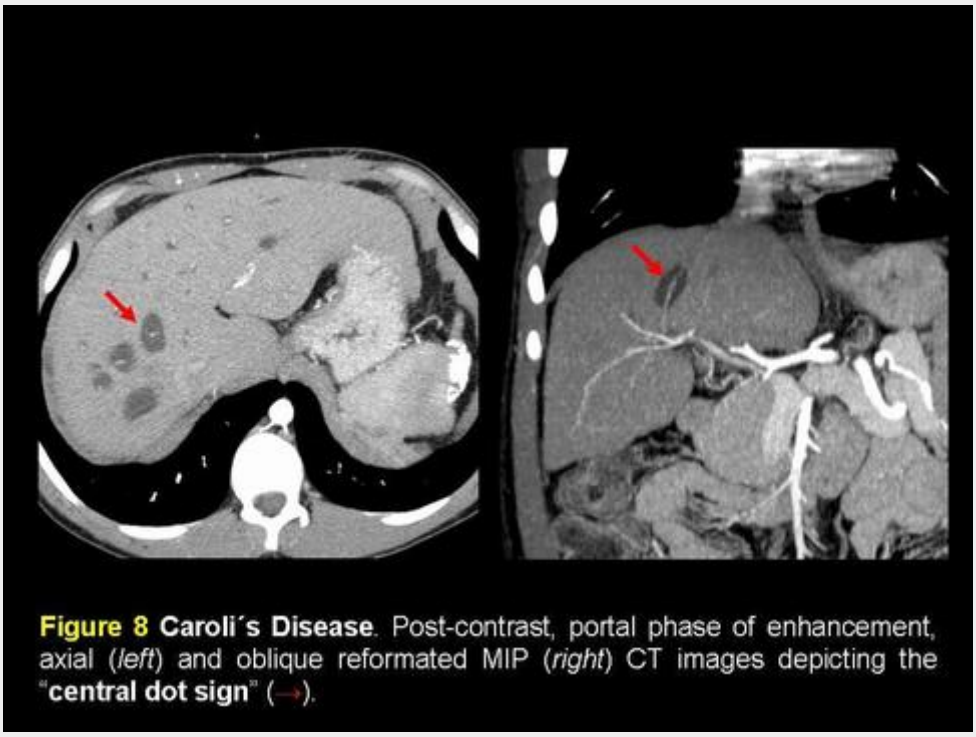
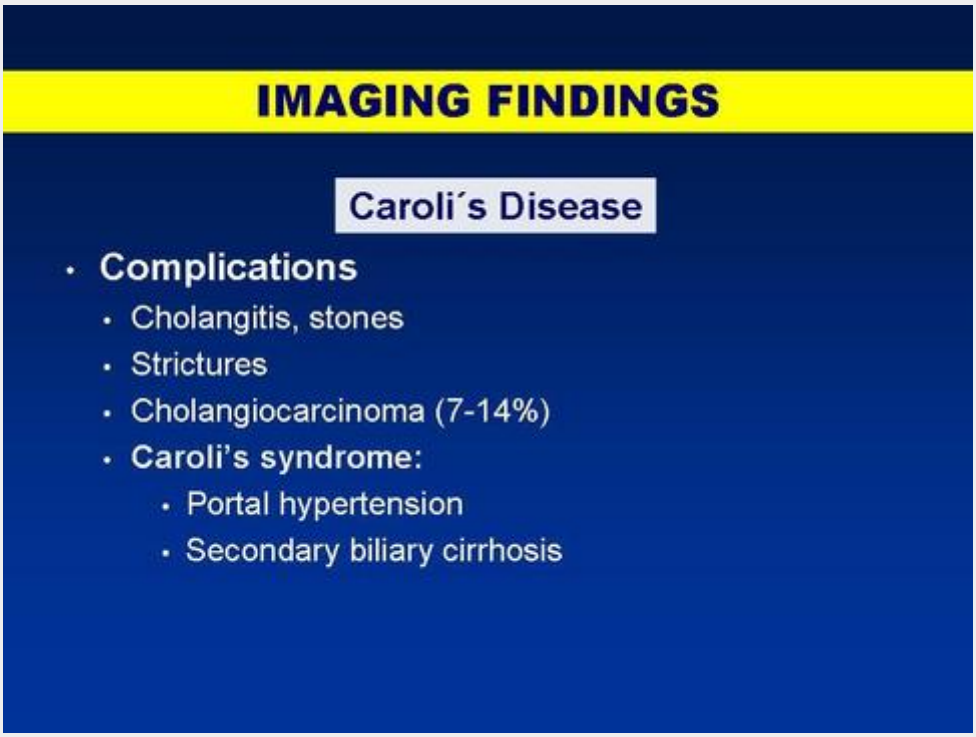


Figure 8 Caroli´s Disease. Post-contrast, portal phase of enhancement, axial (*left*) and oblique reformated MIP (*right*) CT images depicting the "**central dot sign**" (→).

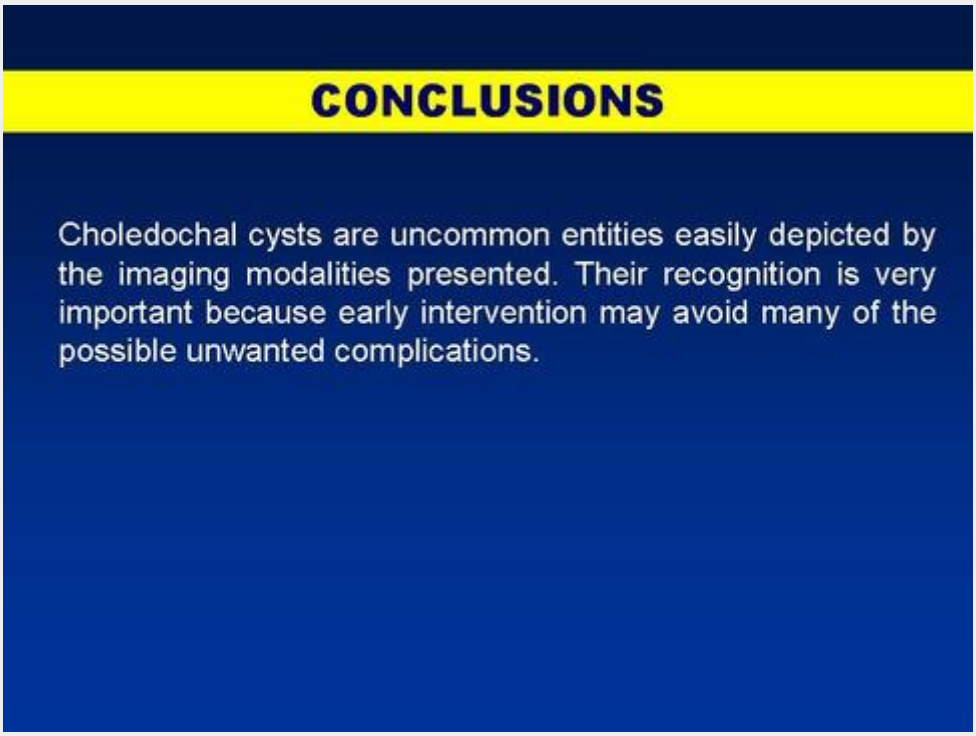
diapositivo52.jpg



4. Conclusion

Conclusion

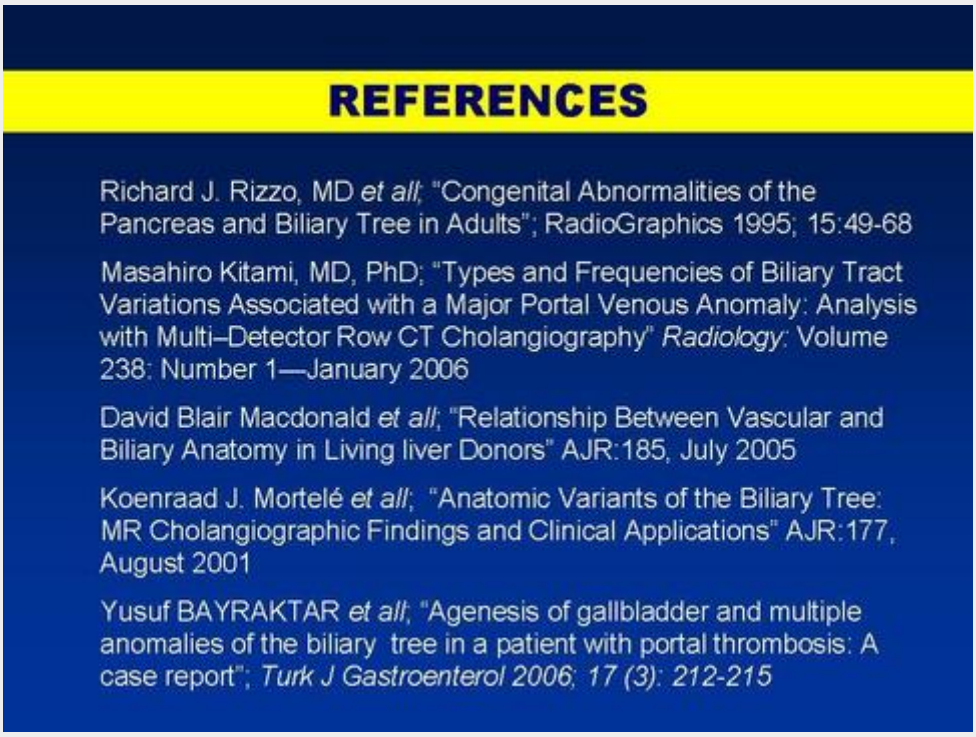
diapositivo53.jpg



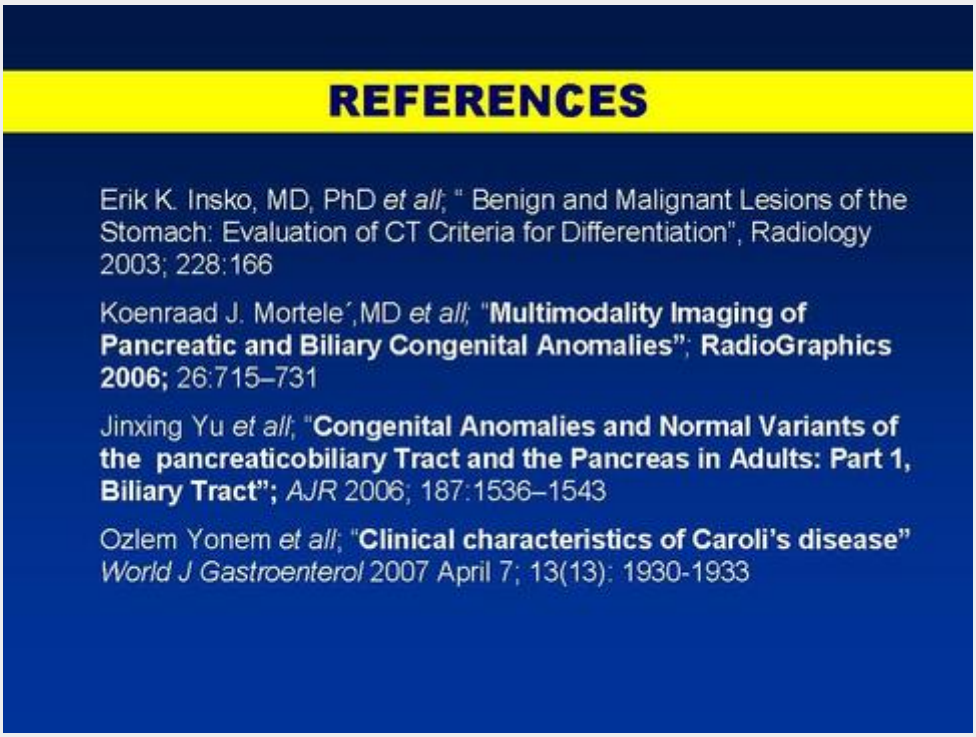
5. References

References

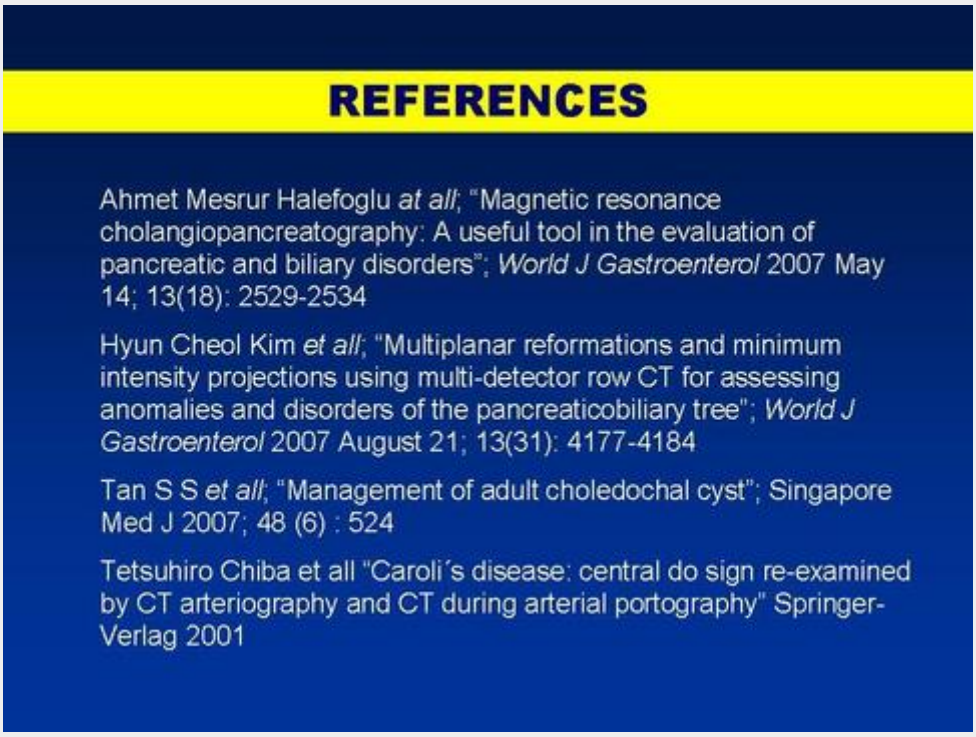
diapositivo55.jpg



diapositivo56.jpg



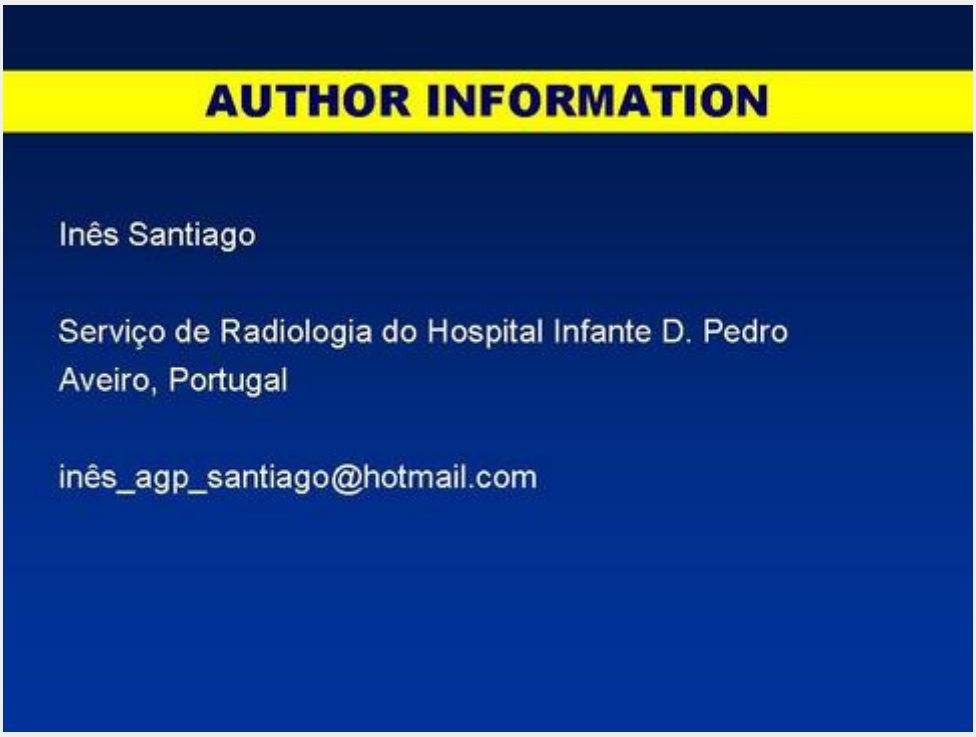
diapositivo57.jpg



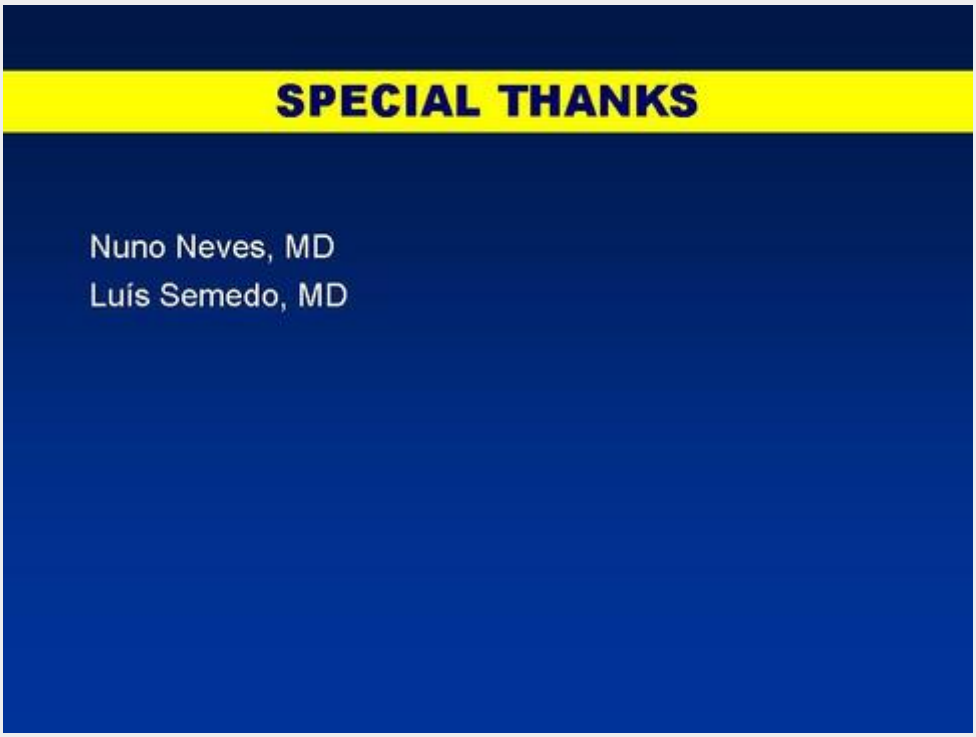
6. Author Information

Author Information

Author information

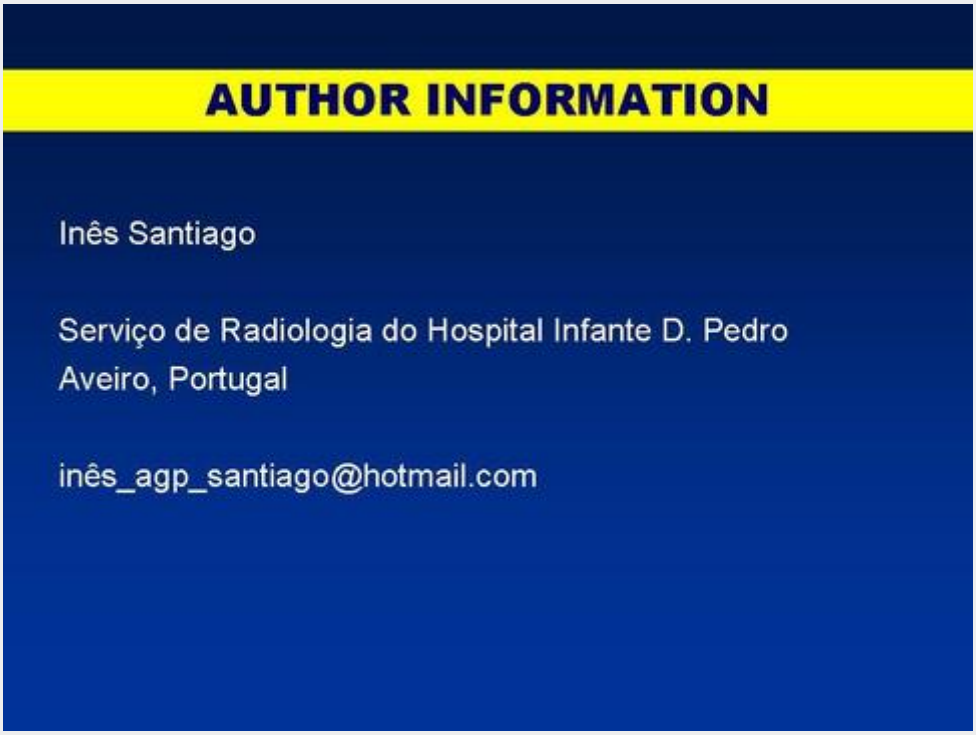


Special thanks



7. Mediafiles

Author information



Caroli´s Syndrome

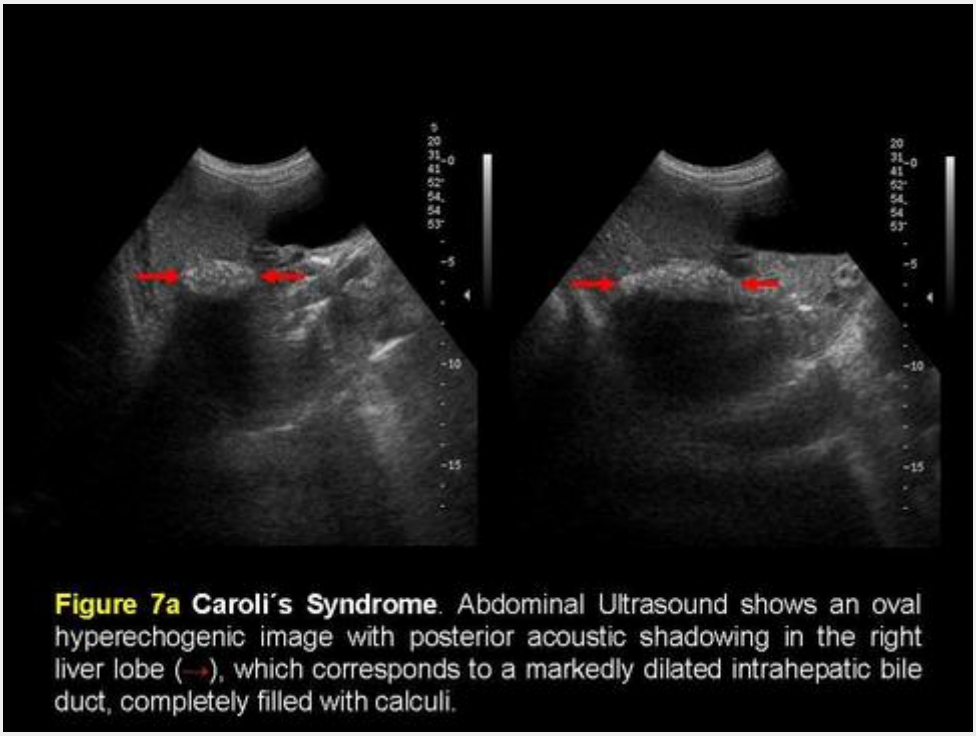


Figure 7a Caroli´s Syndrome. Abdominal Ultrasound shows an oval hyperechogenic image with posterior acoustic shadowing in the right liver lobe (→), which corresponds to a markedly dilated intrahepatic bile duct, completely filled with calculi.

Caroli´s Syndrome

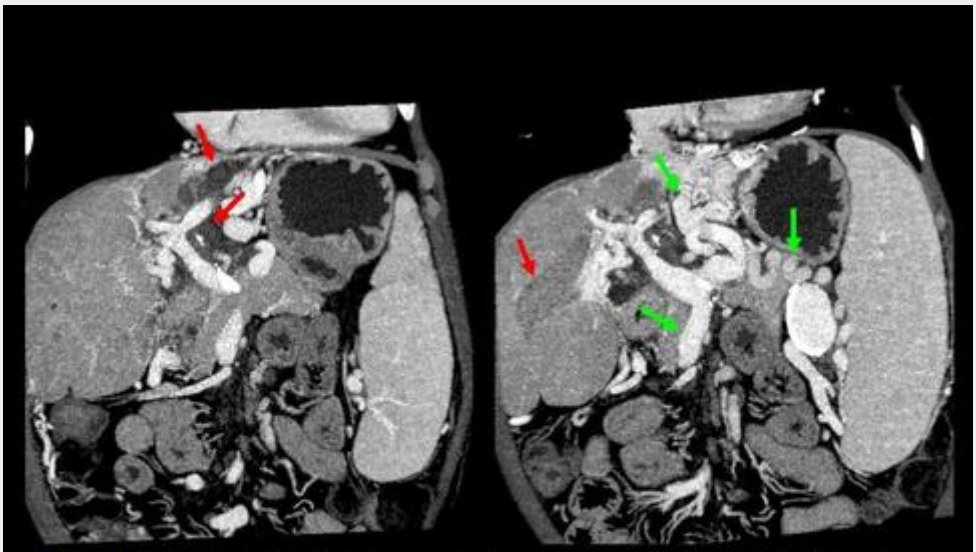


Figure 7g Caroli´s Syndrome. Post-contrast abdominal CT. Reformated oblique MIP images depicting the dilated intra-hepatic bile ducts, some of which filled with calculi (→). Note the splenomegaly and the tortuosity and dilation of the portal, splenic and perigastric veins (→) due to portal hypertension.

Choledochocele

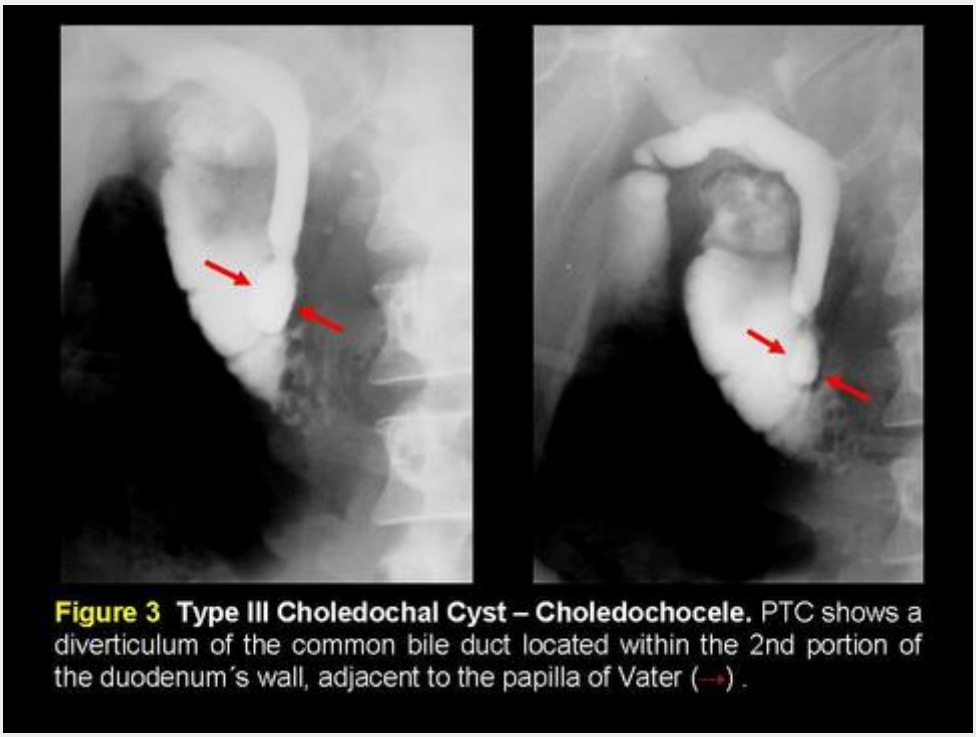
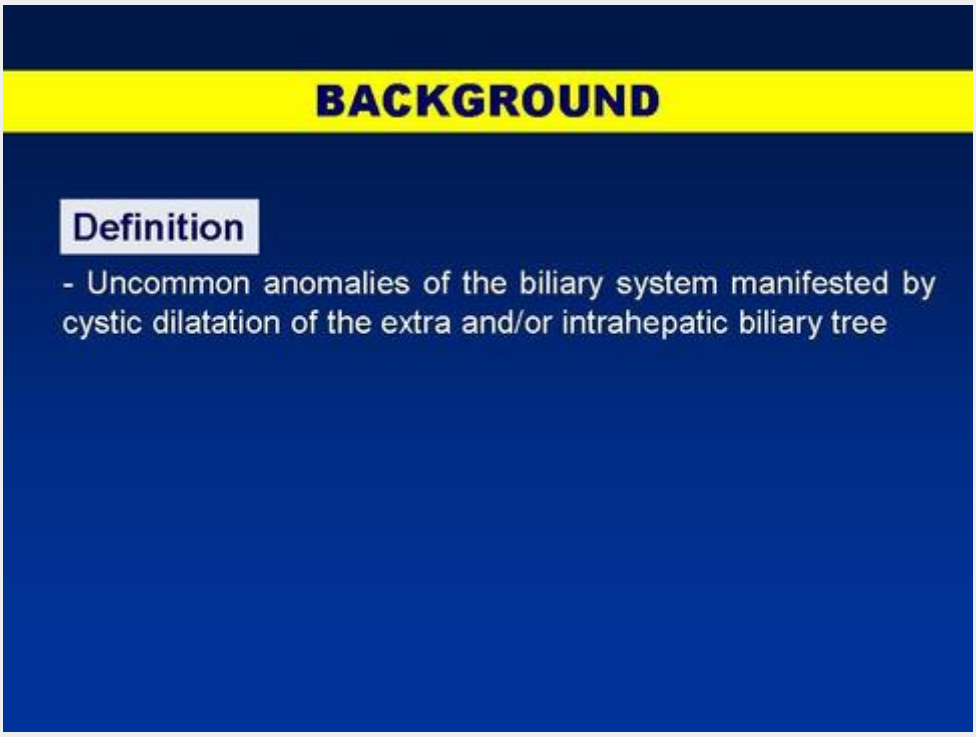


Figure 3 Type III Choledochal Cyst – Choledochocele. PTC shows a diverticulum of the common bile duct located within the 2nd portion of the duodenum´s wall, adjacent to the papilla of Vater (→) .

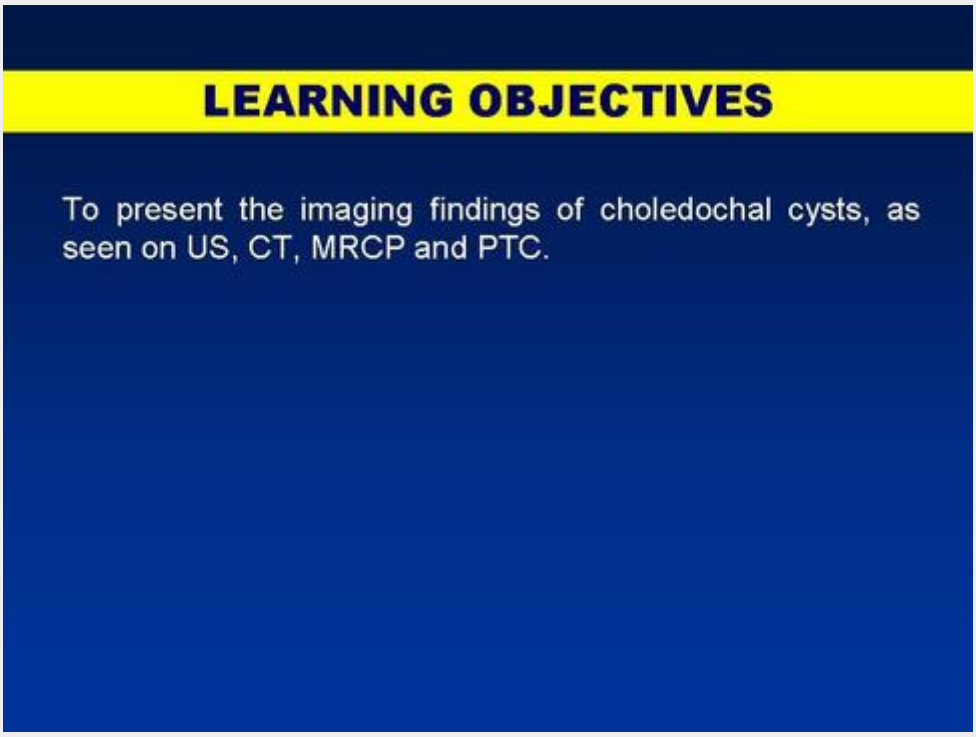
Definition of choledochal cysts



Diverticulum

Figure 3b Type II Choledochal Cyst - Diverticulum. Image obtained after stent placement, showing restoration of the bile flux from the right lobe.

Learning objectives



Monolobar Caroli´s Disease

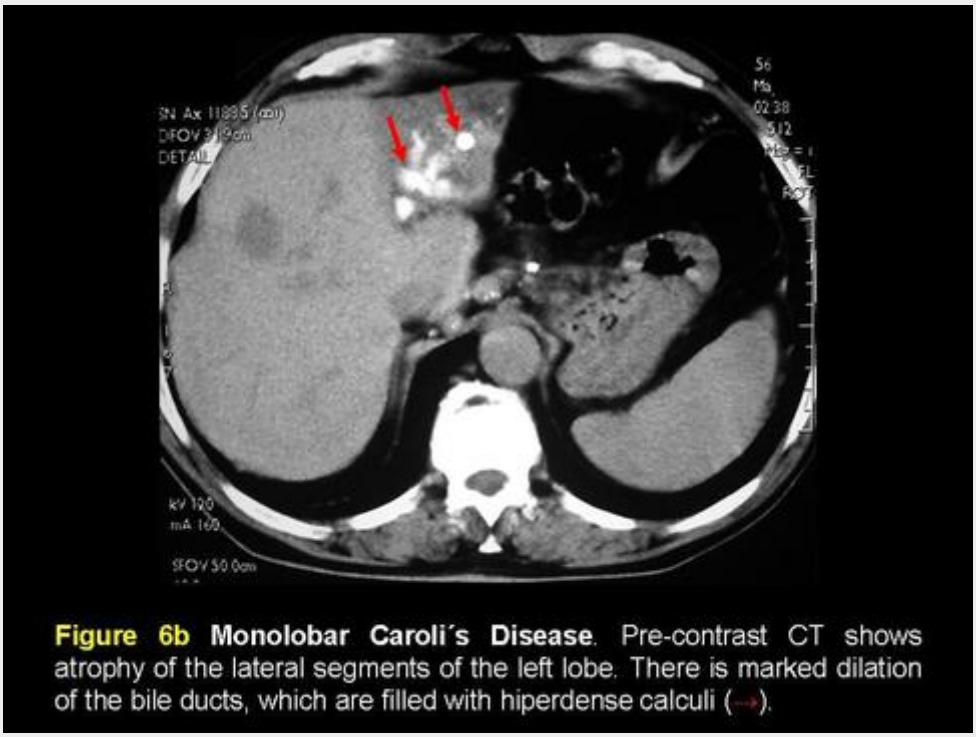
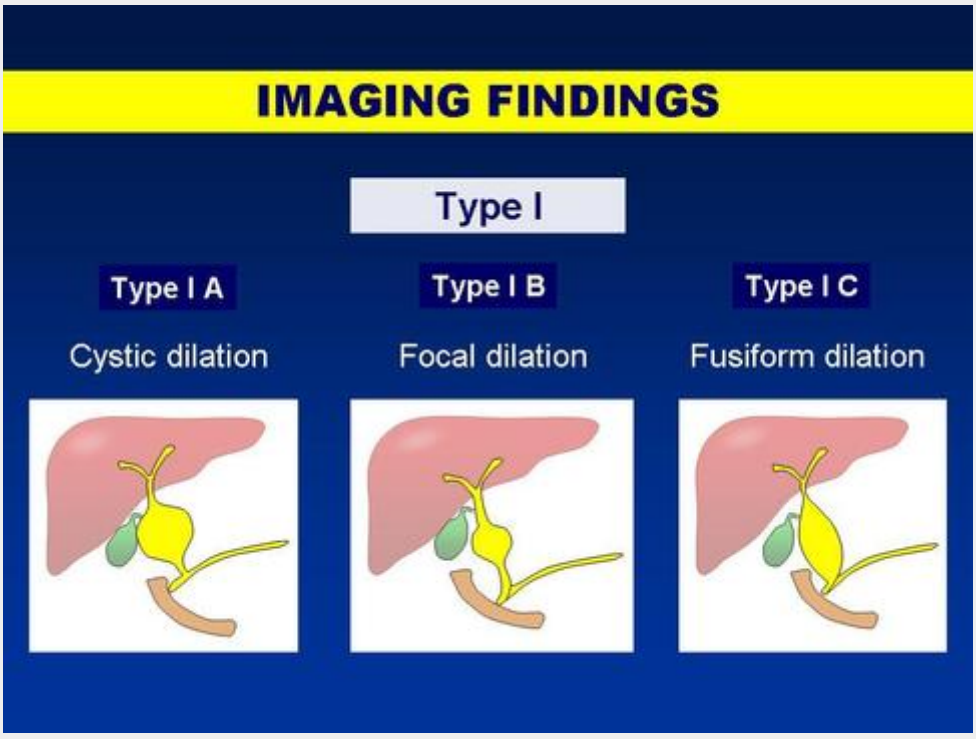


Figure 6b Monolobar Caroli´s Disease. Pre-contrast CT shows atrophy of the lateral segments of the left lobe. There is marked dilation of the bile ducts, which are filled with hiperdense calculi (→).

Special thanks

Type I



Type IC

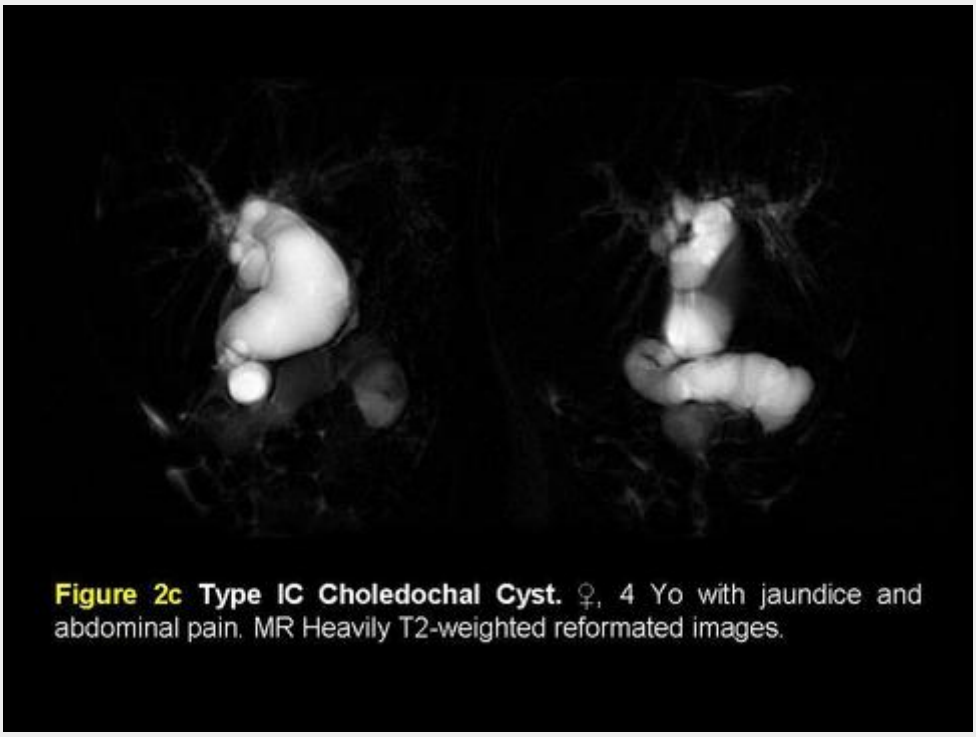
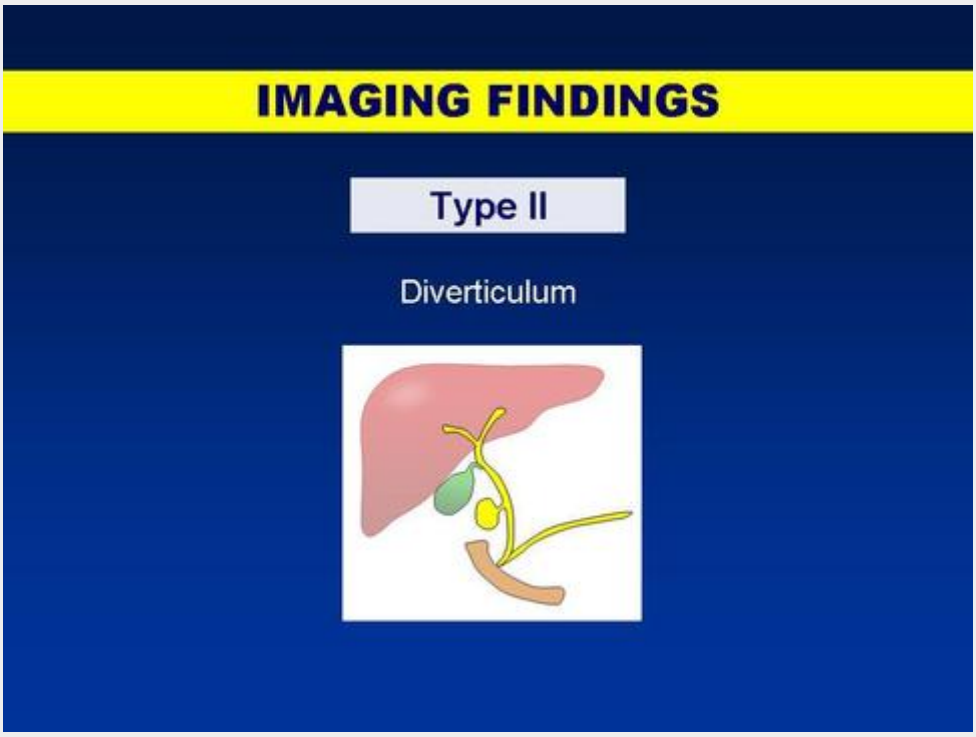


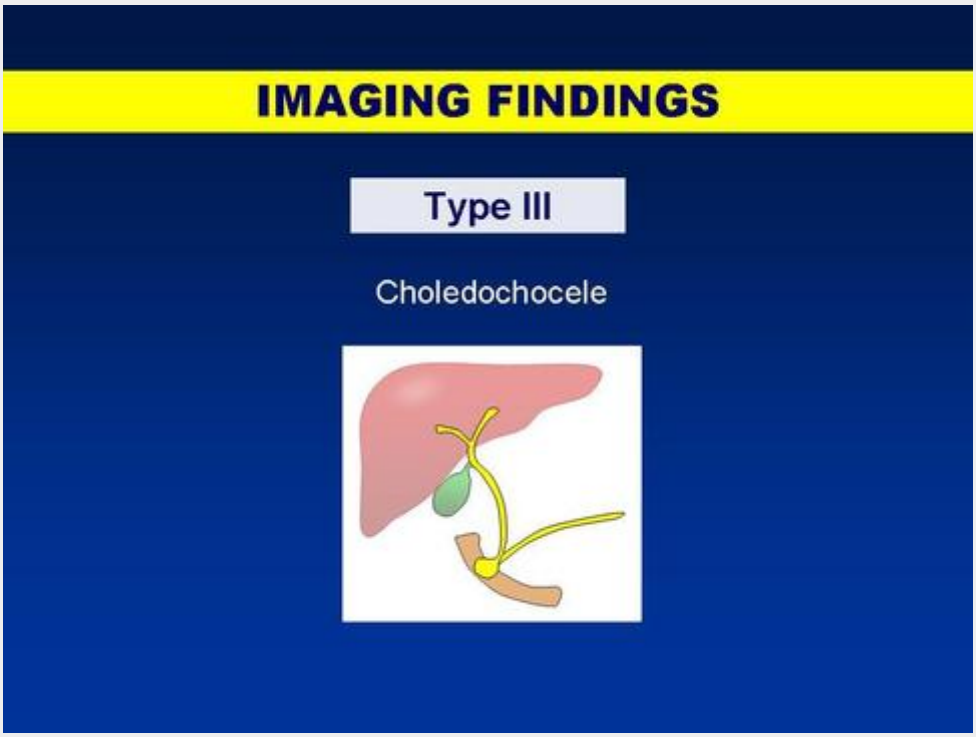
Figure 2c Type IC Choledochal Cyst. ♀, 4 Yo with jaundice and abdominal pain. MR Heavily T2-weighted reformated images.

Type IC Choledochal Cyst

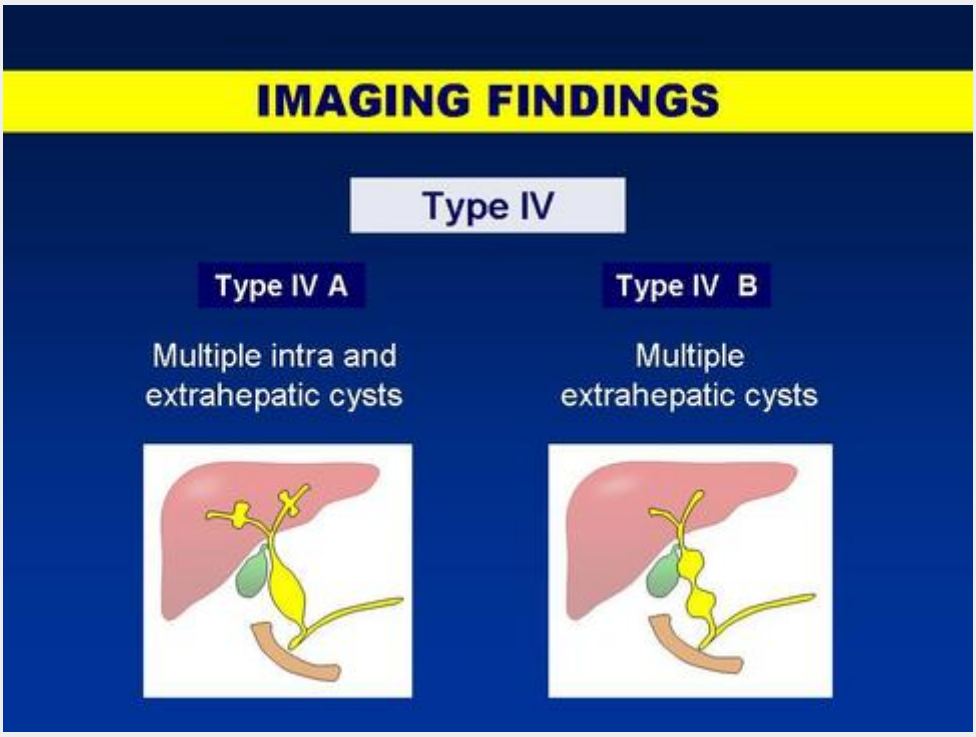
Type II



Type III



Type IV



Type IVA

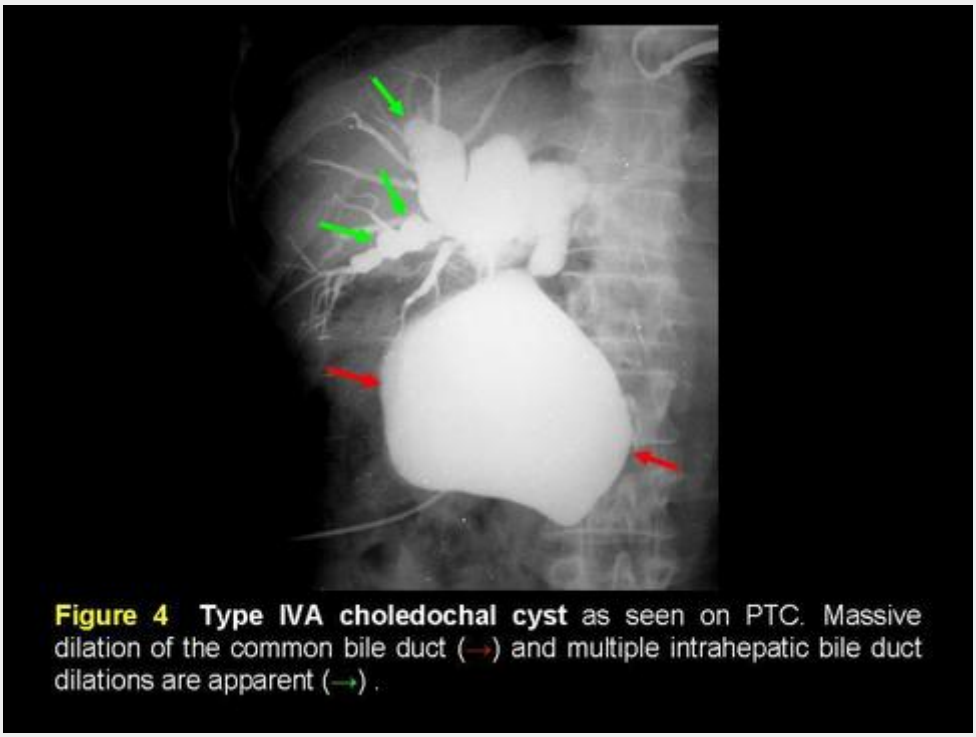
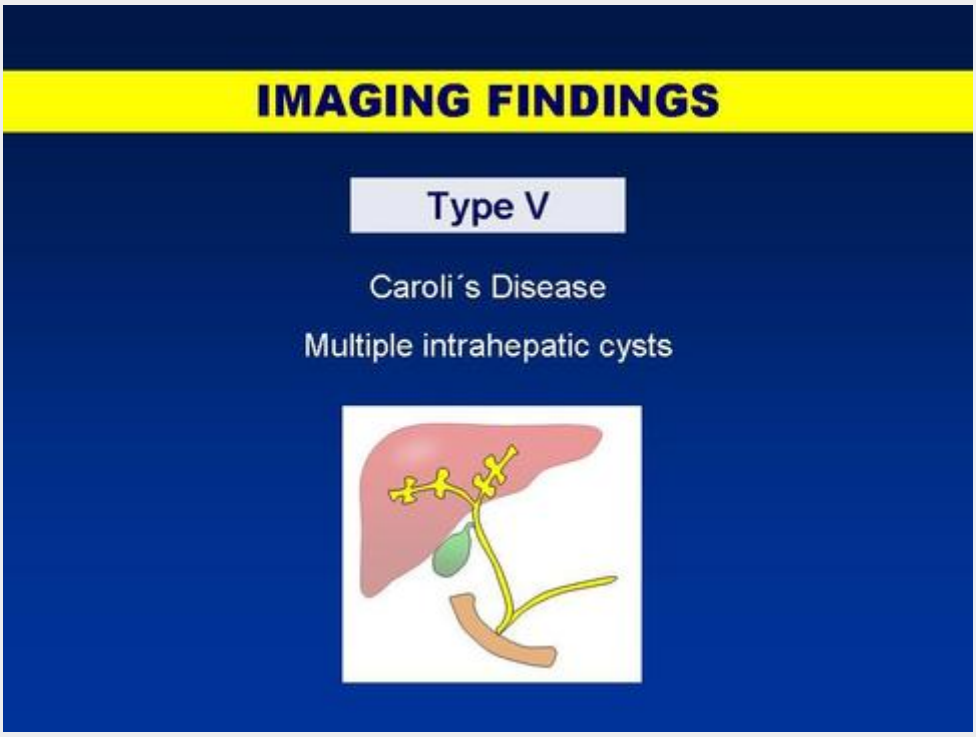
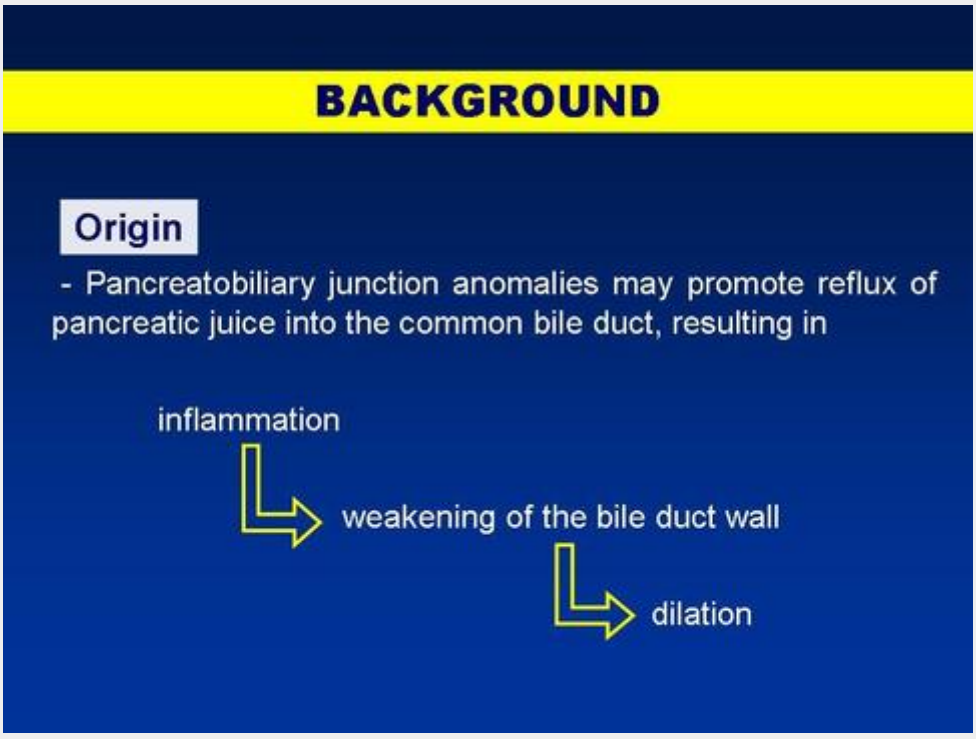


Figure 4 **Type IVA choledochal cyst** as seen on PTC. Massive dilation of the common bile duct (→) and multiple intrahepatic bile duct dilations are apparent (→).

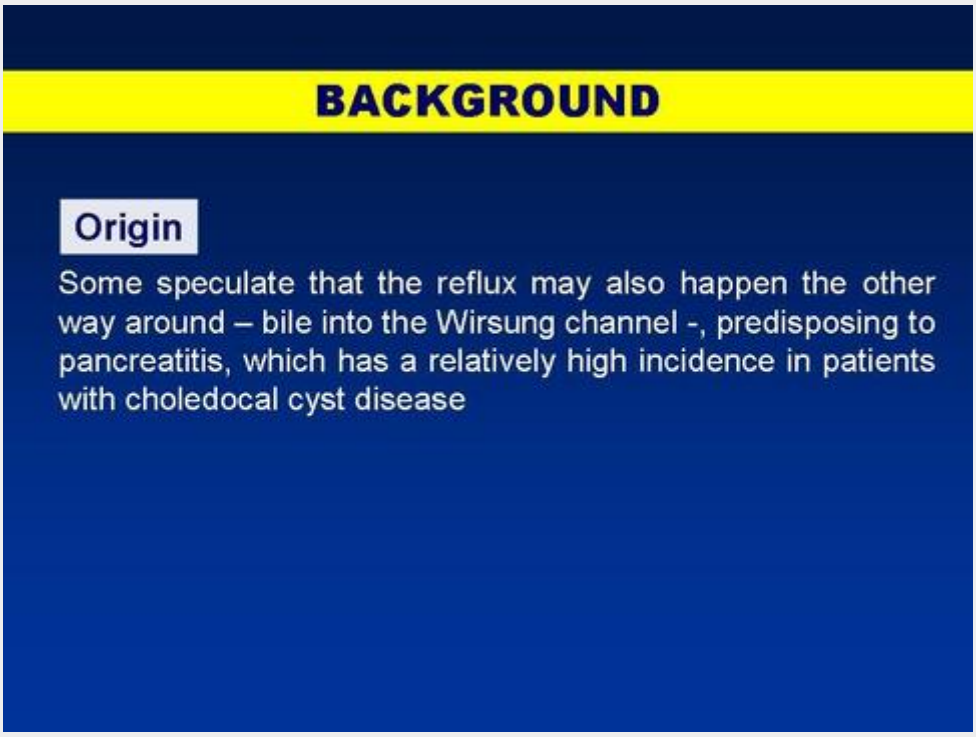
Type V



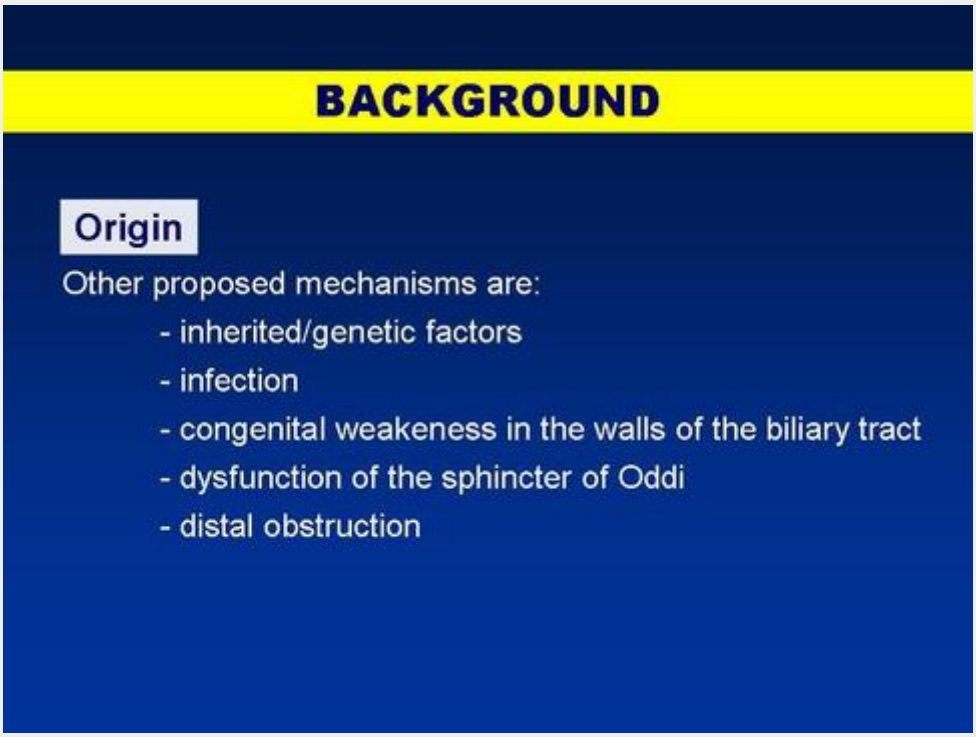
diapositivo4.jpg



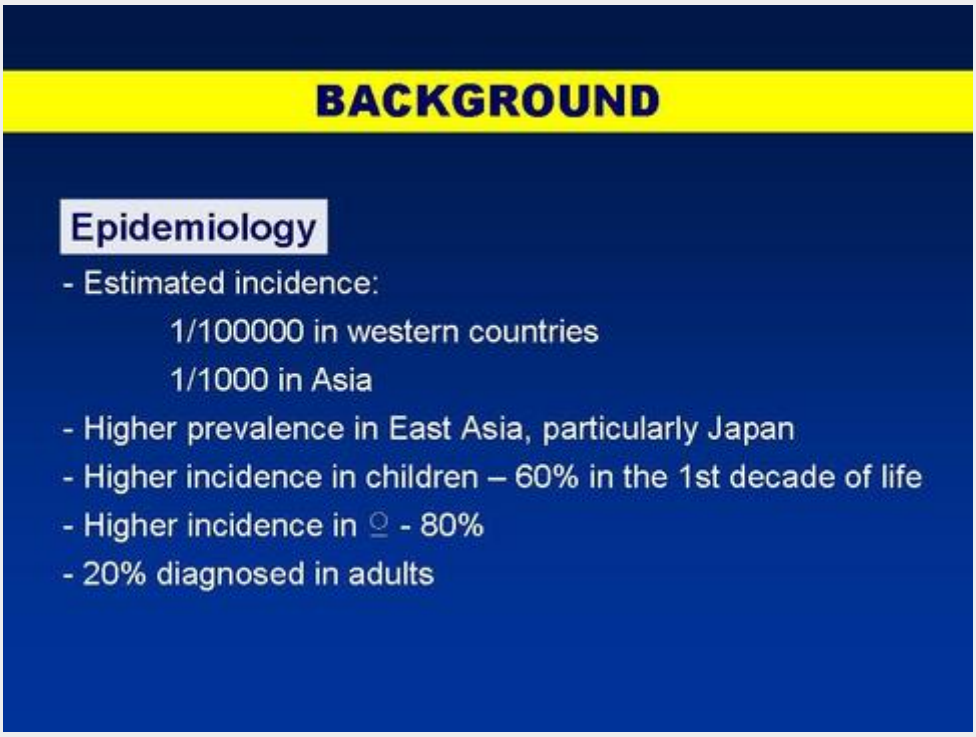
diapositivo5.jpg



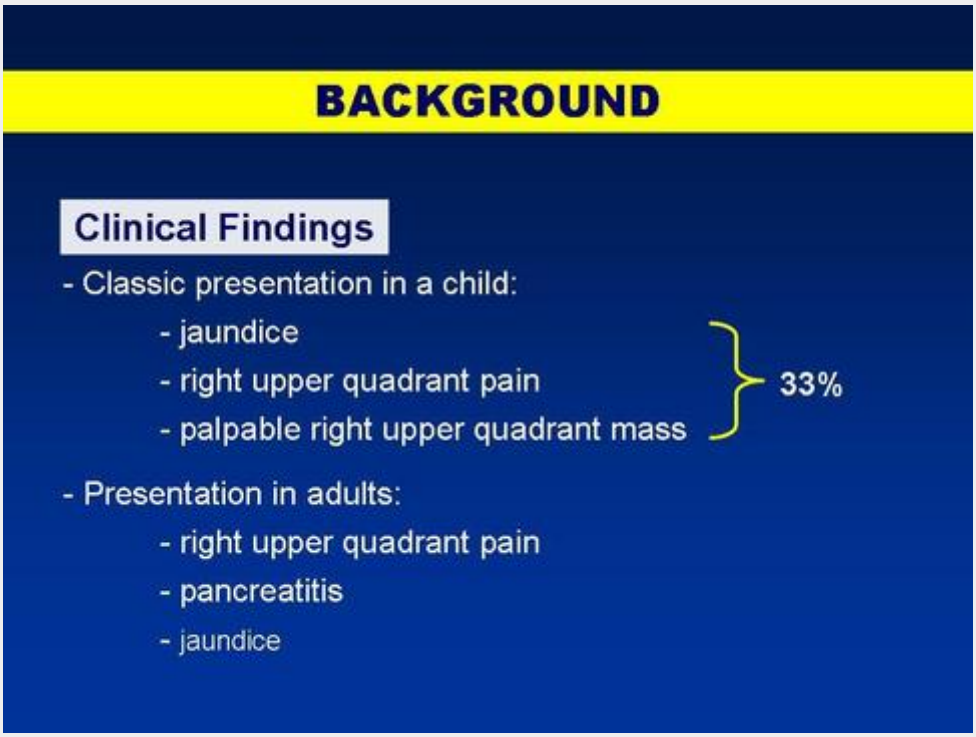
diapositivo6.jpg



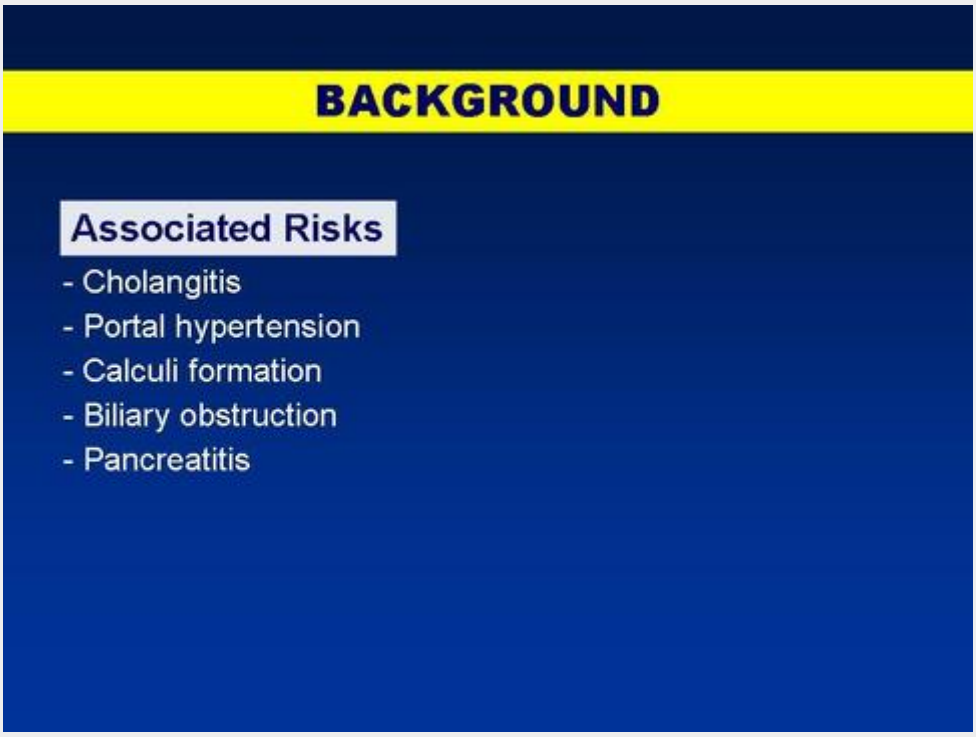
diapositivo7.jpg



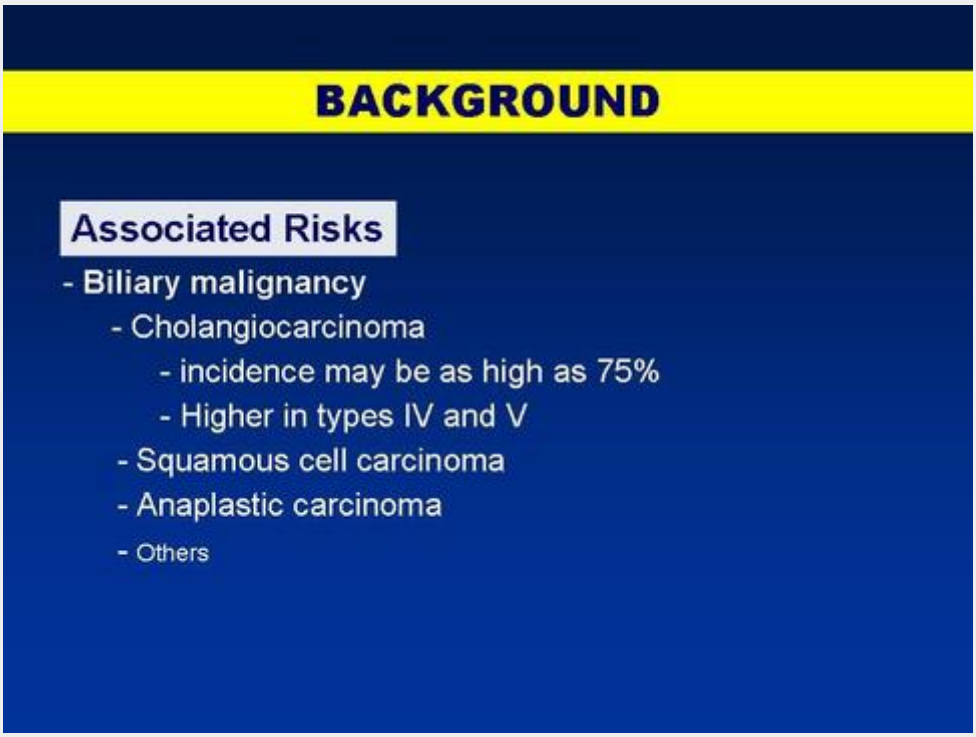
diapositivo8.jpg



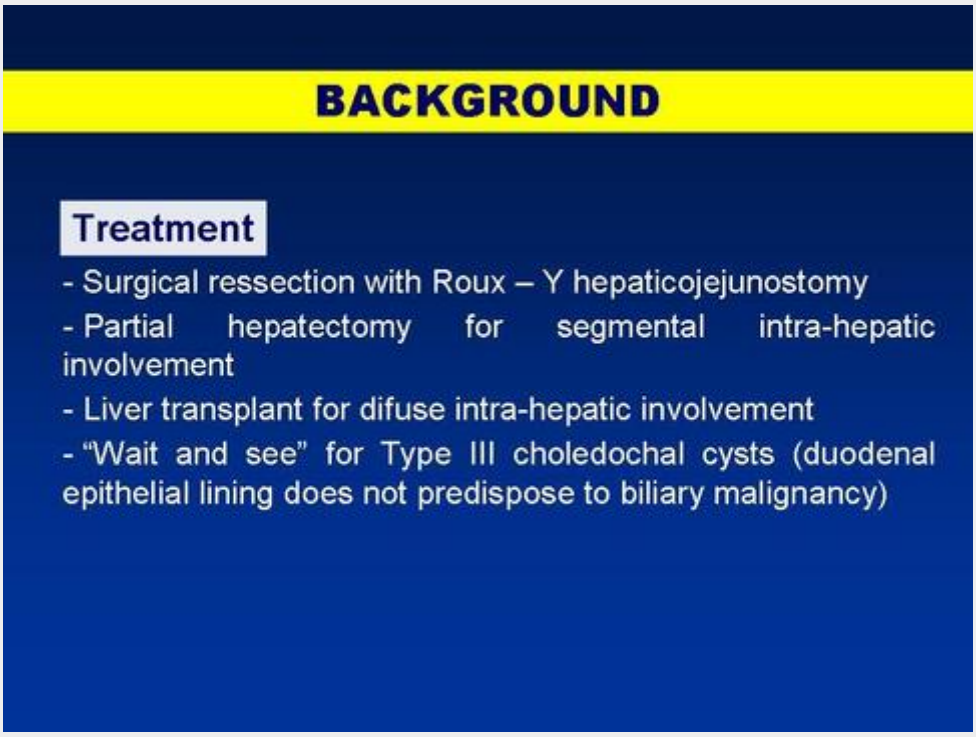
diapositivo9.jpg



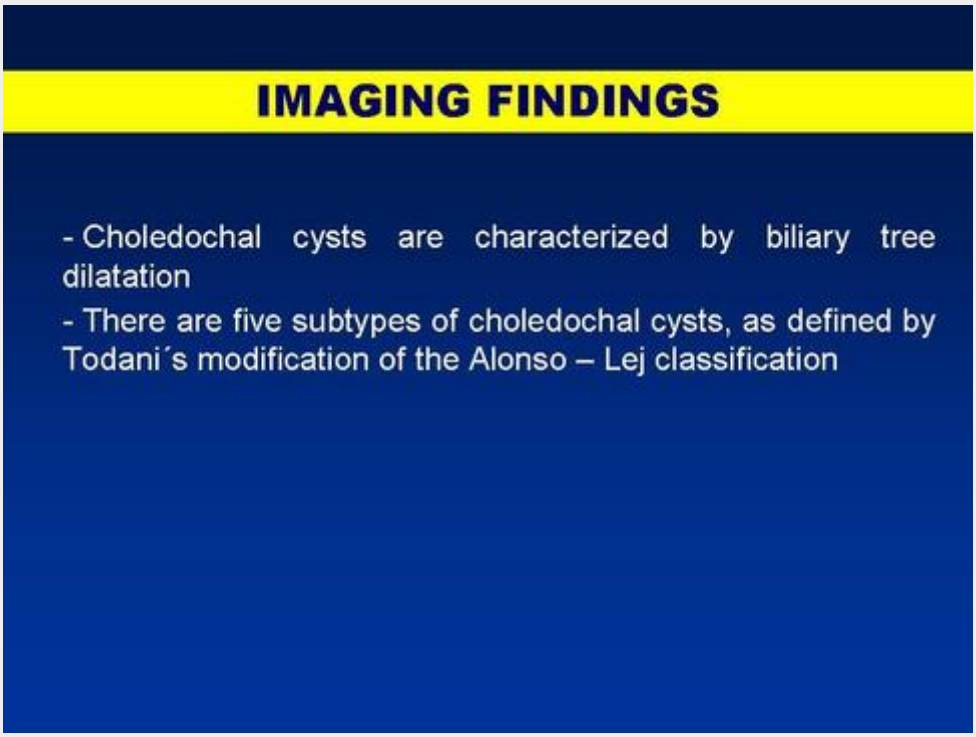
diapositivo10.jpg



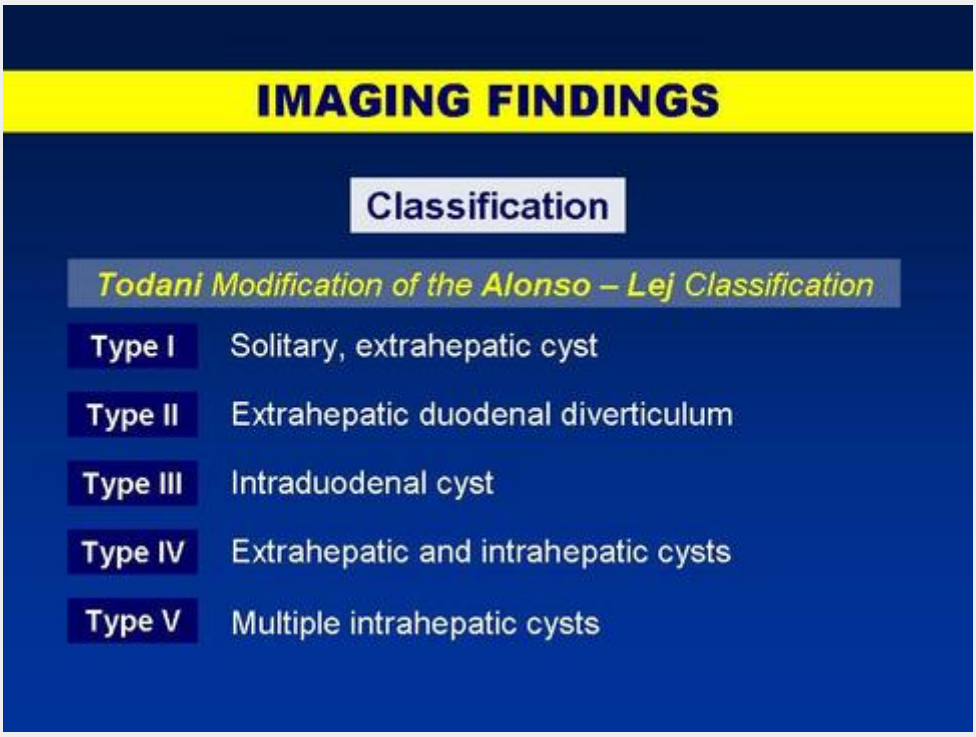
diapositivo11.jpg



diapositivo12.jpg



diapositivo13.jpg



diapositivo15.jpg

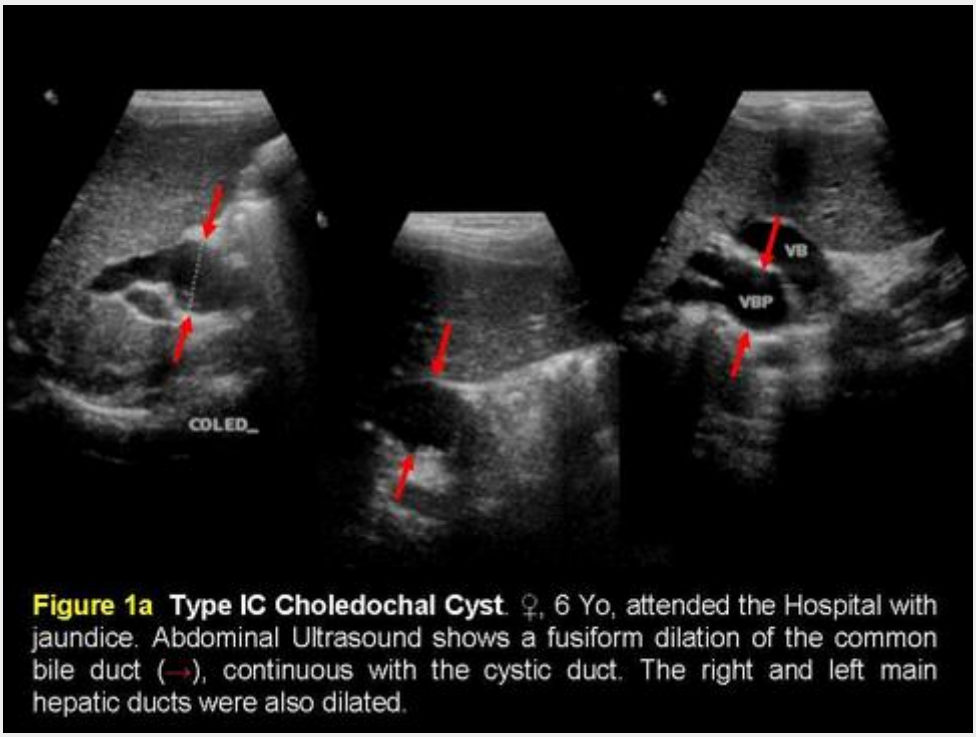


Figure 1a Type IC Choledochal Cyst. ♀, 6 Yo, attended the Hospital with jaundice. Abdominal Ultrasound shows a fusiform dilation of the common bile duct (→), continuous with the cystic duct. The right and left main hepatic ducts were also dilated.

diapositivo16.jpg

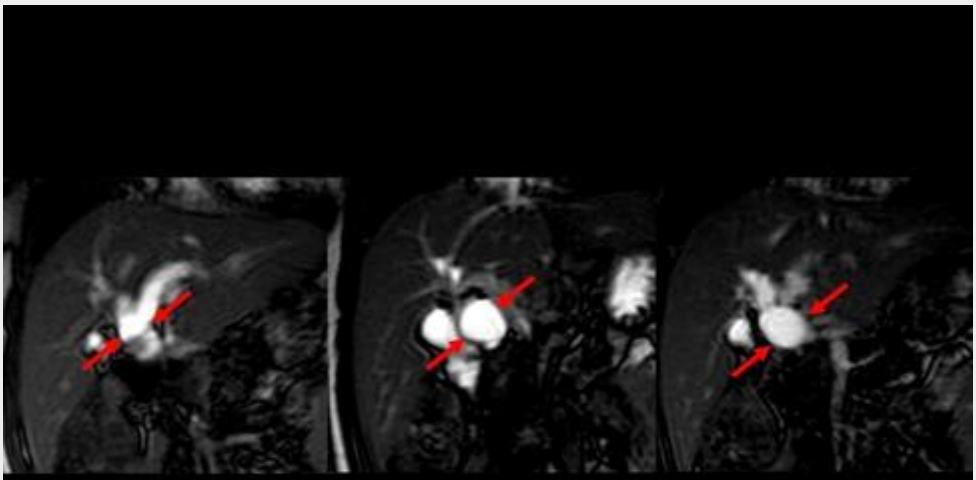


Figure 1b Type IC Choledochal Cyst. Magnetic Ressonance SSFP sequencies show a fusiform dilation of the common hepatic and common bile ducts. The cystic duct drains into the dilated extrahepatic bile duct.

diapositivo17.jpg

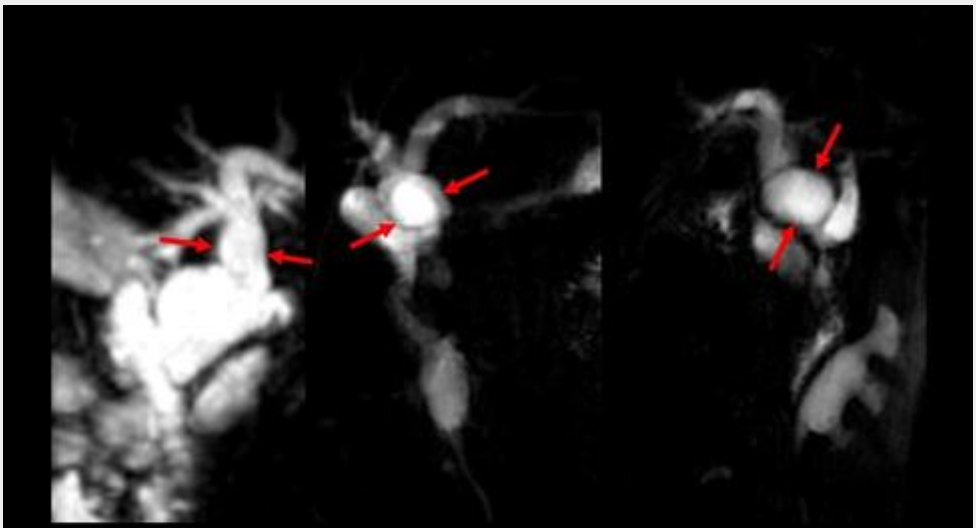


Figure 1c Type IC Choledochal Cyst. MR T2 reformatted images show a fusiform dilation of the common hepatic and common bile ducts. The cystic duct drains to the dilated extrahepatic bile duct. These findings correspond to a Type IC choledochal cyst, according to the Todani classification.

diapositivo18.jpg

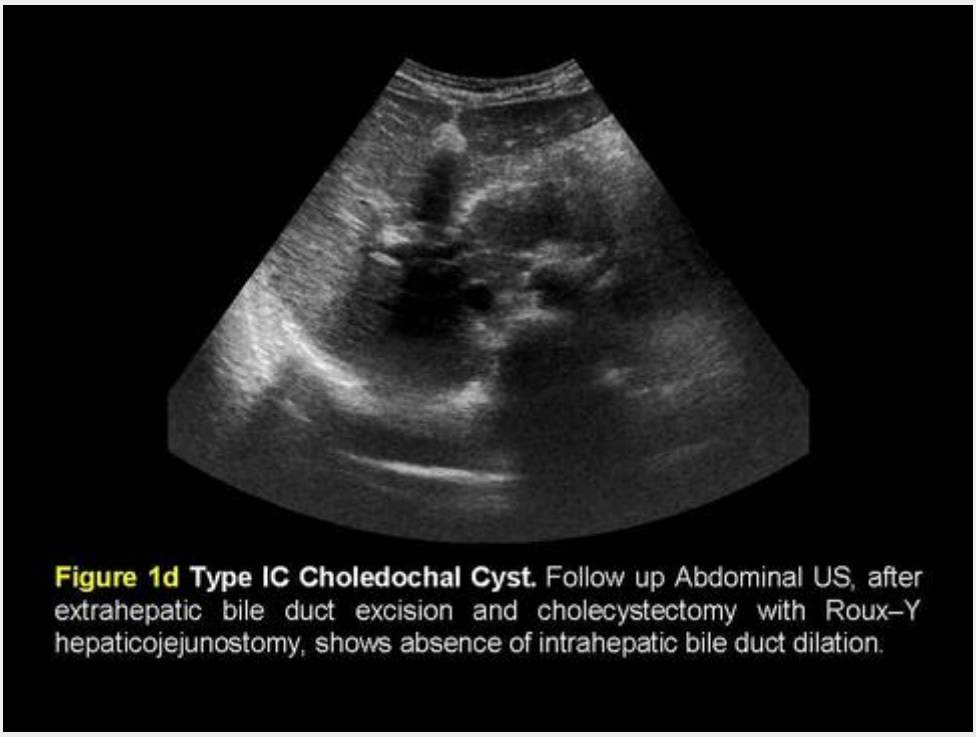


Figure 1d Type IC Choledochal Cyst. Follow up Abdominal US, after extrahepatic bile duct excision and cholecystectomy with Roux–Y hepaticojejunostomy, shows absence of intrahepatic bile duct dilation.

diapositivo19.jpg

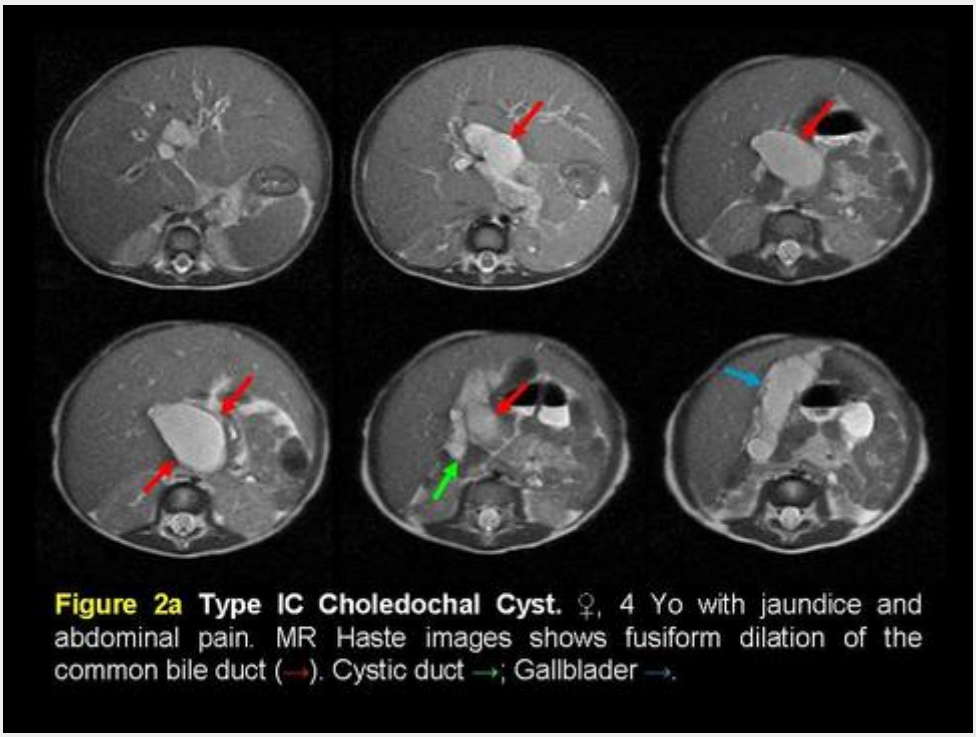


Figure 2a Type IC Choledochal Cyst. ♀, 4 Yo with jaundice and abdominal pain. MR Haste images shows fusiform dilation of the common bile duct (→). Cystic duct →; Gallblader →.

diapositivo20.jpg

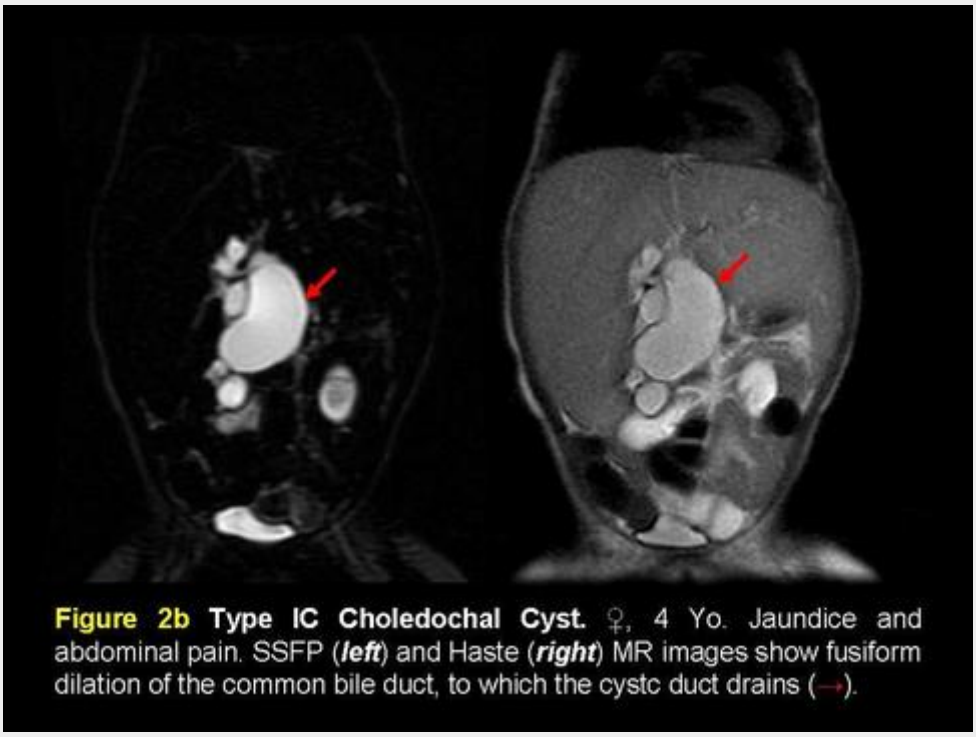


Figure 2b Type IC Choledochal Cyst. ♀, 4 Yo. Jaundice and abdominal pain. SSFP (***left***) and Haste (***right***) MR images show fusiform dilation of the common bile duct, to which the cystc duct drains (→).

diapositivo23.jpg

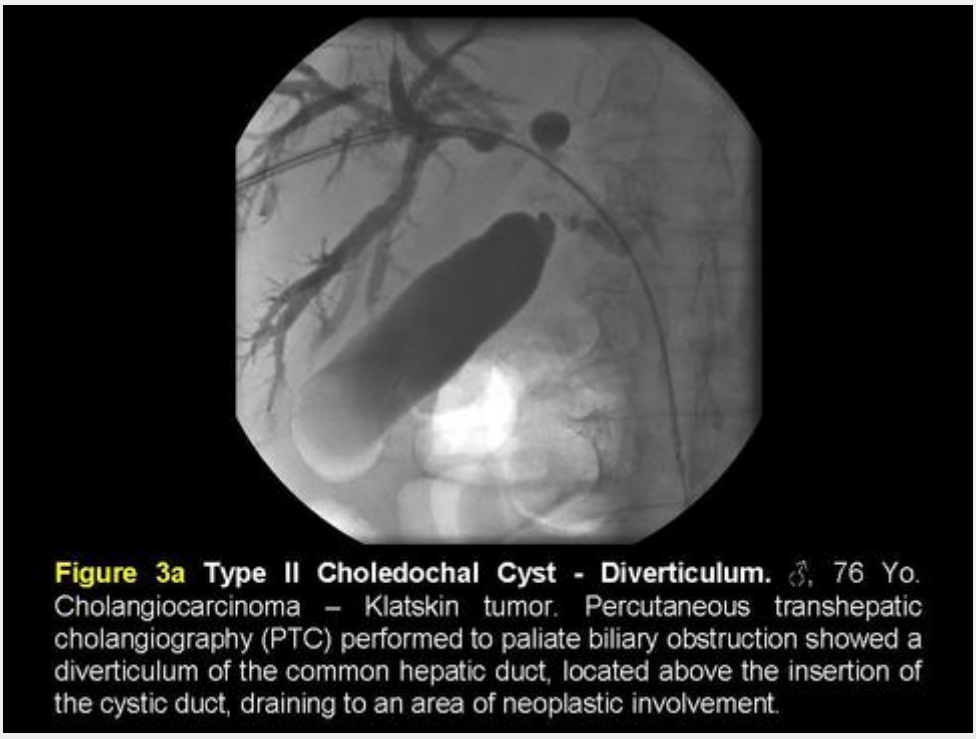
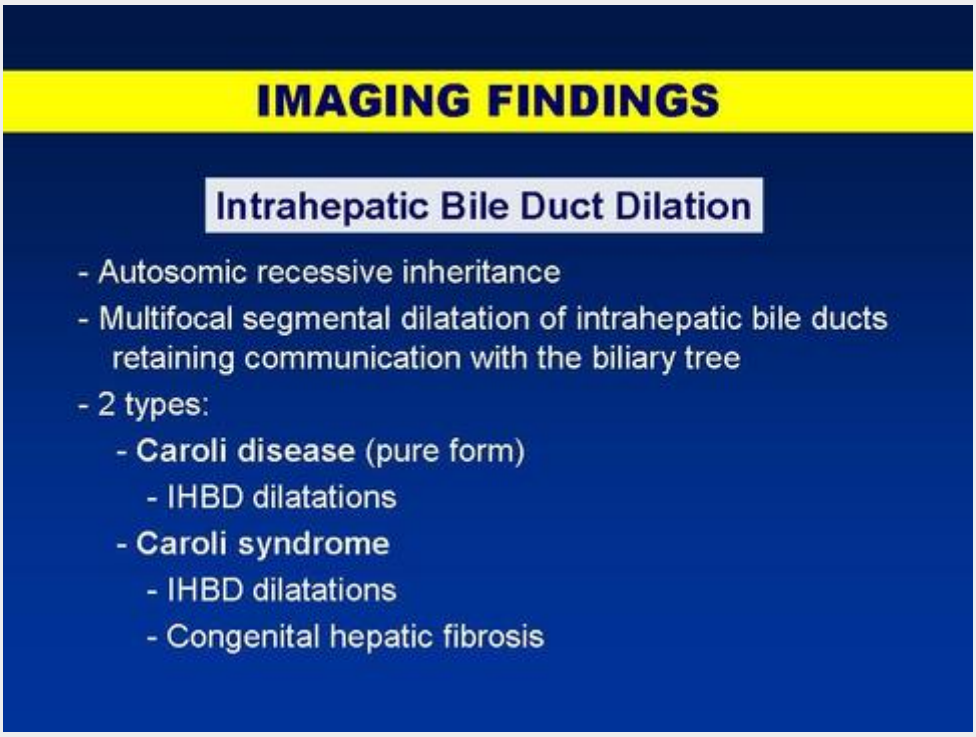
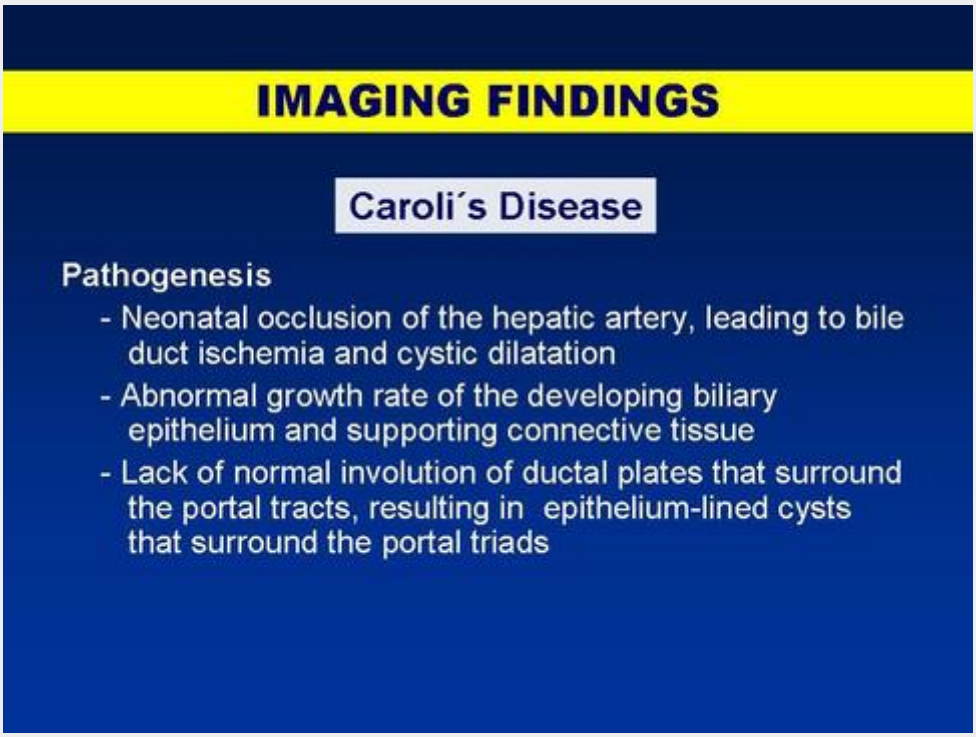


Figure 3a Type II Choledochal Cyst - Diverticulum. ♂, 76 Yo. Cholangiocarcinoma – Klatskin tumor. Percutaneous transhepatic cholangiography (PTC) performed to paliate biliary obstruction showed a diverticulum of the common hepatic duct, located above the insertion of the cystic duct, draining to an area of neoplastic involvement.

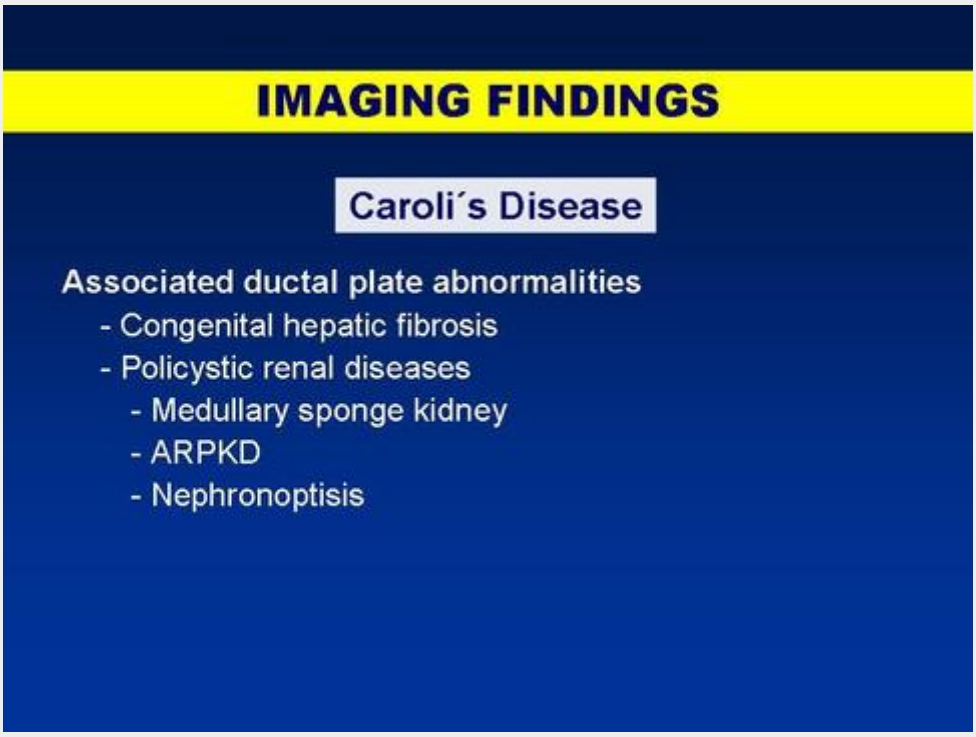
diapositivo30.jpg



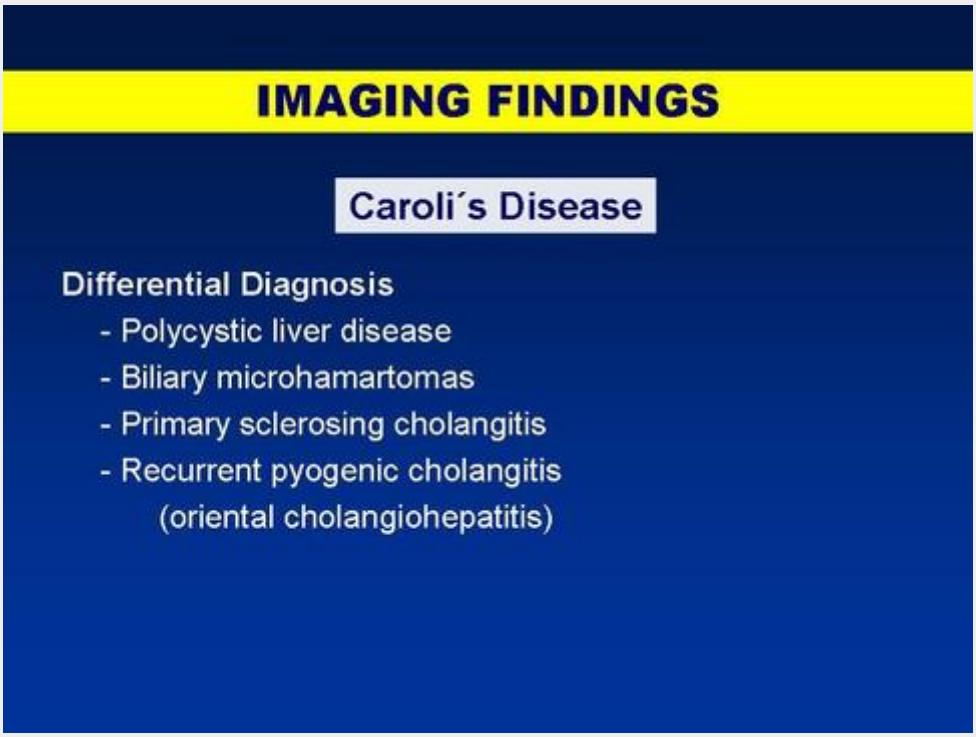
diapositivo31.jpg



diapositivo32.jpg



diapositivo33.jpg



diapositivo34.jpg

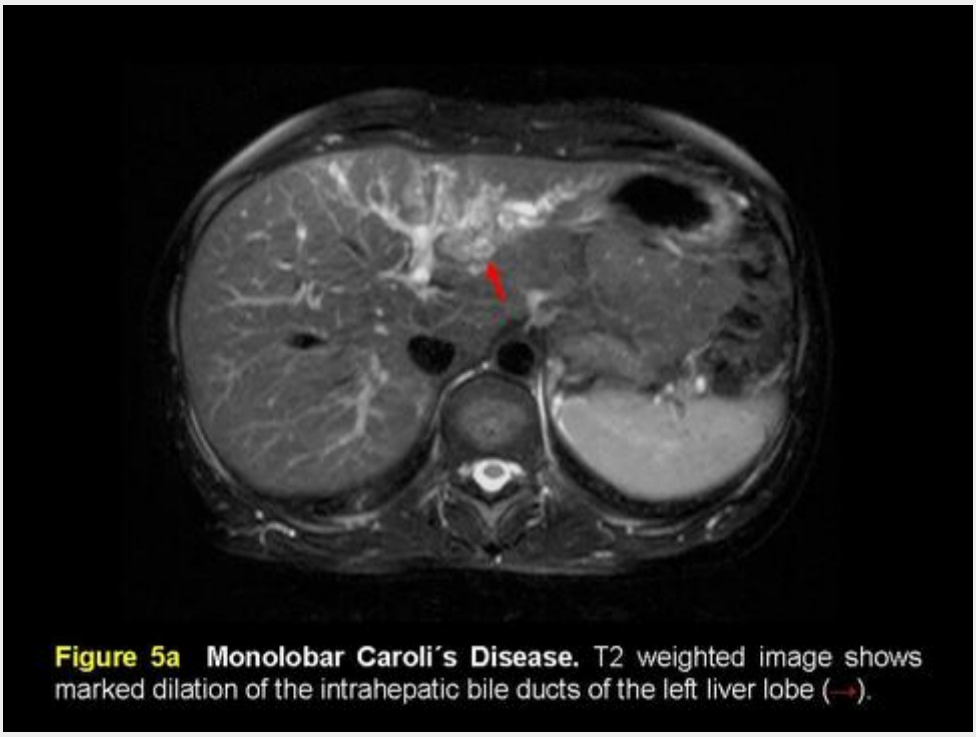


Figure 5a Monolobar Caroli´s Disease. T2 weighted image shows marked dilation of the intrahepatic bile ducts of the left liver lobe (→).

diapositivo35.jpg

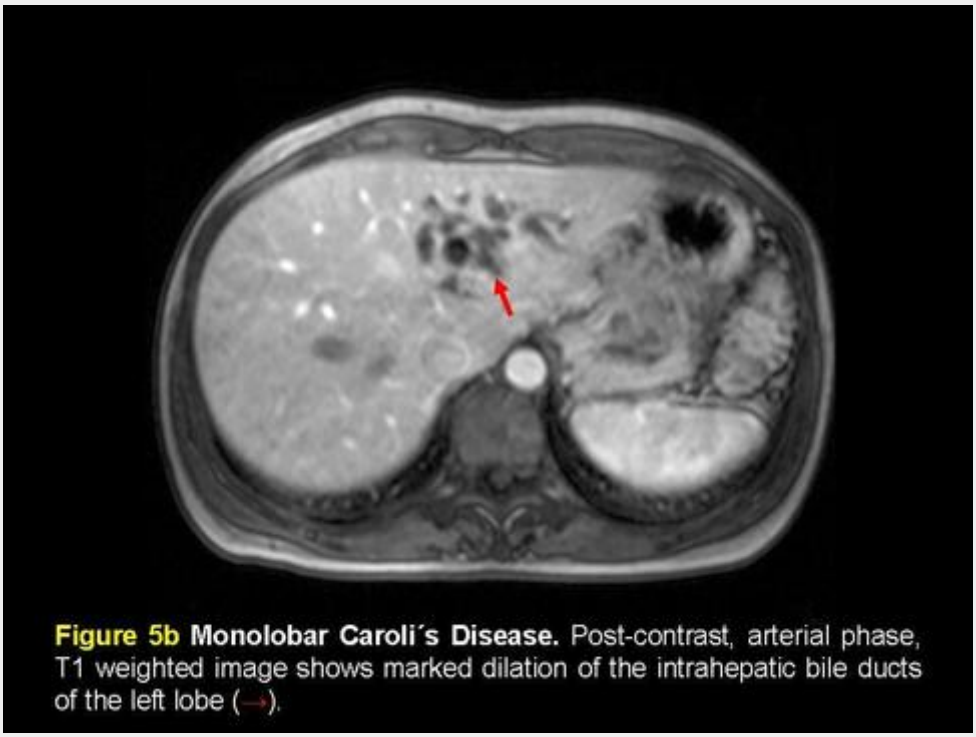


Figure 5b Monolobar Caroli´s Disease. Post-contrast, arterial phase, T1 weighted image shows marked dilation of the intrahepatic bile ducts of the left lobe (→).

diapositivo36.jpg

Figure 5c Monolobar Caroli´s Disease. Heavily T2-weighted image, projection technique, depicting the dilated left lobe intrahepatic bile ducts (→).

diapositivo37.jpg

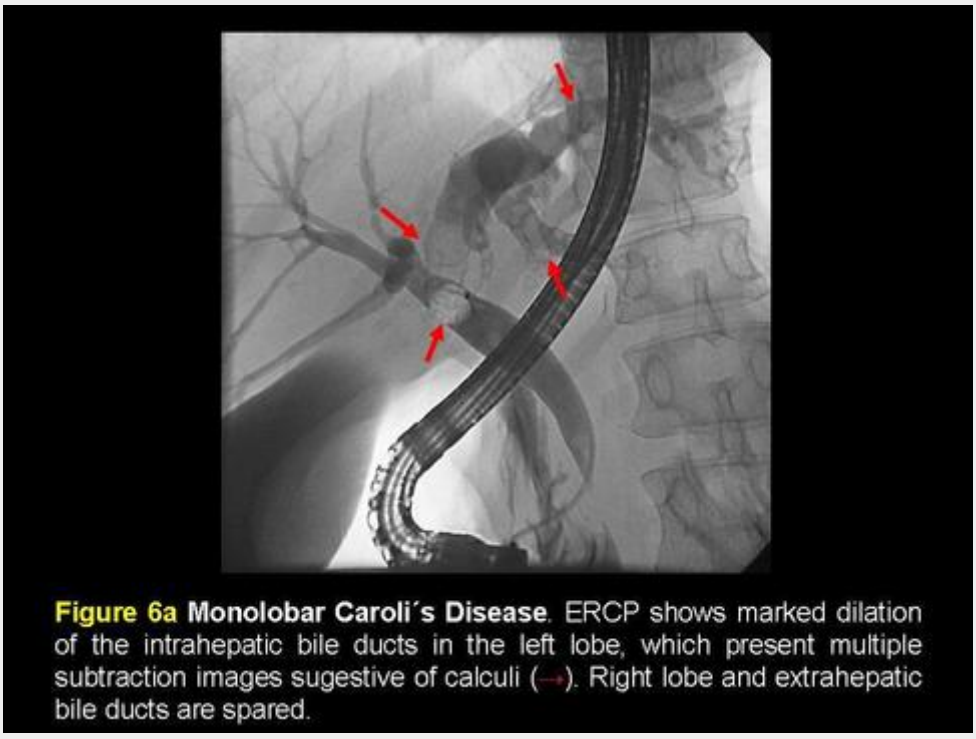


Figure 6a Monolobar Caroli´s Disease. ERCP shows marked dilation of the intrahepatic bile ducts in the left lobe, which present multiple subtraction images sugestive of calculi (→). Right lobe and extrahepatic bile ducts are spared.

diapositivo39.jpg

Figure 6b Monolobar Caroli´s Disease. Heavily T2-weighted image, projection technique, showing marked dilation of the left lobe´s intrahepatic bile ducts (→).

diapositivo41.jpg

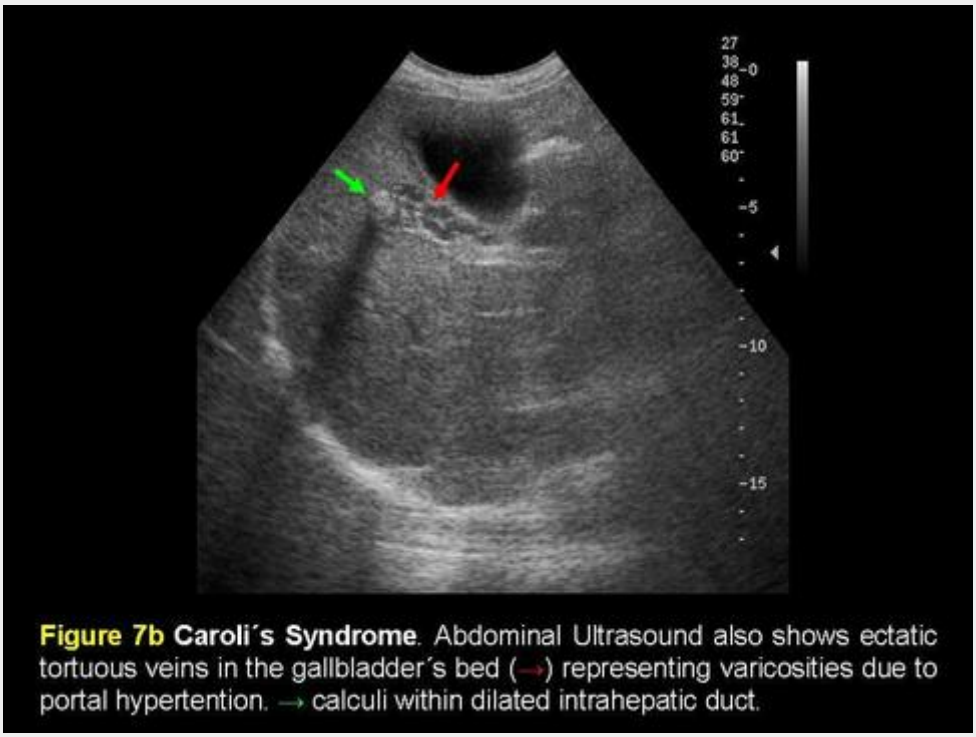


Figure 7b Caroli´s Syndrome. Abdominal Ultrasound also shows ectatic tortuous veins in the gallbladder´s bed (→) representing varicosities due to portal hypertention. → calculi within dilated intrahepatic duct.

diapositivo42.jpg

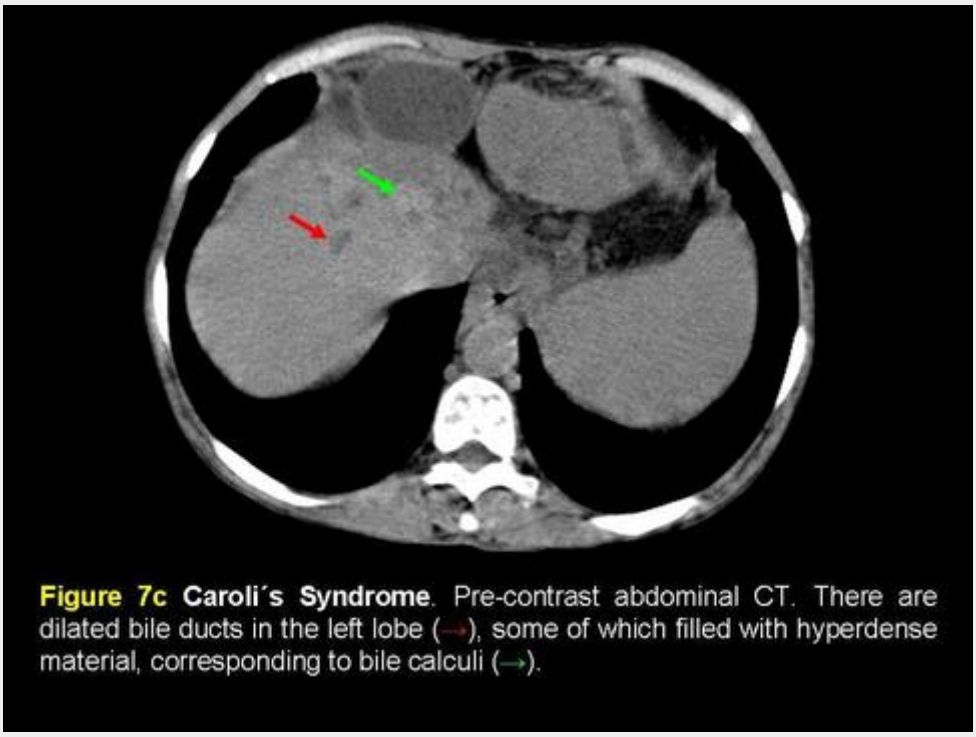


Figure 7c Caroli´s Syndrome. Pre-contrast abdominal CT. There are dilated bile ducts in the left lobe (→), some of which filled with hyperdense material, corresponding to bile calculi (→).

diapositivo43.jpg

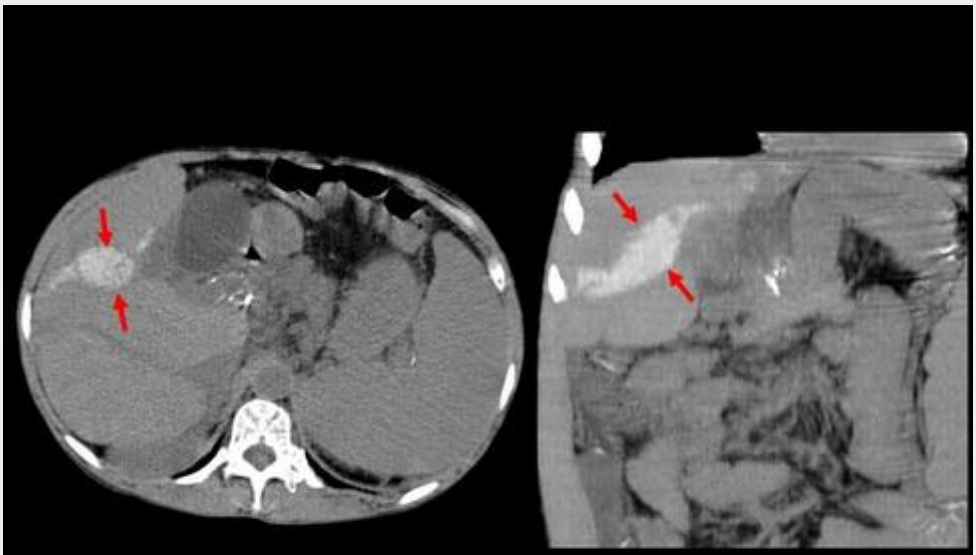


Figure 7d Caroli´s Syndrome. Pre-contrast abdominal CT. Axial (*left*) and oblique reformated (*right*) images. There is a markedly dilated bile duct in the right lobe, completely filled with hyperdense material, corresponding to bile calculi (→).

diapositivo44.jpg

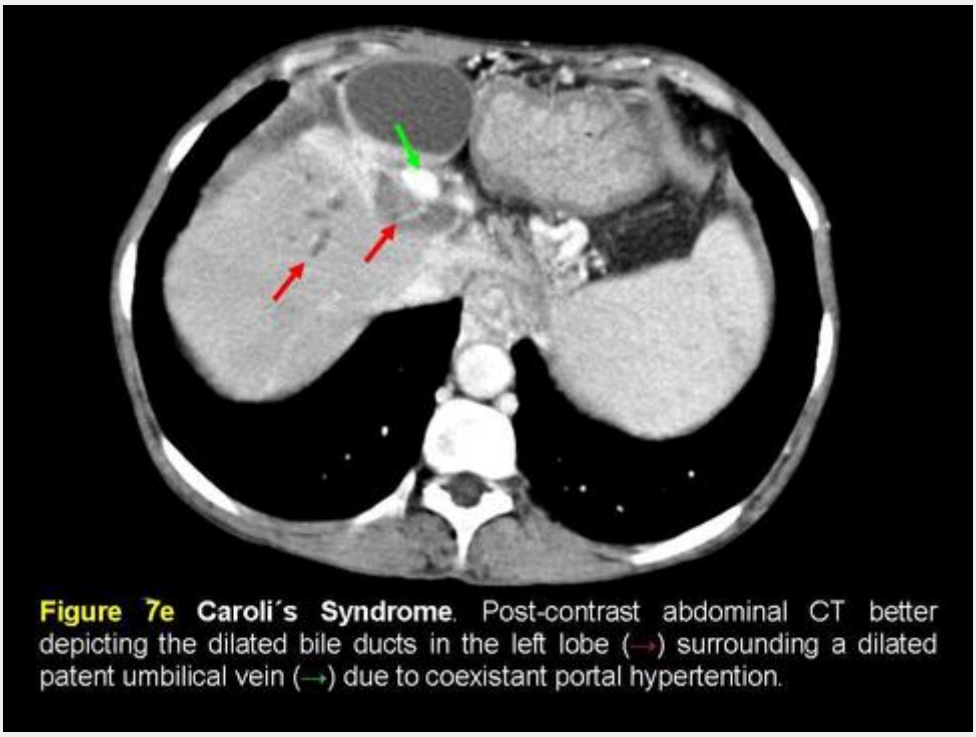


Figure 7e Caroli´s Syndrome. Post-contrast abdominal CT better depicting the dilated bile ducts in the left lobe (→) surrounding a dilated patent umbilical vein (→) due to coexistant portal hypertention.

diapositivo45.jpg

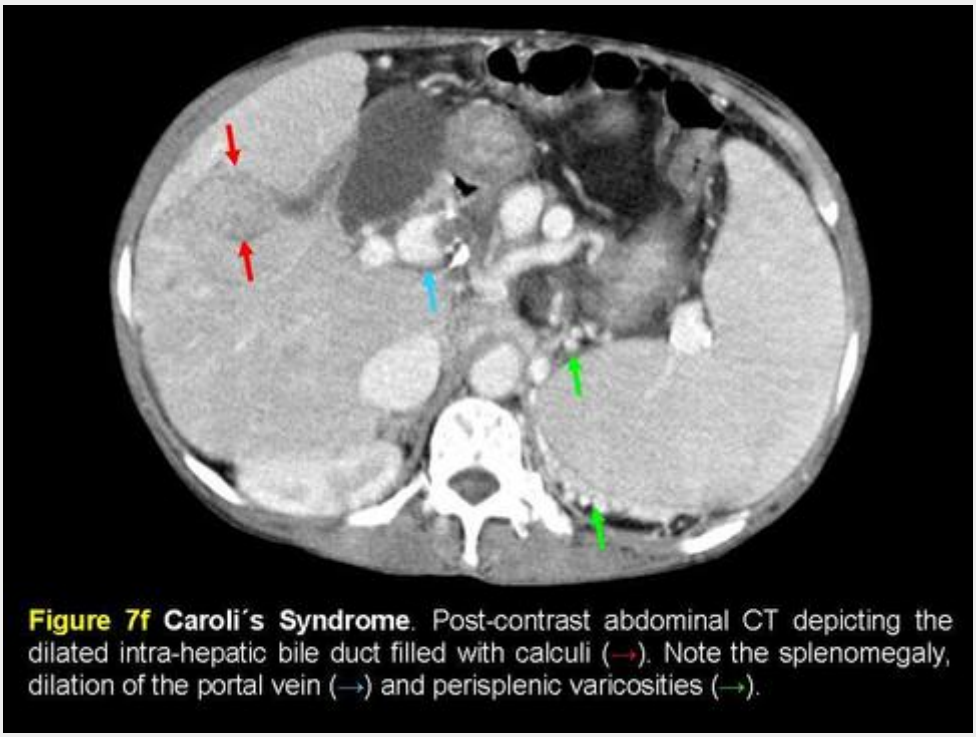


Figure 7f Caroli´s Syndrome. Post-contrast abdominal CT depicting the dilated intra-hepatic bile duct filled with calculi (→). Note the splenomegaly, dilation of the portal vein (→) and perisplenic varicosities (→).

diapositivo47.jpg

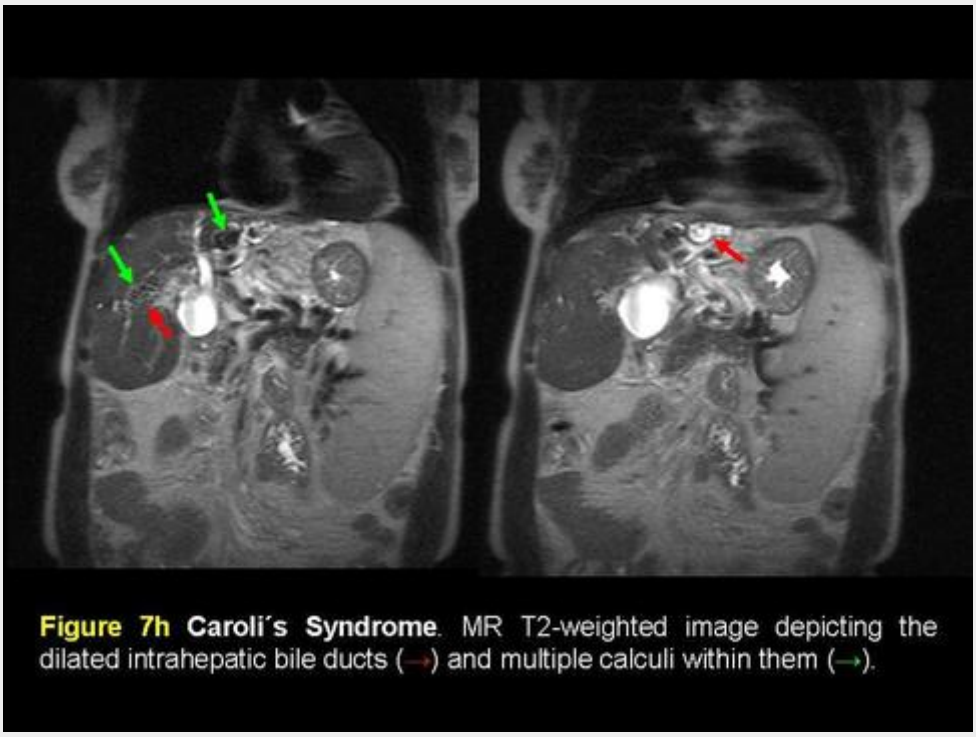


Figure 7h Caroli´s Syndrome. MR T2-weighted image depicting the dilated intrahepatic bile ducts (→) and multiple calculi within them (→).

diapositivo48.jpg

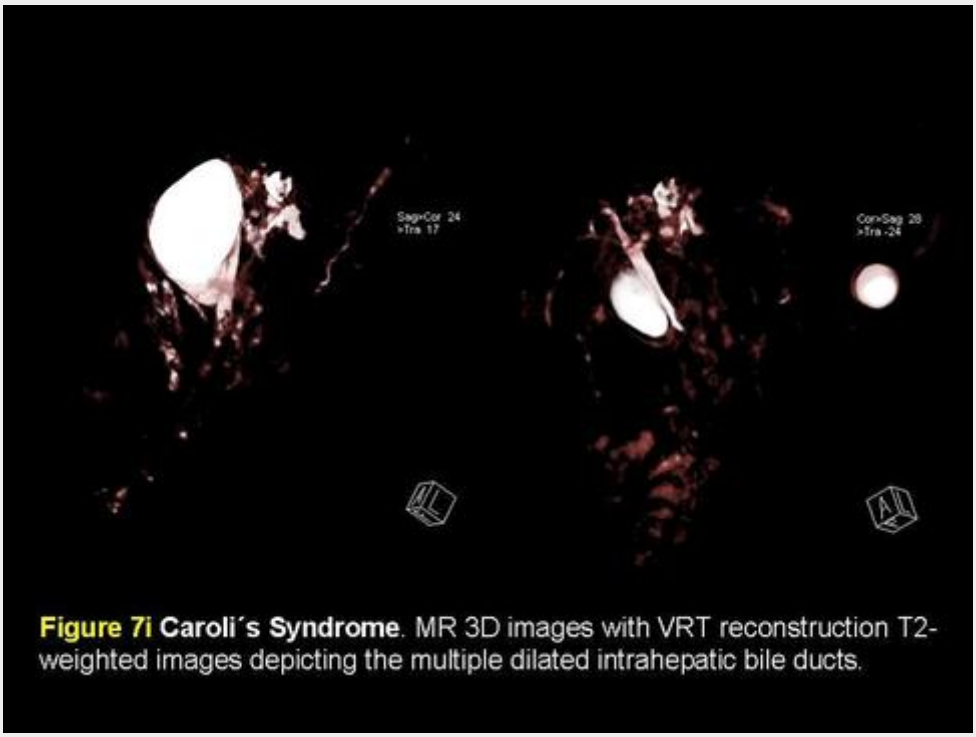


Figure 7i Caroli´s Syndrome. MR 3D images with VRT reconstruction T2-weighted images depicting the multiple dilated intrahepatic bile ducts.

diapositivo50.jpg

IMAGING FINDINGS

Caroli´s Disease

- Central Dot Sign
  - Solid "dot" within or at the periphery of a cystic liver lesion
    - Doppler signal
      - Continuous (portal vein branch)
      - Arterial waveform (hepatic artery branch)
    - Enhancement
      - CT, MRI

diapositivo51.jpg

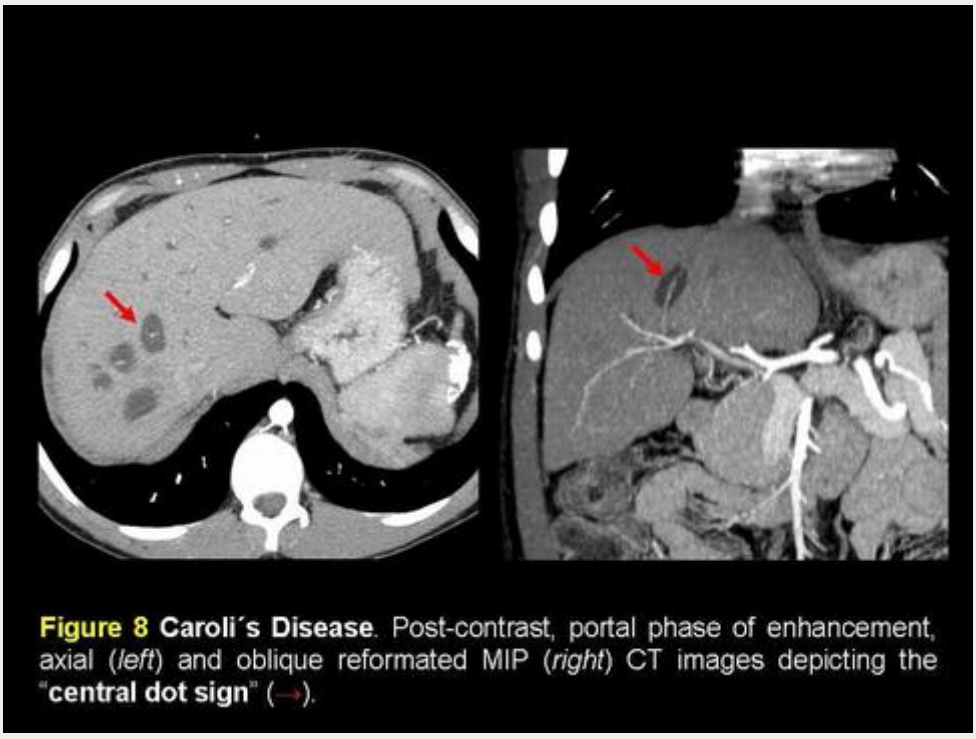
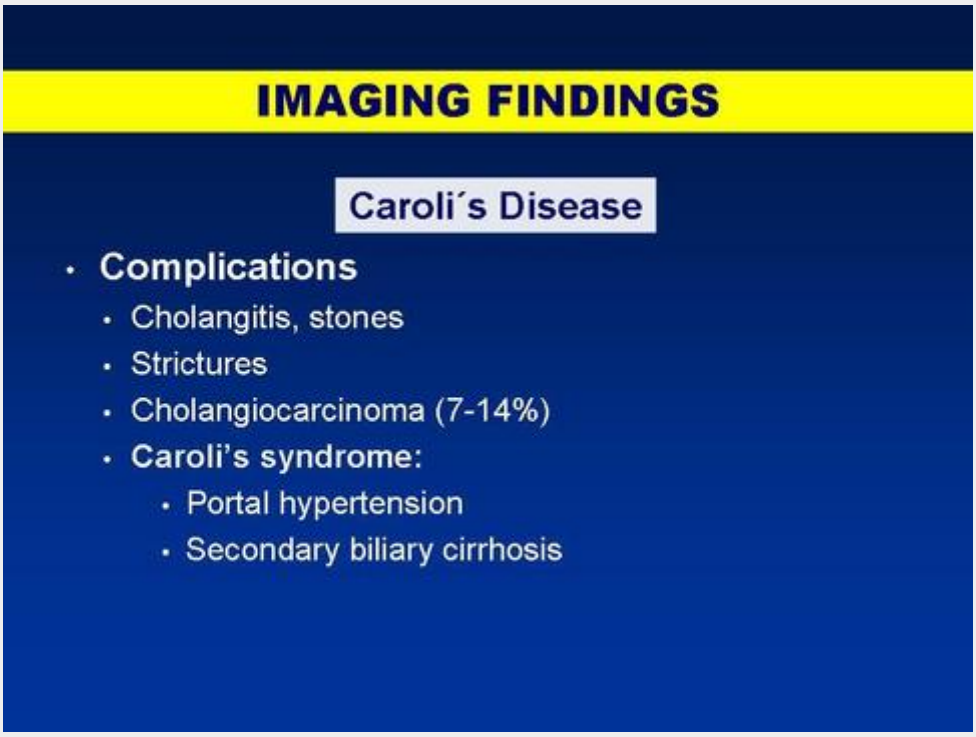
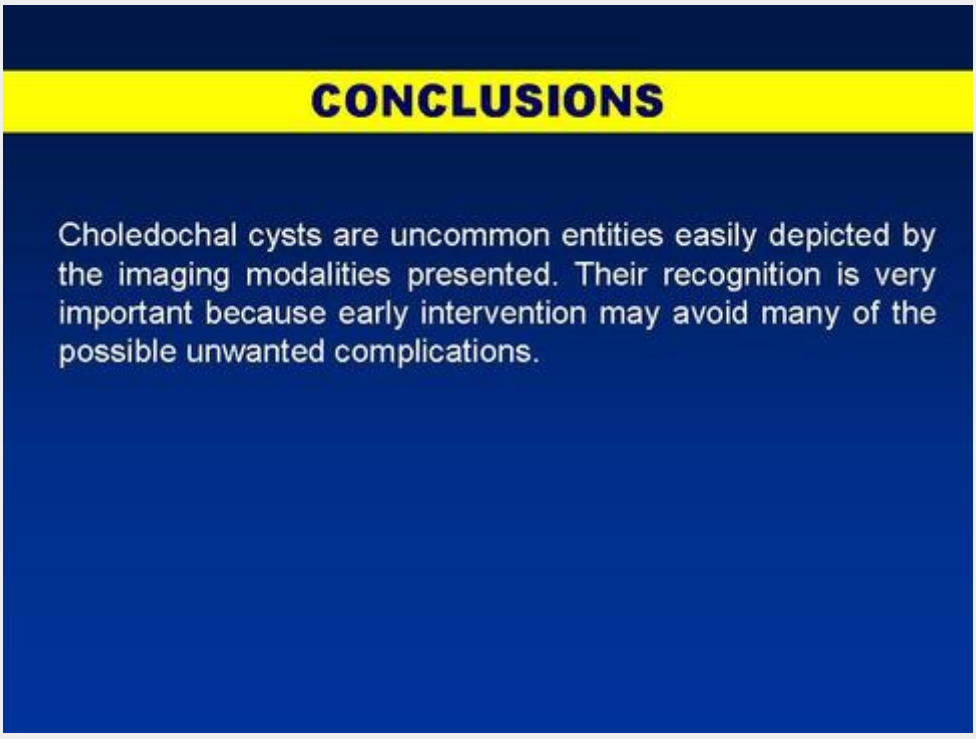


Figure 8 Caroli´s Disease. Post-contrast, portal phase of enhancement, axial (*left*) and oblique reformated MIP (*right*) CT images depicting the "**central dot sign**" (→).

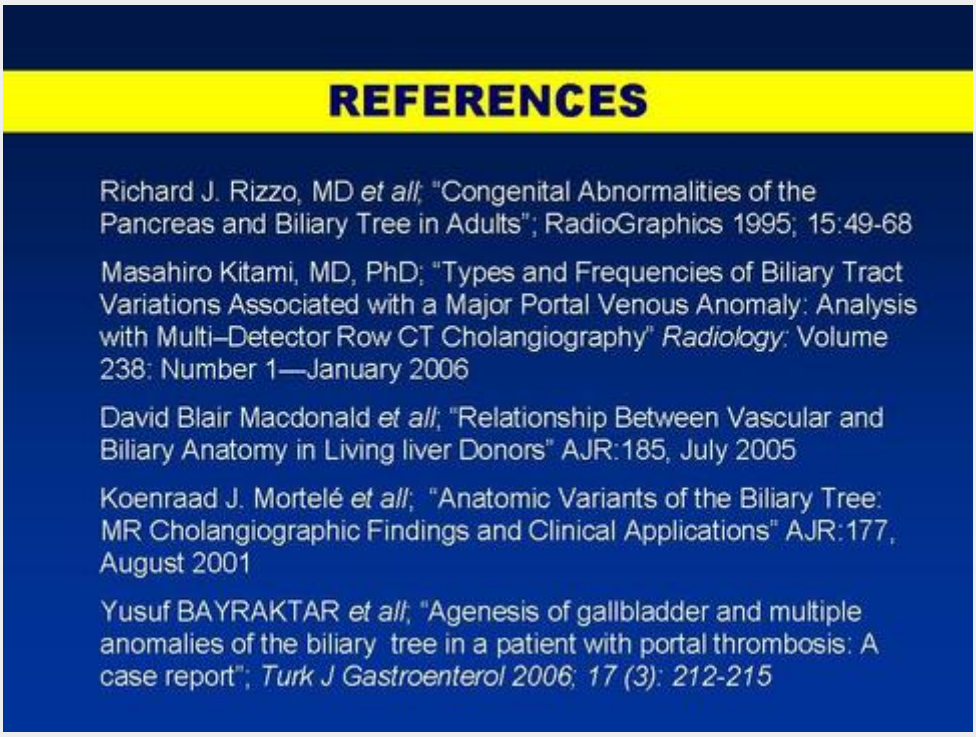
diapositivo52.jpg



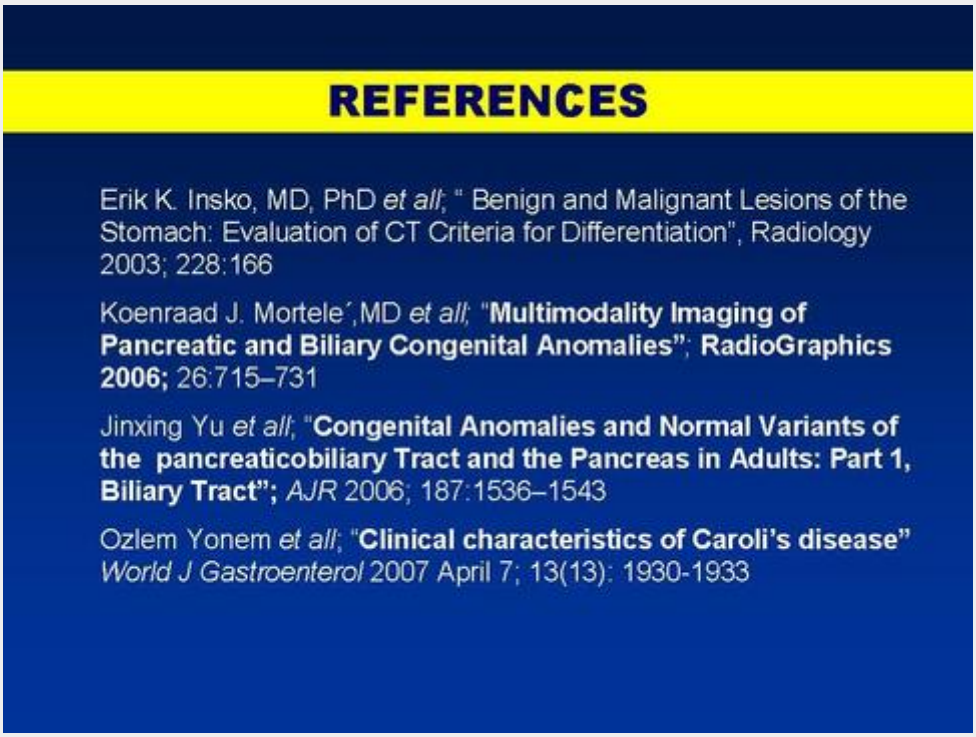
diapositivo53.jpg



diapositivo55.jpg



diapositivo56.jpg



diapositivo57.jpg