# Choledocal Cysts - Spectrum of Imaging Findings

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Type: Educational Exhibit

Topic: Diagnostic / Bile Ducts

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MeSH:

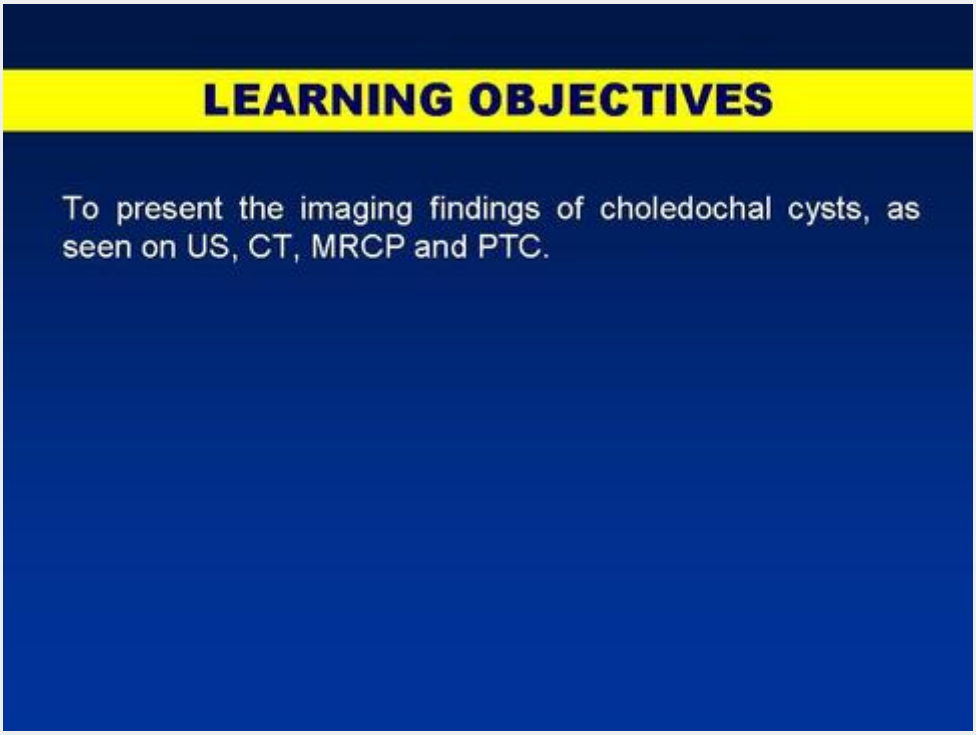
Choledochal Cyst [C06.130.120.127]

Keyword: Choledochal Cysts

## 1. Learning objectives

Learning Objectives

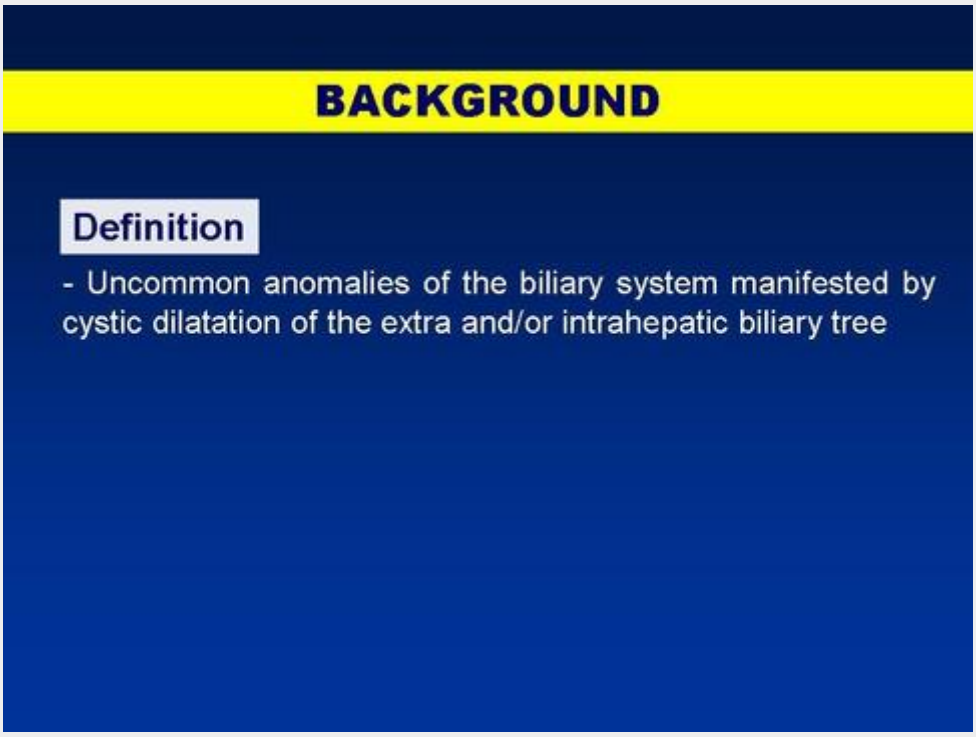
**Learning objectives**




## 2. Background

Background

**Definition of choledochal cysts**

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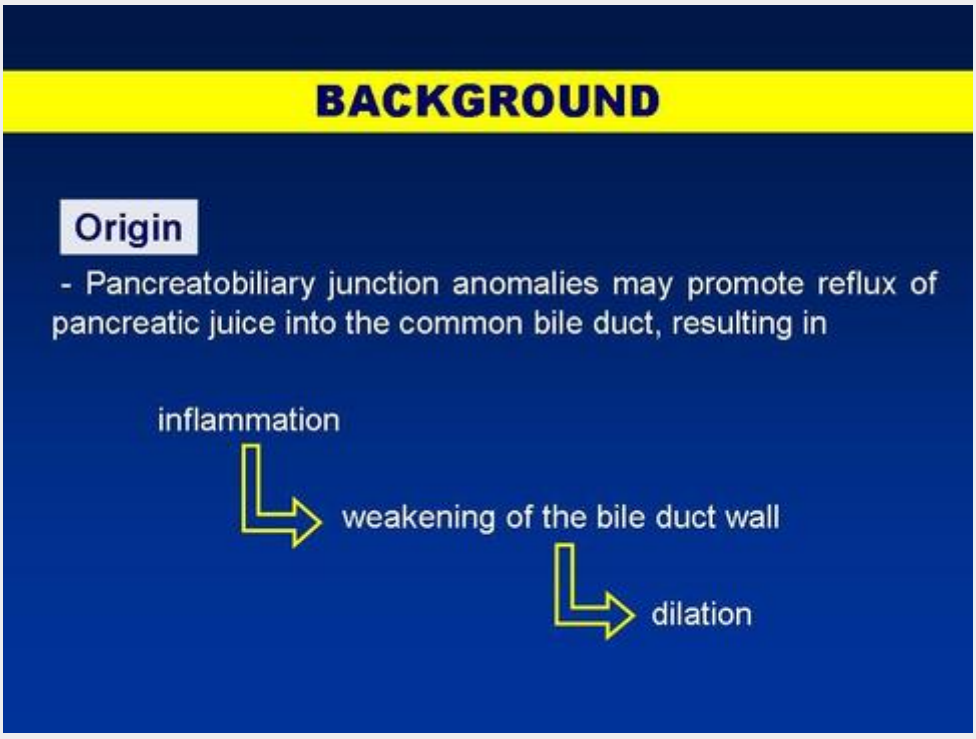

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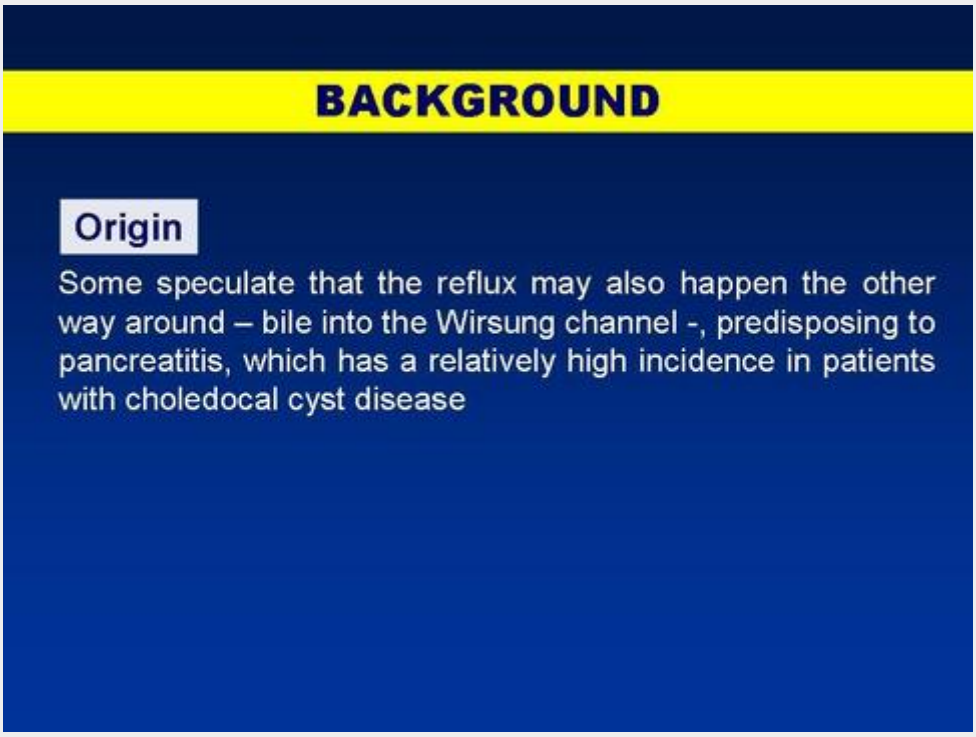


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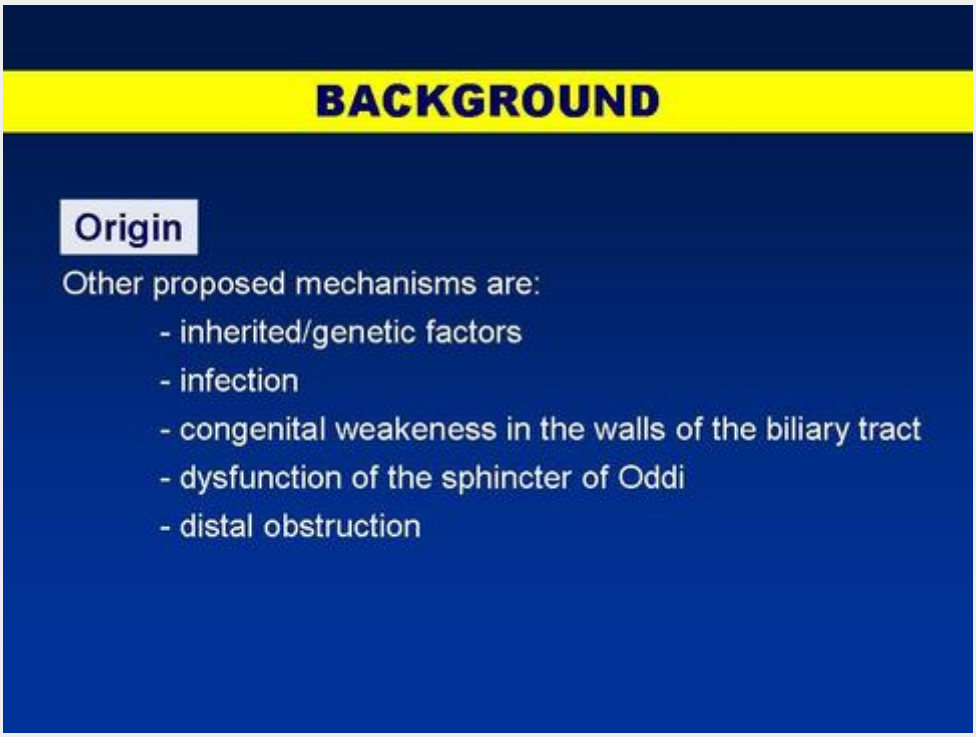

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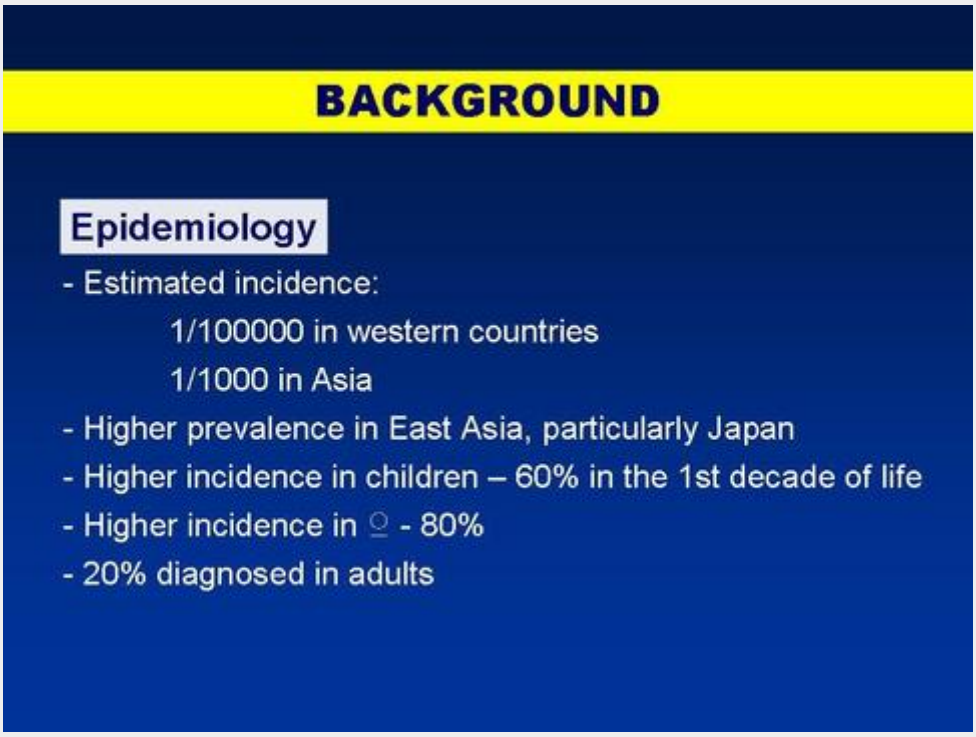


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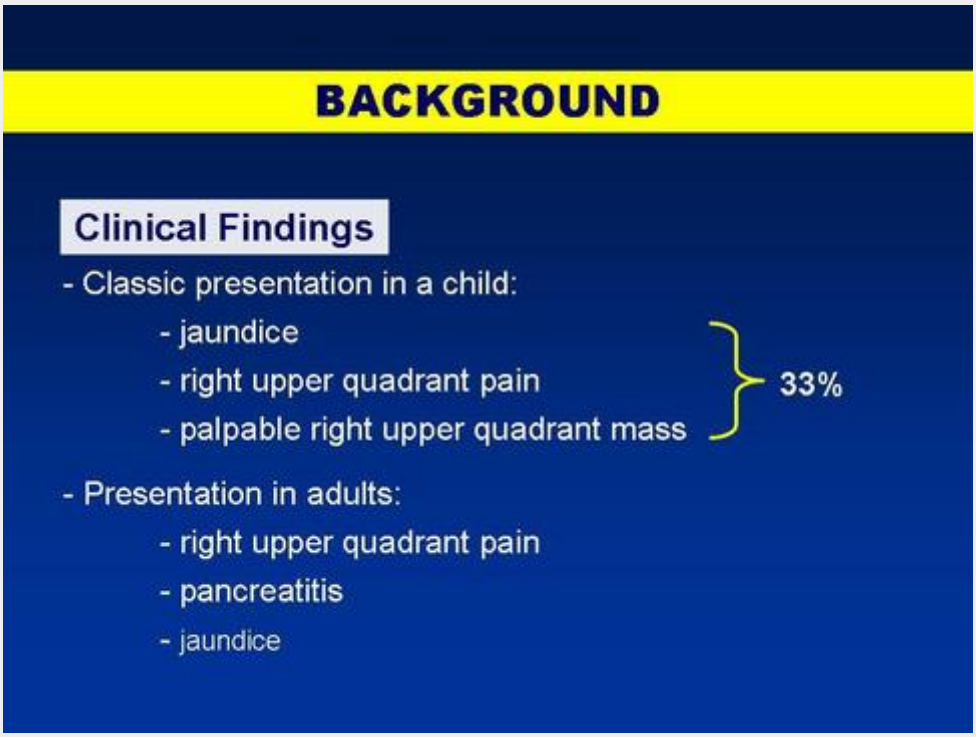

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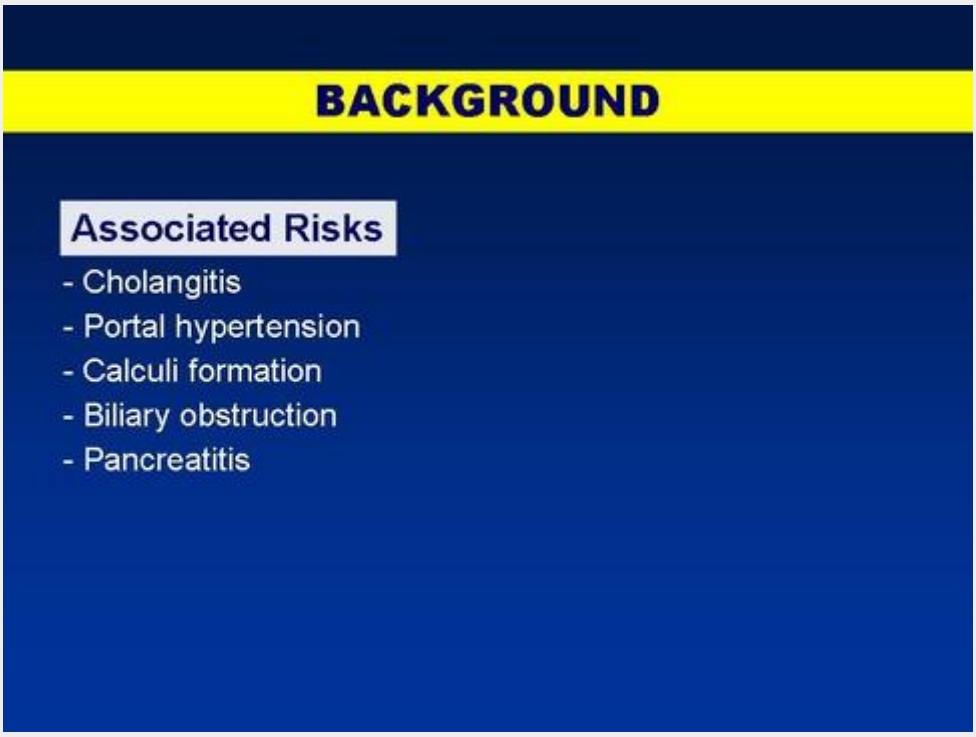


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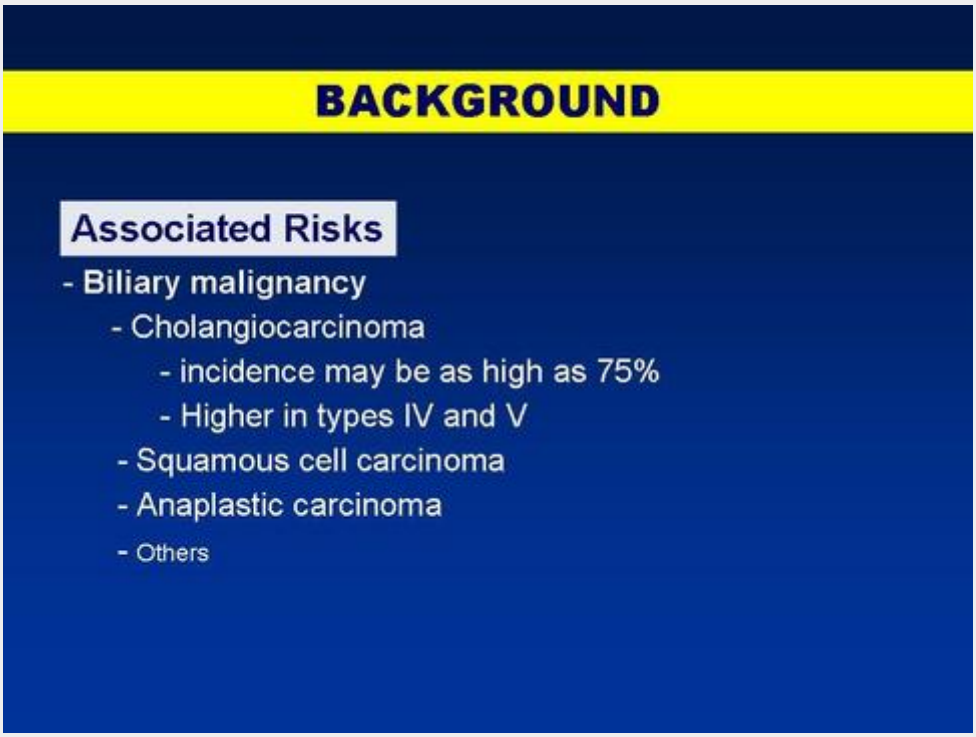

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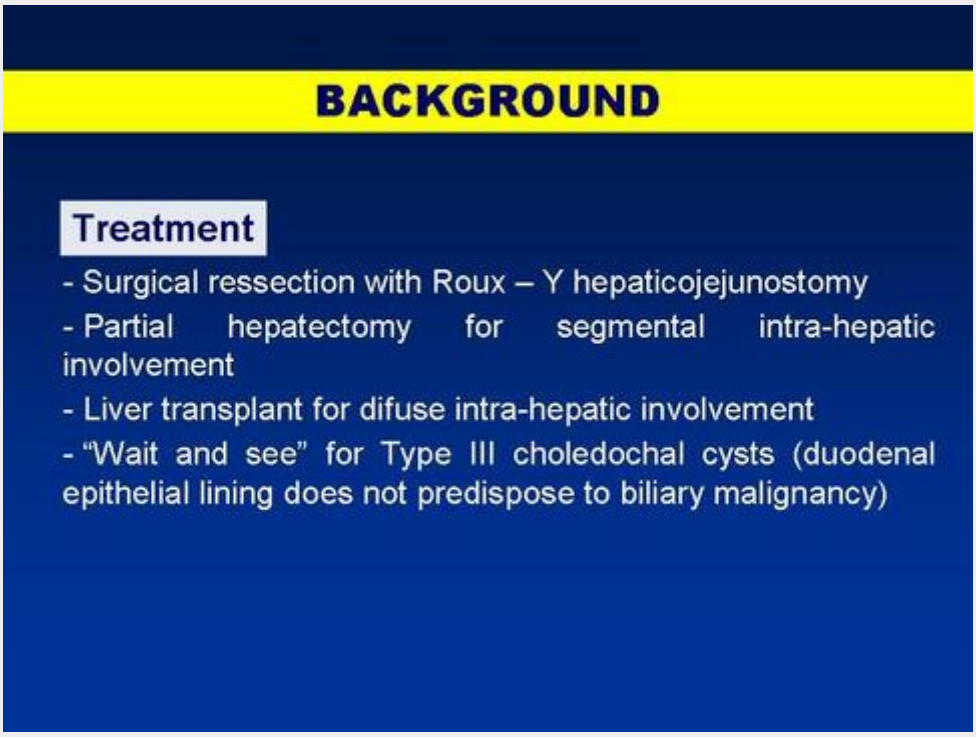
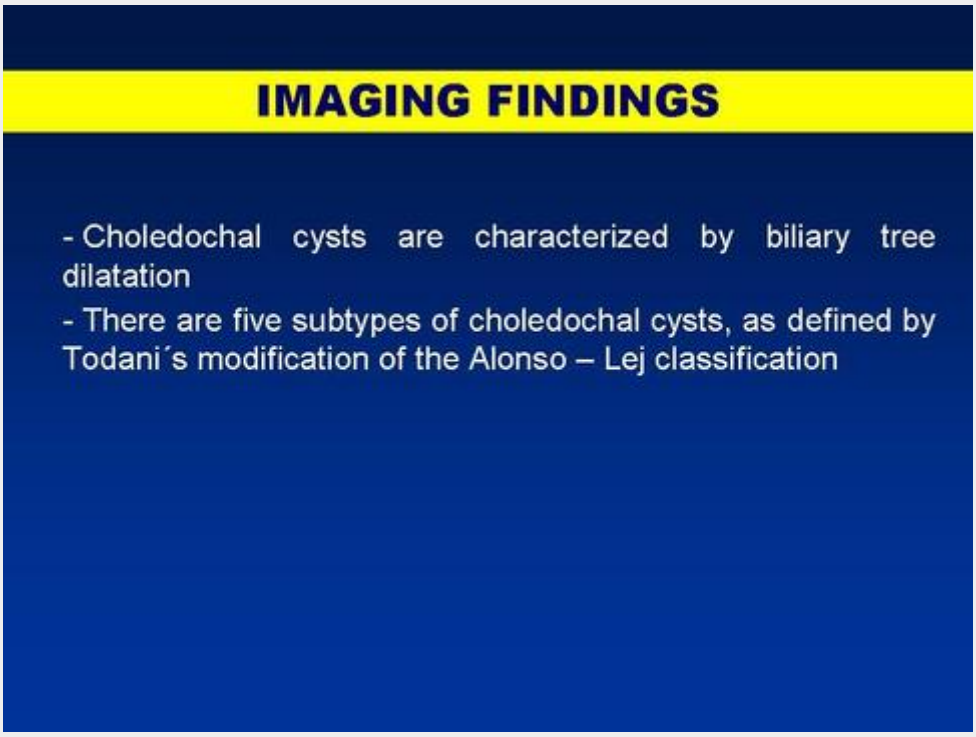



**3. Imaging findings OR Procedure details**

Imaging Findings

**diapositivo12.jpg**

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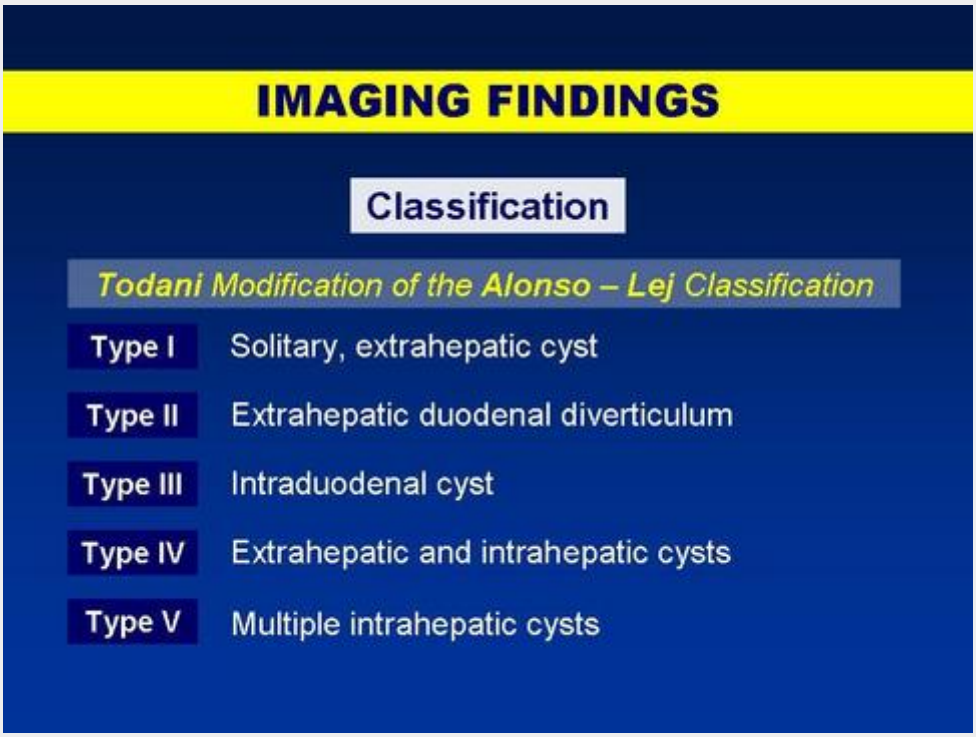
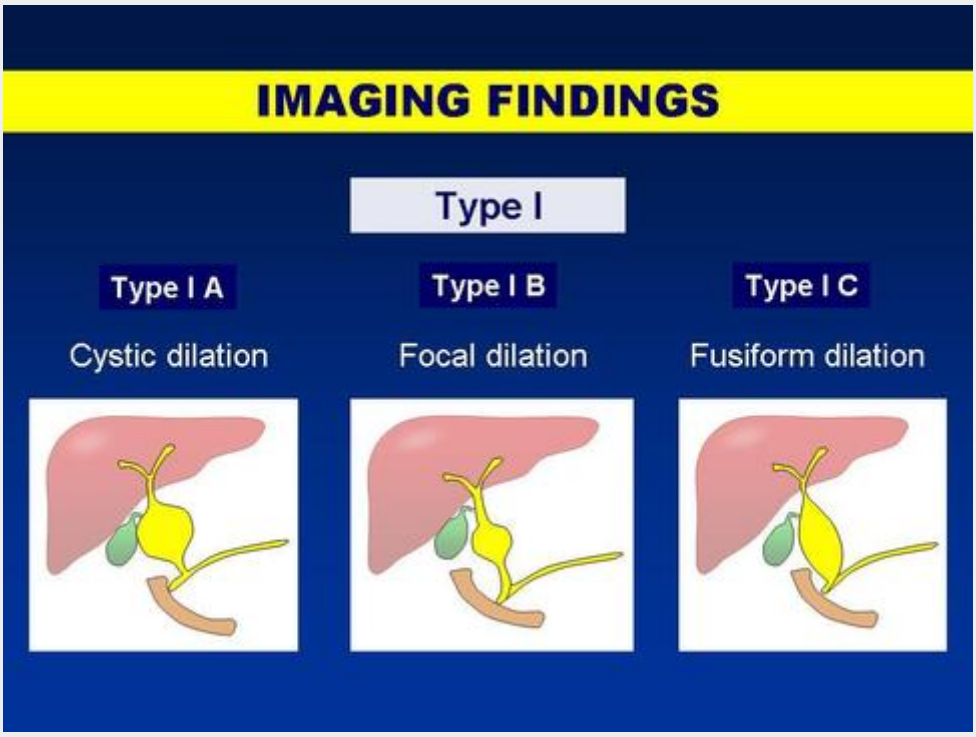


**Type I**

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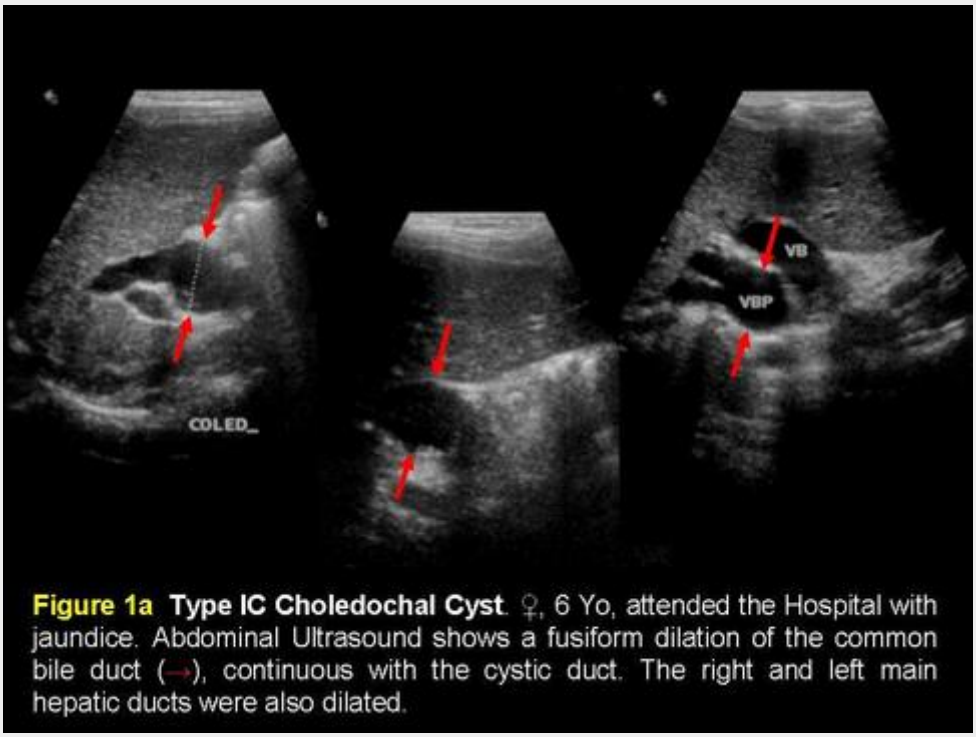



**Figure 1a Type IC Choledochal Cyst**. ♀, 6 Yo, attended the Hospital with jaundice. Abdominal Ultrasound shows a fusiform dilation of the common bile duct (→), continuous with the cystic duct. The right and left main hepatic ducts were also dilated.

**diapositivo16.jpg**

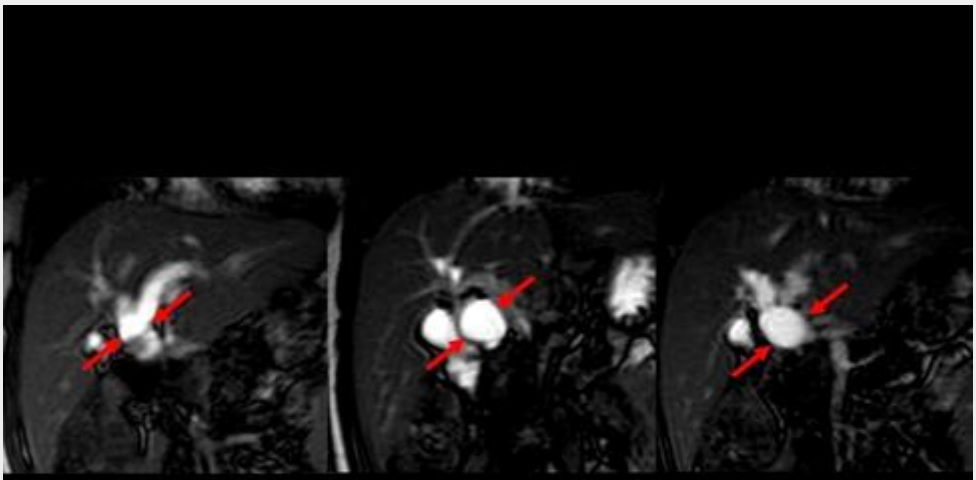


**Figure 1b Type IC Choledochal Cyst.** Magnetic Ressonance SSFP sequencies show a fusiform dilation of the common hepatic and common bile ducts. The cystic duct drains into the dilated extrahepatic bile duct.

**diapositivo17.jpg**

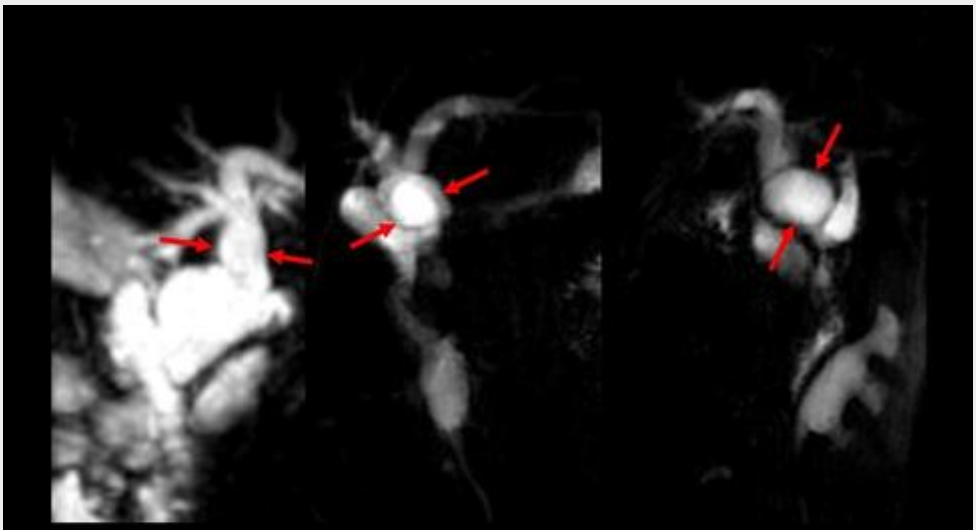


**Figure 1c Type IC Choledochal Cyst**. MR T2 reformatted images show a fusiform dilation of the common hepatic and common bile ducts. The cystic duct drains to the dilated extrahepatic bile duct. These findings correspond to a Type IC choledochal cyst, according to the Todani classification.

**diapositivo18.jpg**

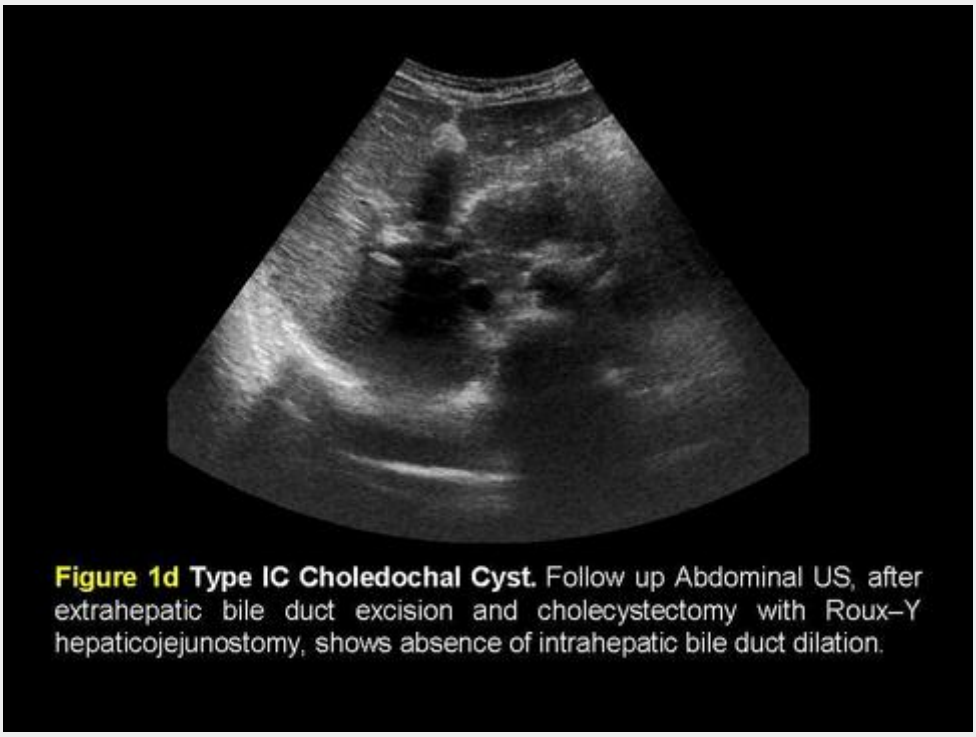


**Figure 1d Type IC Choledochal Cyst.** Follow up Abdominal US, after extrahepatic bile duct excision and cholecystectomy with Roux–Y hepaticojejunostomy, shows absence of intrahepatic bile duct dilation.

**diapositivo19.jpg**

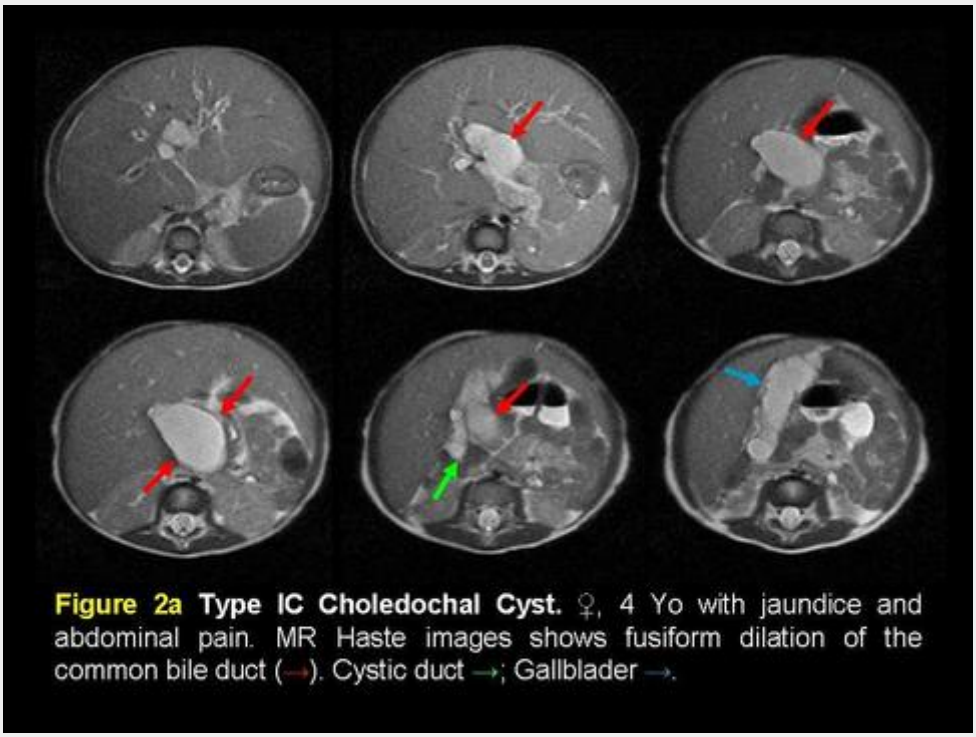


**Figure 2a Type IC Choledochal Cyst.** ♀, 4 Yo with jaundice and abdominal pain. MR Haste images shows fusiform dilation of the common bile duct (→). Cystic duct →; Gallblader →.

**diapositivo20.jpg**

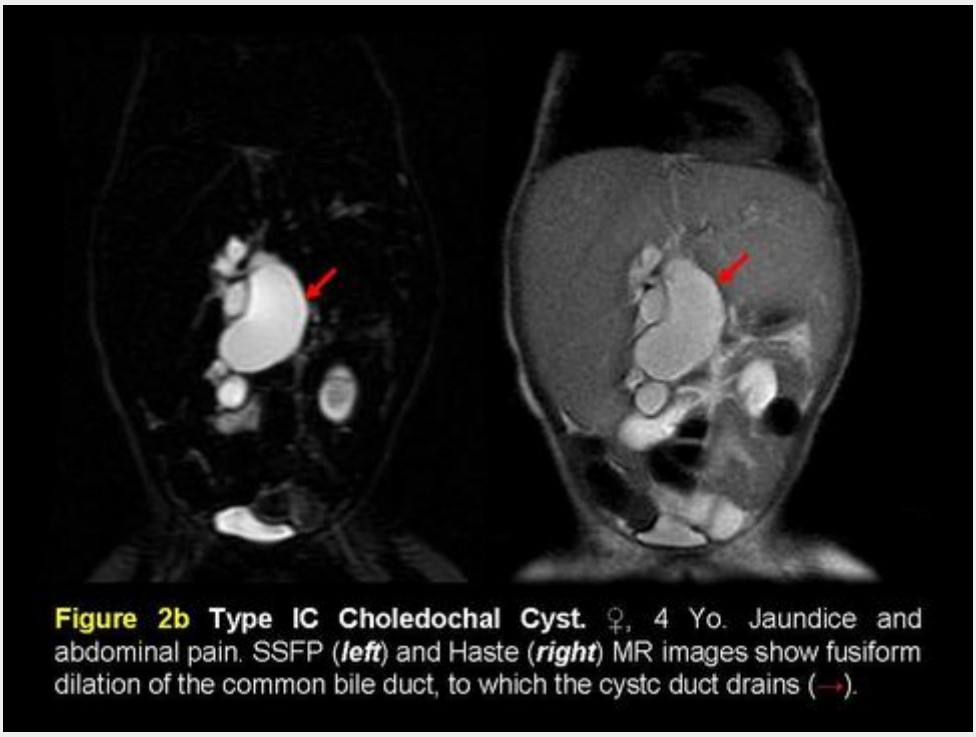


**Figure 2b Type IC Choledochal Cyst.** ♀, 4 Yo. Jaundice and abdominal pain. SSFP (***left***) and Haste (***right***) MR images show fusiform dilation of the common bile duct, to which the cystc duct drains (→).

**Type IC**

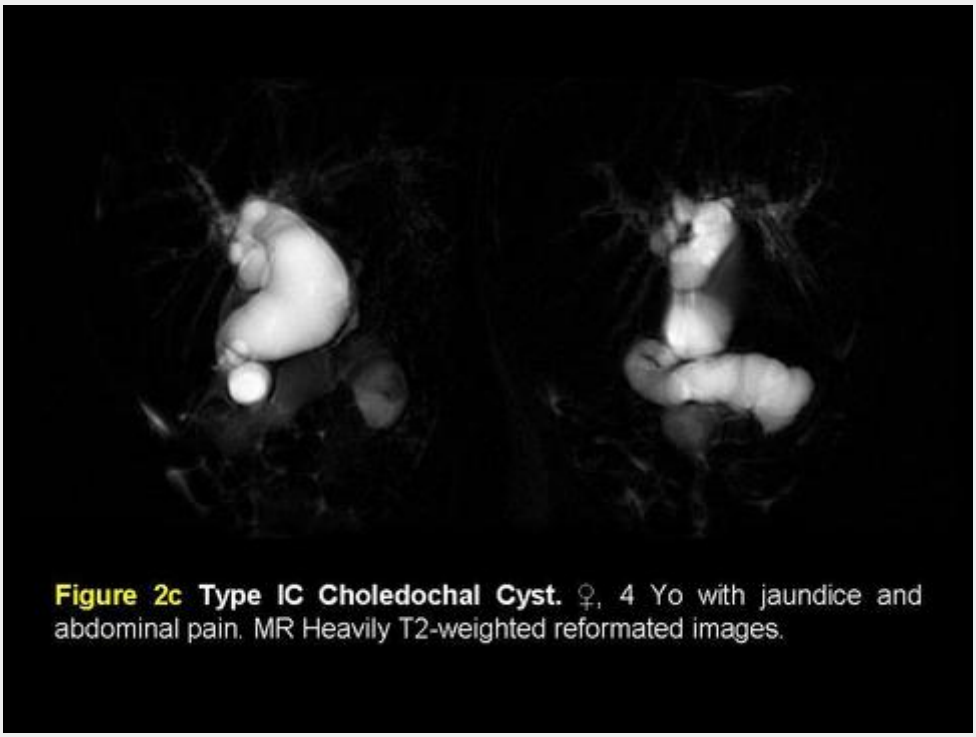
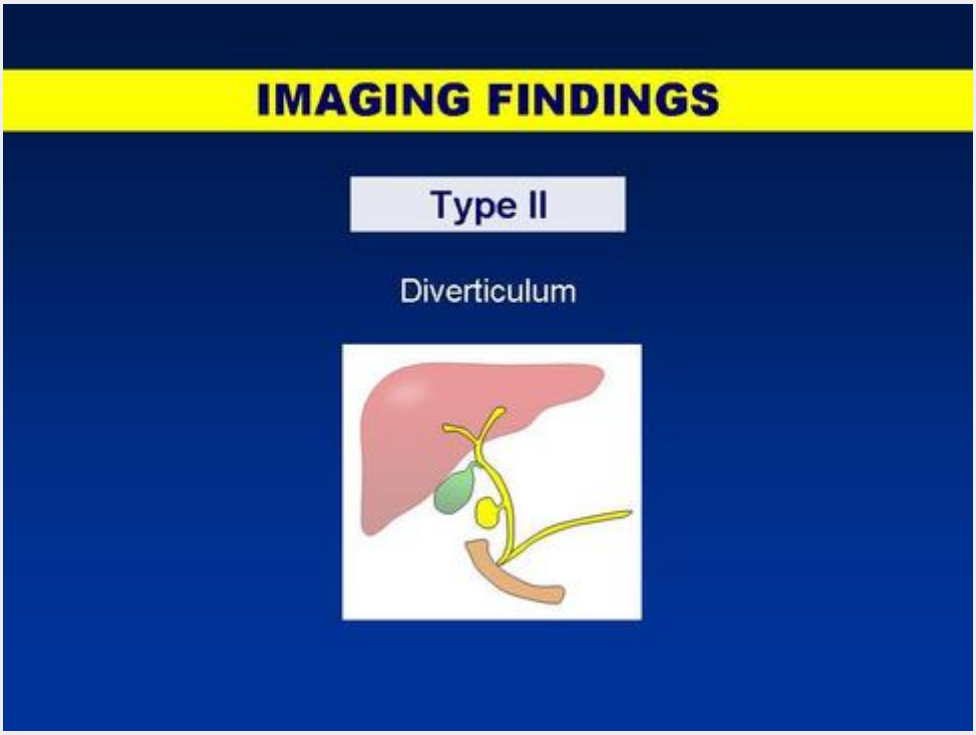


**Figure 2c Type IC Choledochal Cyst.** ♀, 4 Yo with jaundice and abdominal pain. MR Heavily T2-weighted reformated images.

[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**

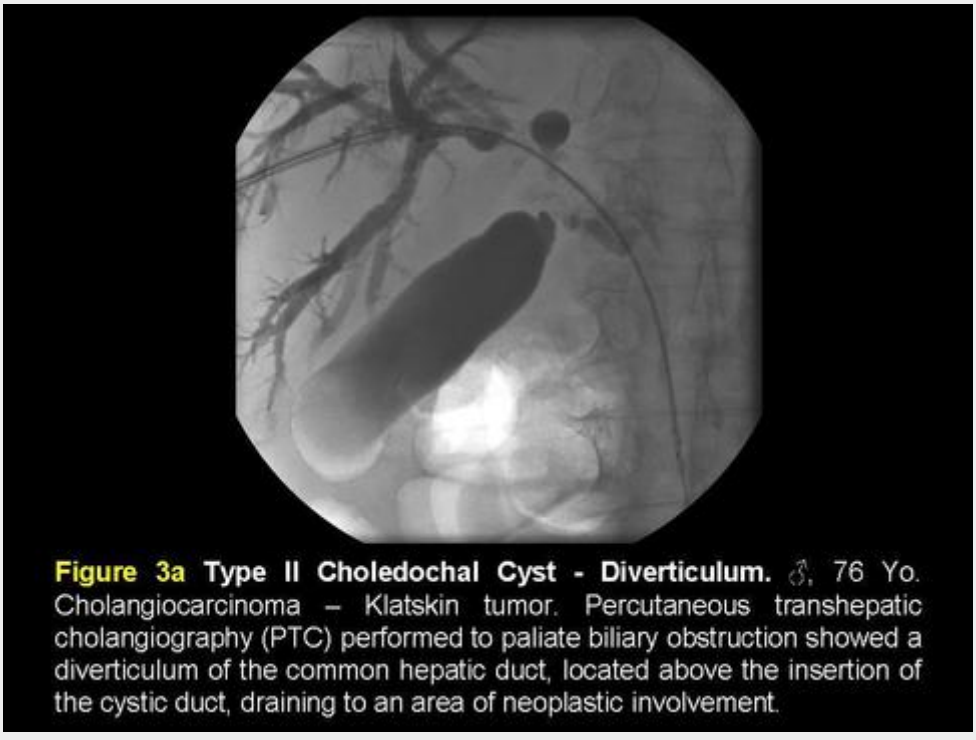
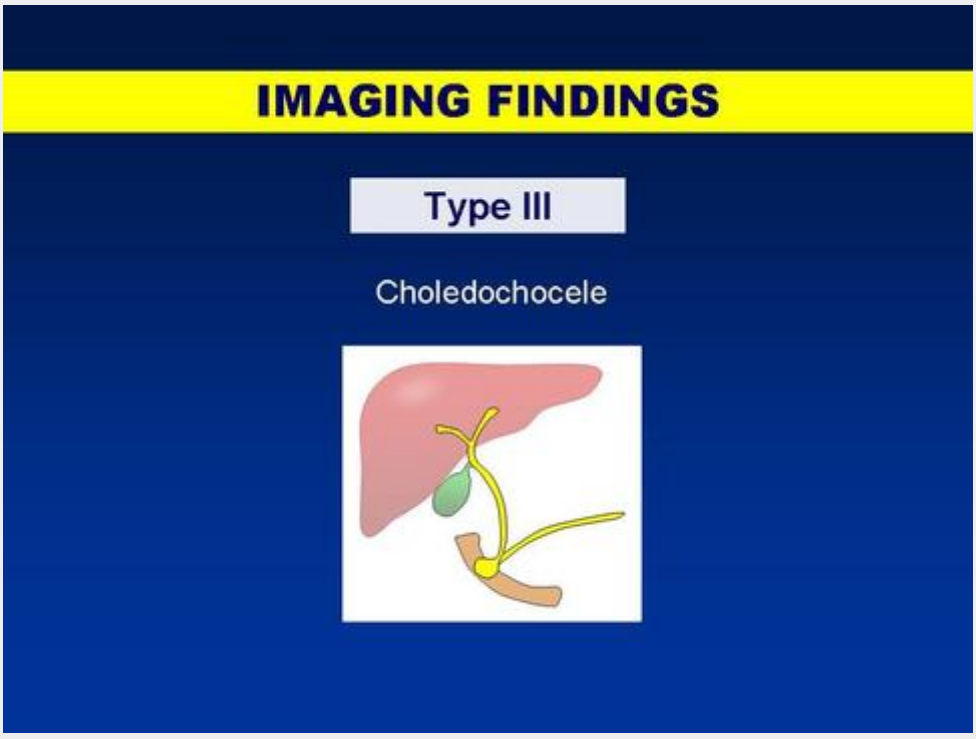


**Figure 3a Type II Choledochal Cyst - Diverticulum.** ♂, 76 Yo. Cholangiocarcinoma – Klatskin tumor. Percutaneous transhepatic cholangiography (PTC) performed to paliate biliary obstruction showed a diverticulum of the common hepatic duct, located above the insertion of the cystic duct, draining to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

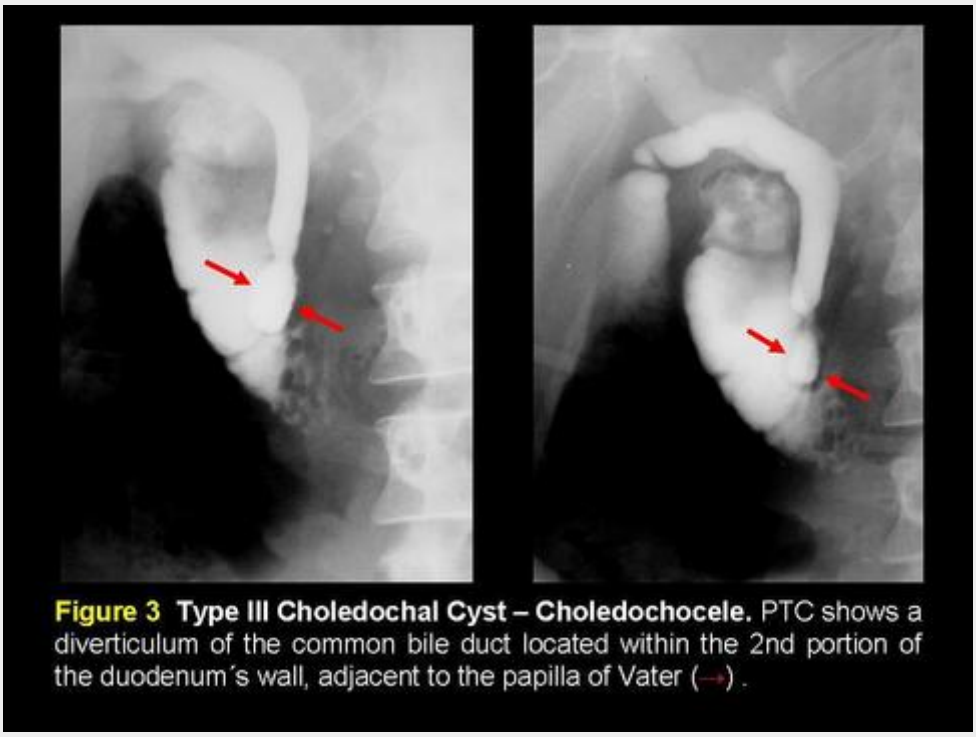
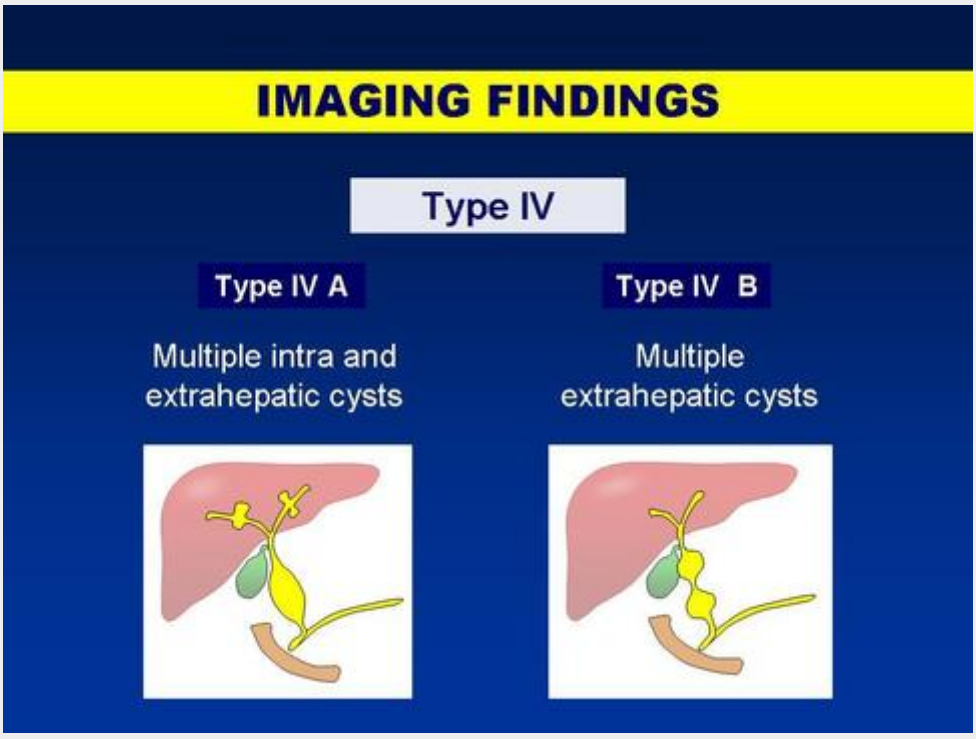


**Figure 3 Type III Choledochal Cyst – Choledochocele.** PTC shows a diverticulum of the common bile duct located within the 2nd portion of the duodenum´s wall, adjacent to the papilla of Vater (→) .

**Type IV**



**Type IVA**

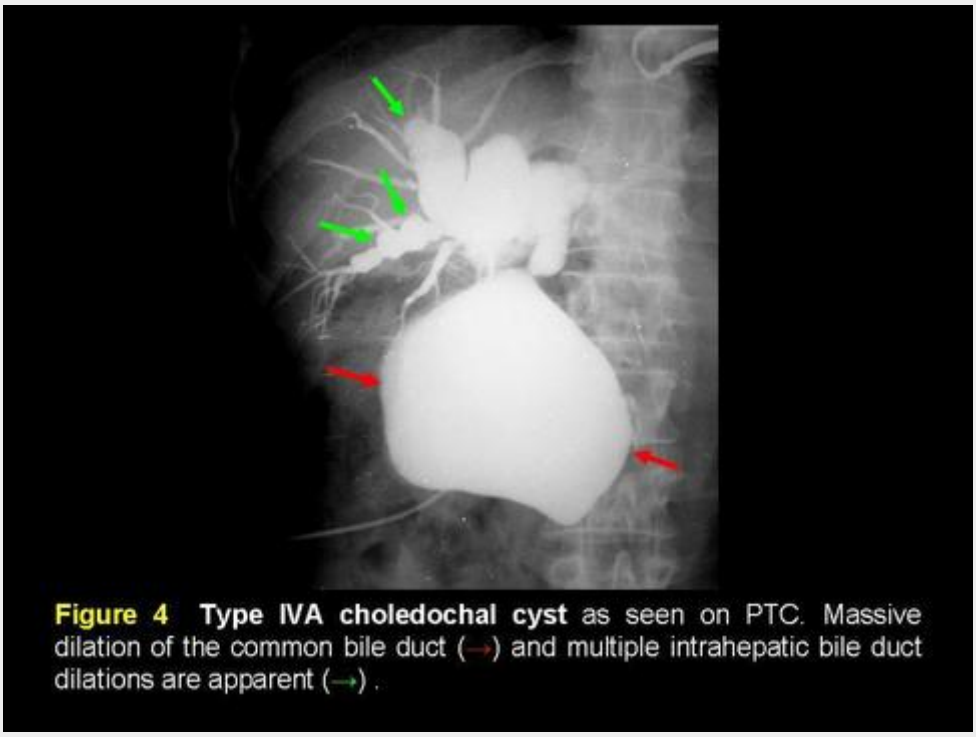
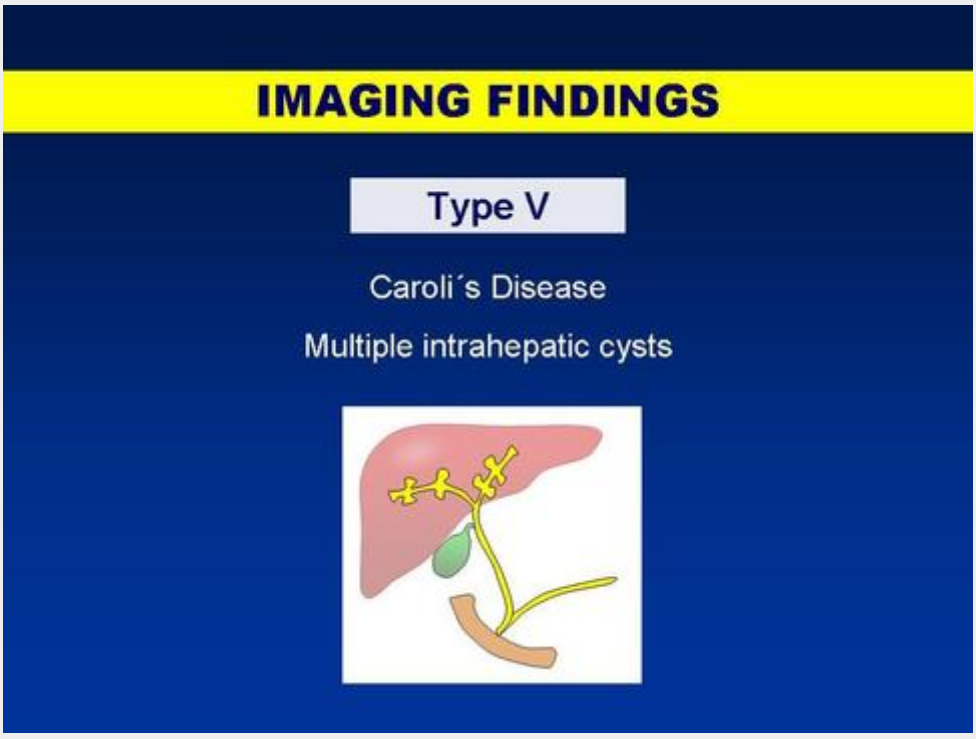
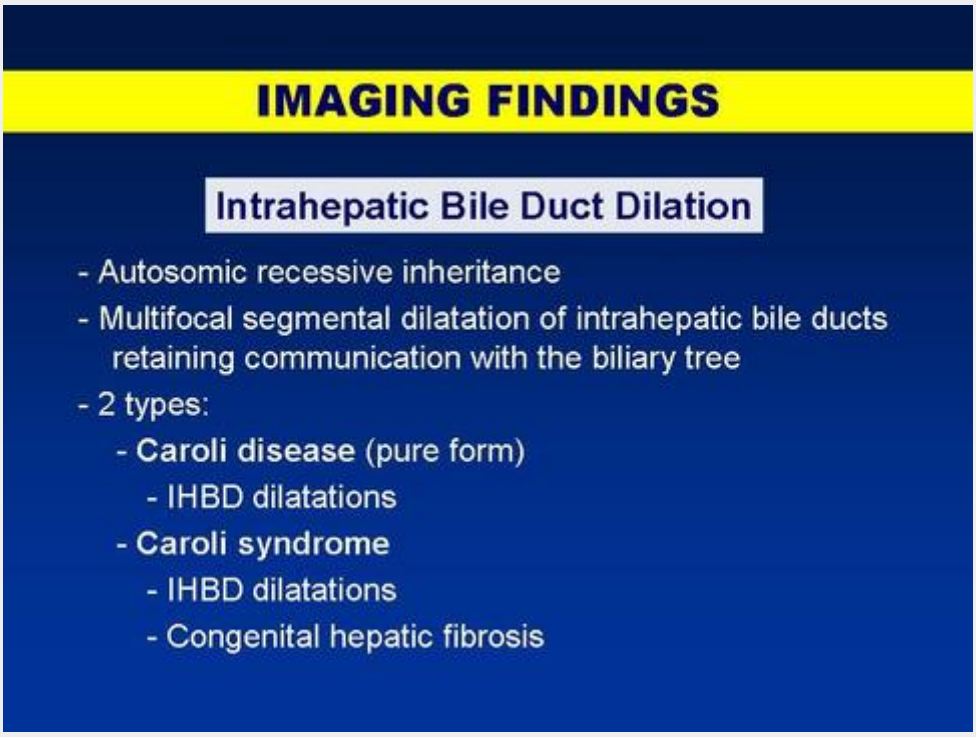


**Figure 4** **Type IVA choledochal cyst** as seen on PTC. Massive dilation of the common bile duct (→) and multiple intrahepatic bile duct dilations are apparent (→).

**Type V**



**diapositivo30.jpg**

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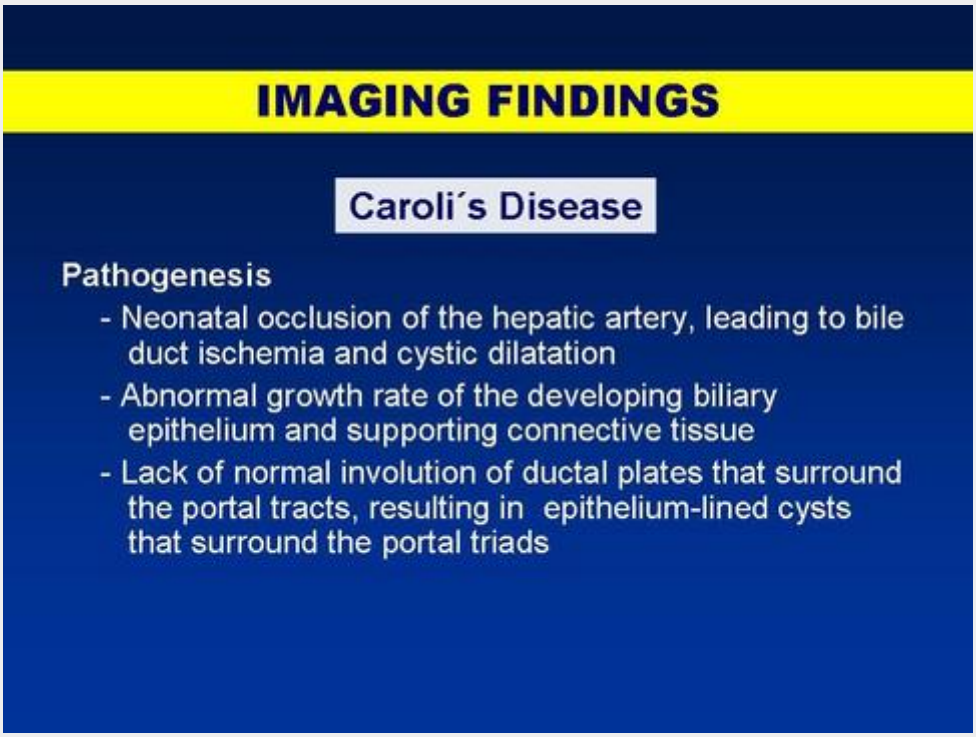

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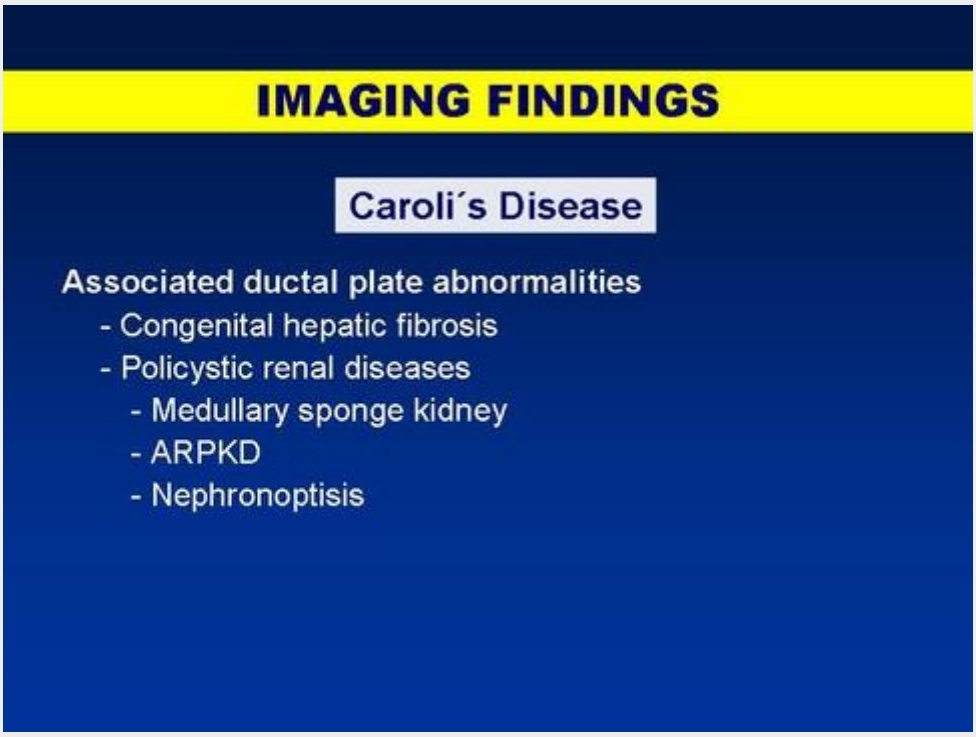


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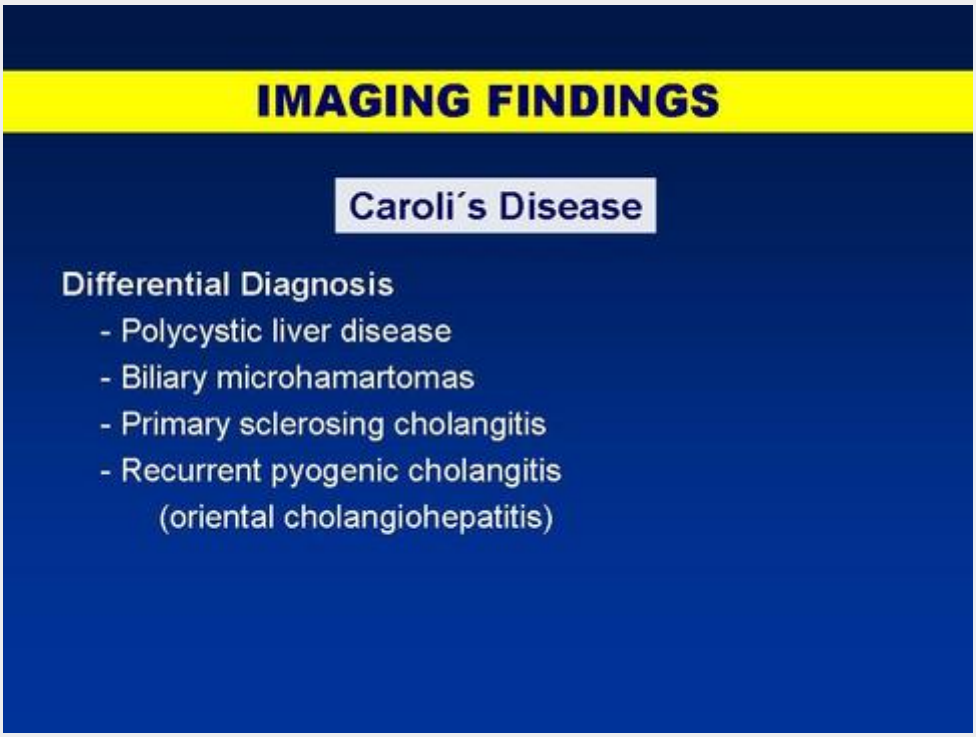

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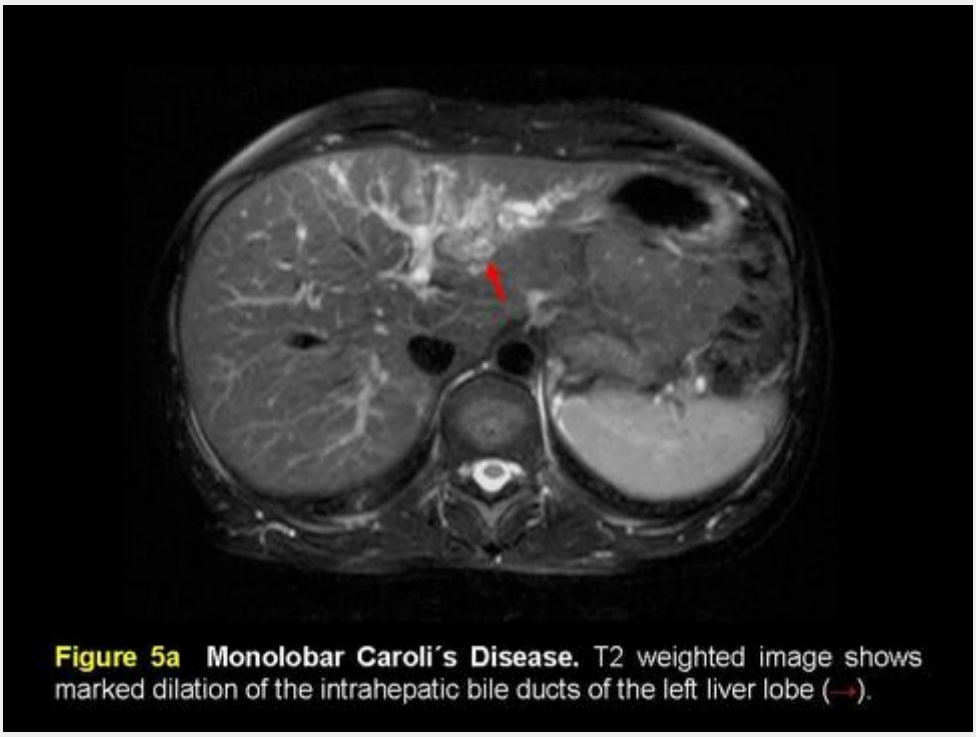


**Figure 5a Monolobar Caroli´s Disease.** T2 weighted image shows marked dilation of the intrahepatic bile ducts of the left liver lobe (→).

**diapositivo35.jpg**

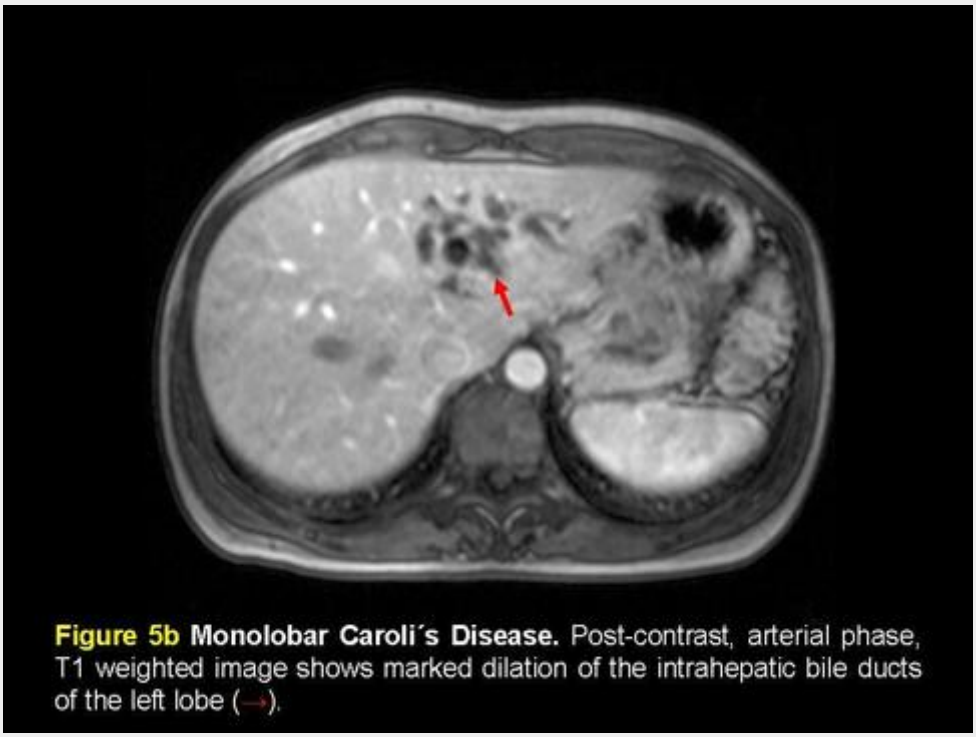


**Figure 5b Monolobar Caroli´s Disease.** Post-contrast, arterial phase, T1 weighted image shows marked dilation of the intrahepatic bile ducts of the left lobe (→).

**diapositivo36.jpg**

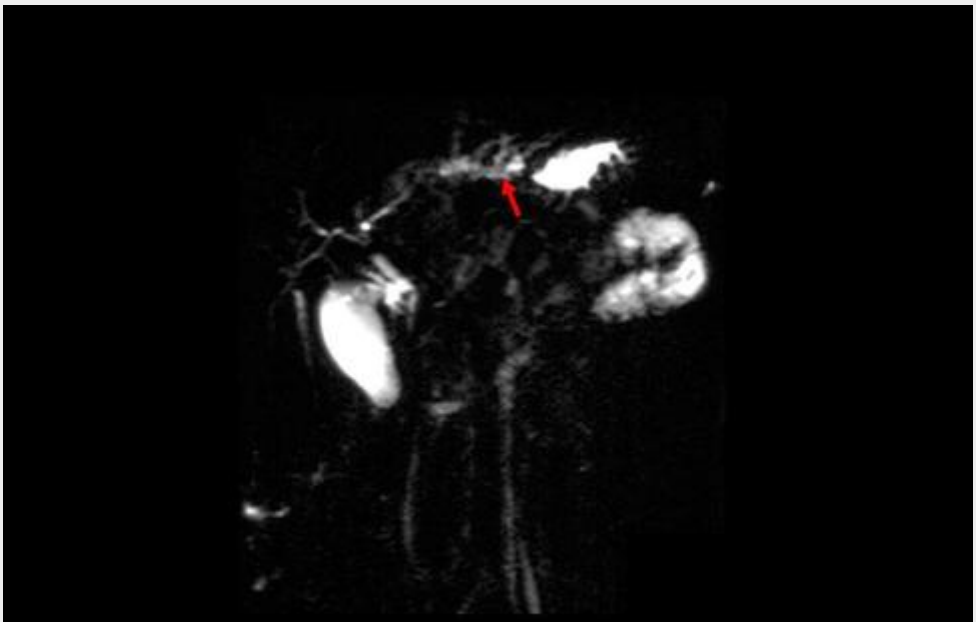


**Figure 5c Monolobar Caroli´s Disease.** Heavily T2-weighted image, projection technique, depicting the dilated left lobe intrahepatic bile ducts (→).

**diapositivo37.jpg**

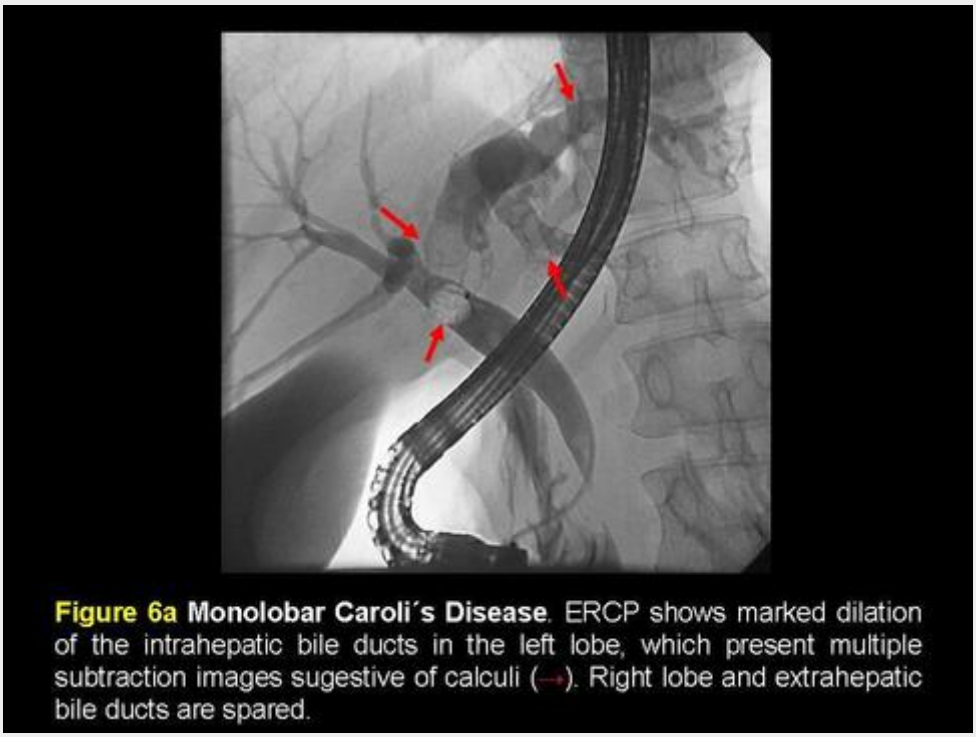


**Figure 6a Monolobar Caroli´s Disease**. ERCP shows marked dilation of the intrahepatic bile ducts in the left lobe, which present multiple subtraction images sugestive of calculi (→). Right lobe and extrahepatic bile ducts are spared.

**Monolobar Caroli´s Disease**

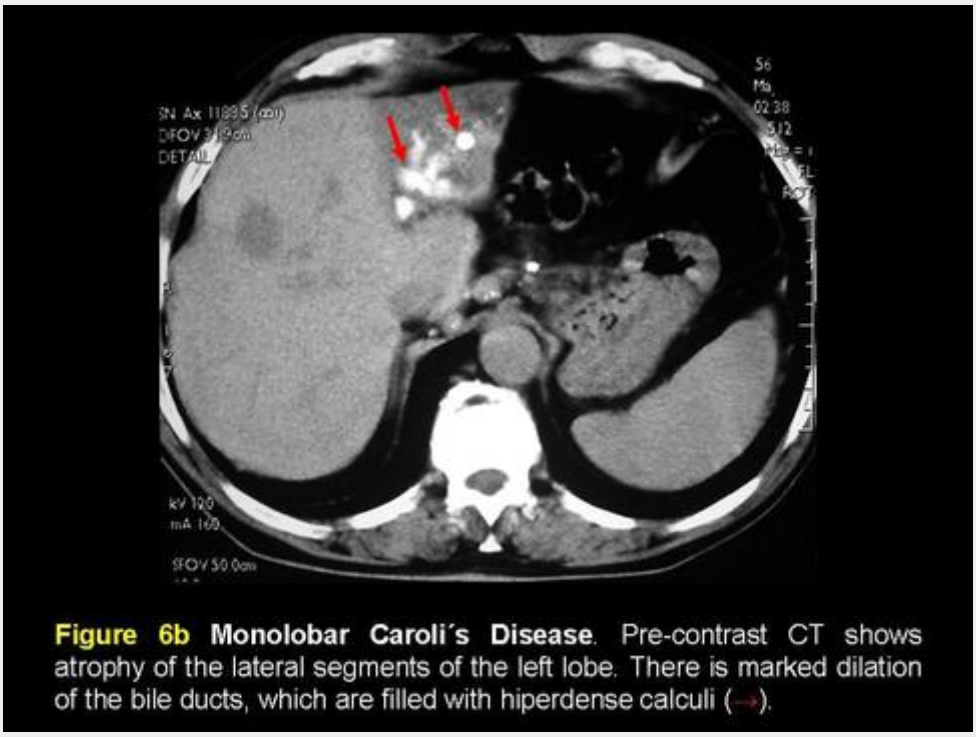


**Figure 6b Monolobar Caroli´s Disease**. Pre-contrast CT shows atrophy of the lateral segments of the left lobe. There is marked dilation of the bile ducts, which are filled with hiperdense calculi (→).

**diapositivo39.jpg**

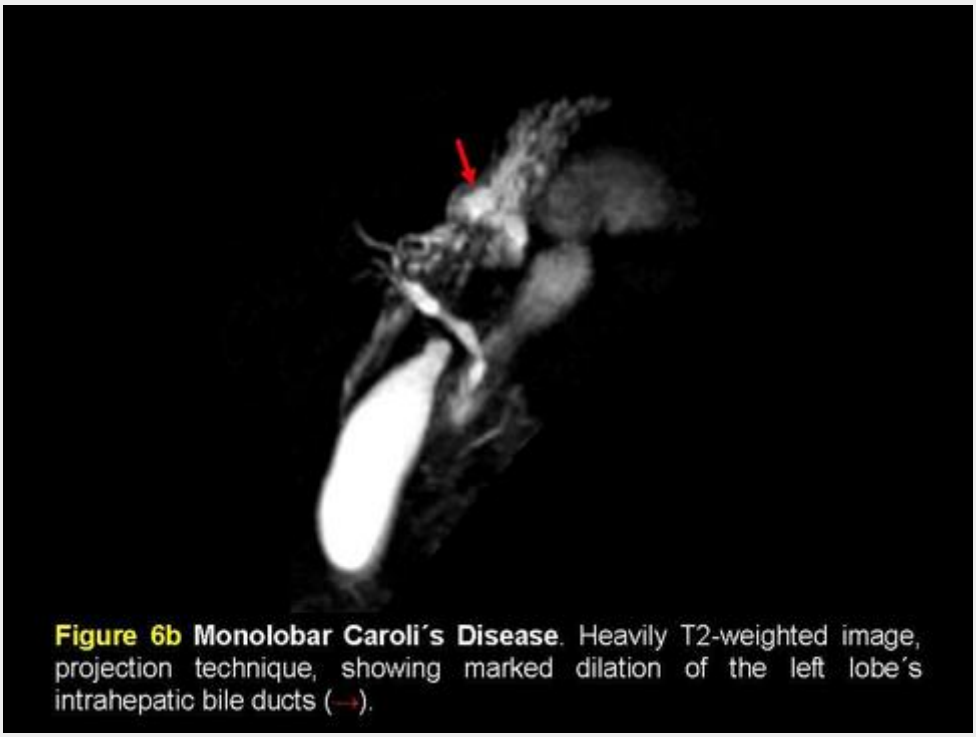


**Figure 6b Monolobar Caroli´s Disease**. Heavily T2-weighted image, projection technique, showing marked dilation of the left lobe´s intrahepatic bile ducts (→).

**Caroli´s Syndrome**

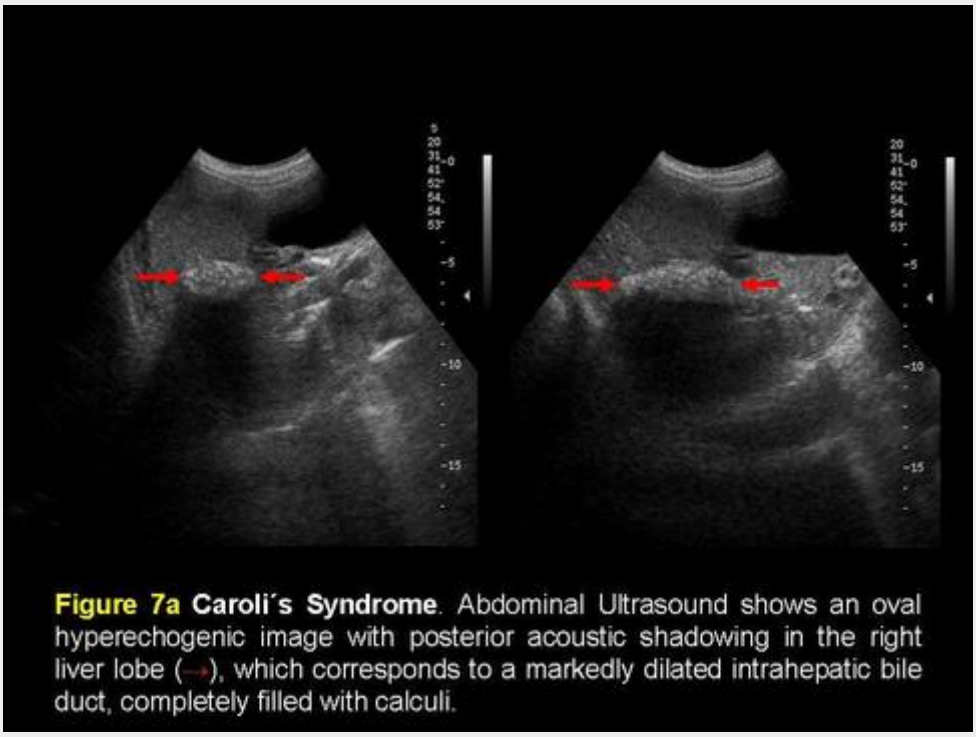


**Figure 7a Caroli´s Syndrome**. Abdominal Ultrasound shows an oval hyperechogenic image with posterior acoustic shadowing in the right liver lobe (→), which corresponds to a markedly dilated intrahepatic bile duct, completely filled with calculi.

**diapositivo41.jpg**

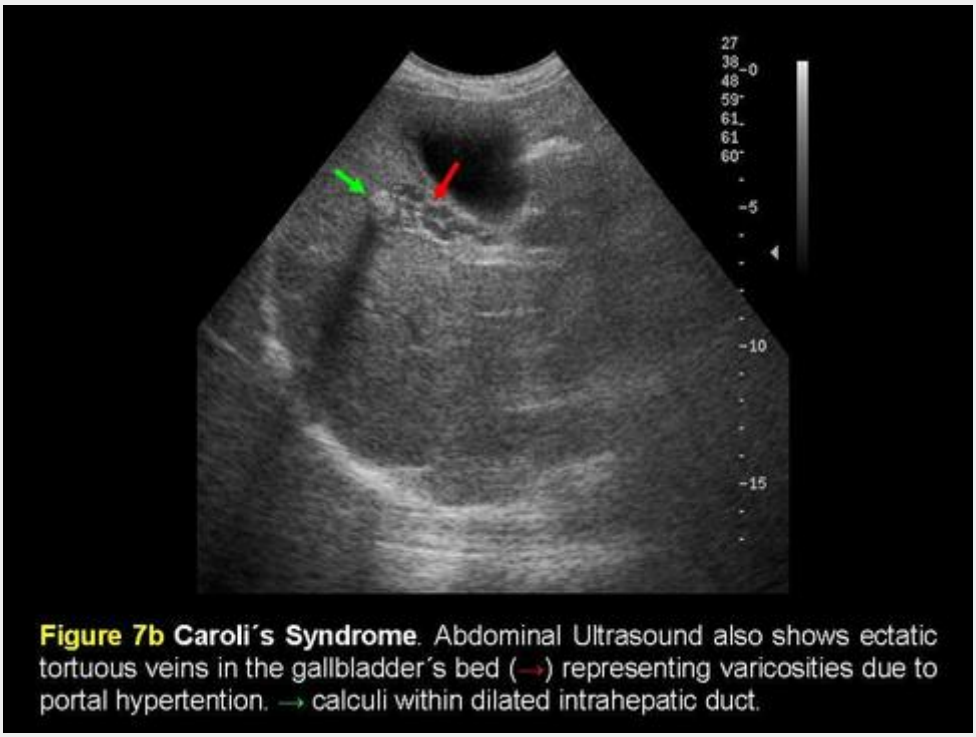


**Figure 7b Caroli´s Syndrome**. Abdominal Ultrasound also shows ectatic tortuous veins in the gallbladder´s bed (→) representing varicosities due to portal hypertention. → calculi within dilated intrahepatic duct.

**diapositivo42.jpg**

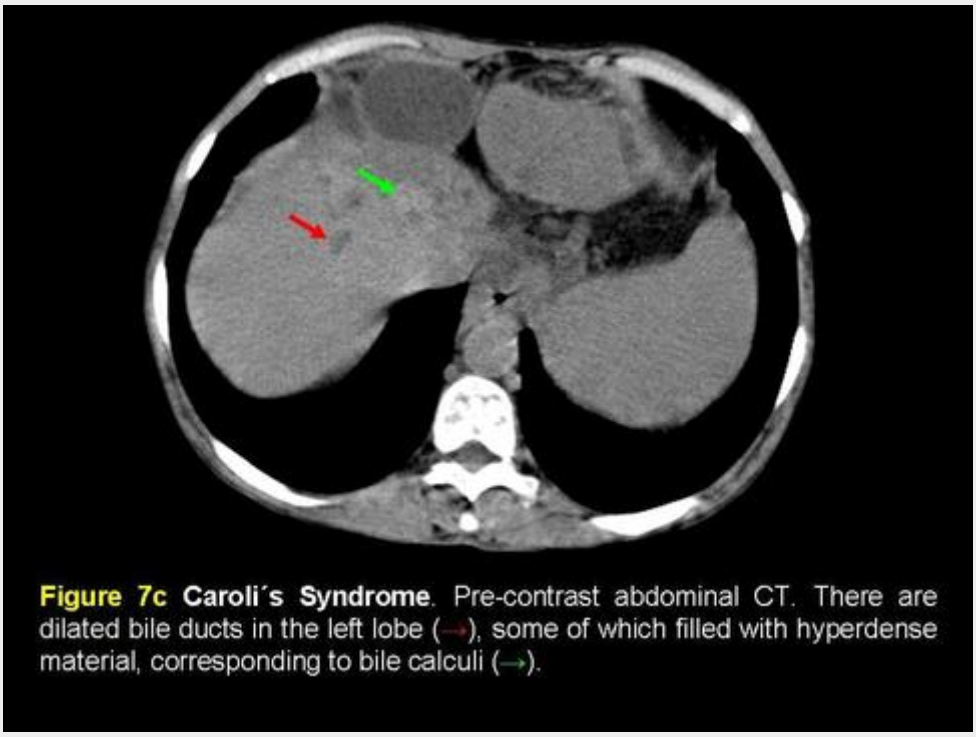


**Figure 7c Caroli´s Syndrome**. Pre-contrast abdominal CT. There are dilated bile ducts in the left lobe (→), some of which filled with hyperdense material, corresponding to bile calculi (→).

**diapositivo43.jpg**

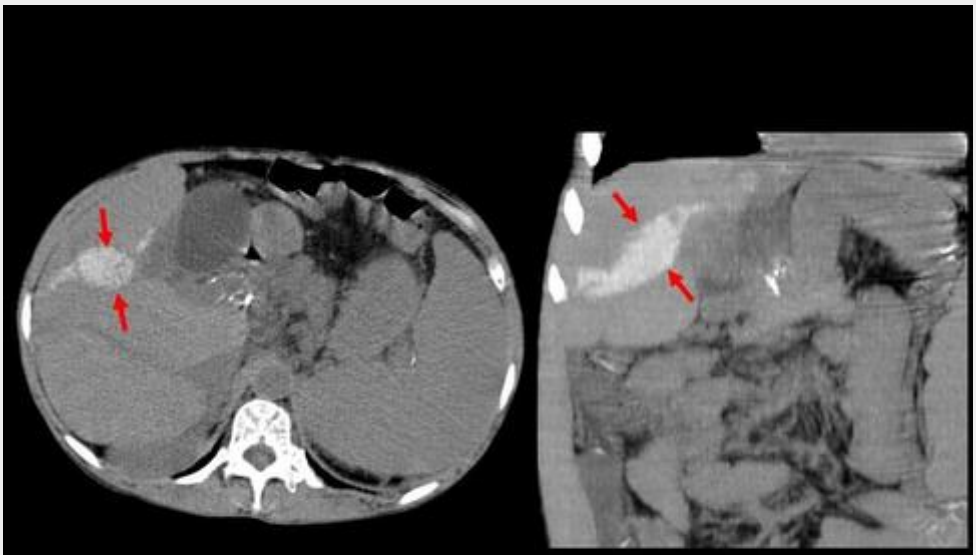


**Figure 7d Caroli´s Syndrome**. Pre-contrast abdominal CT. Axial (*left*) and oblique reformated (*right*) images. There is a markedly dilated bile duct in the right lobe, completely filled with hyperdense material, corresponding to bile calculi (→).

**diapositivo44.jpg**

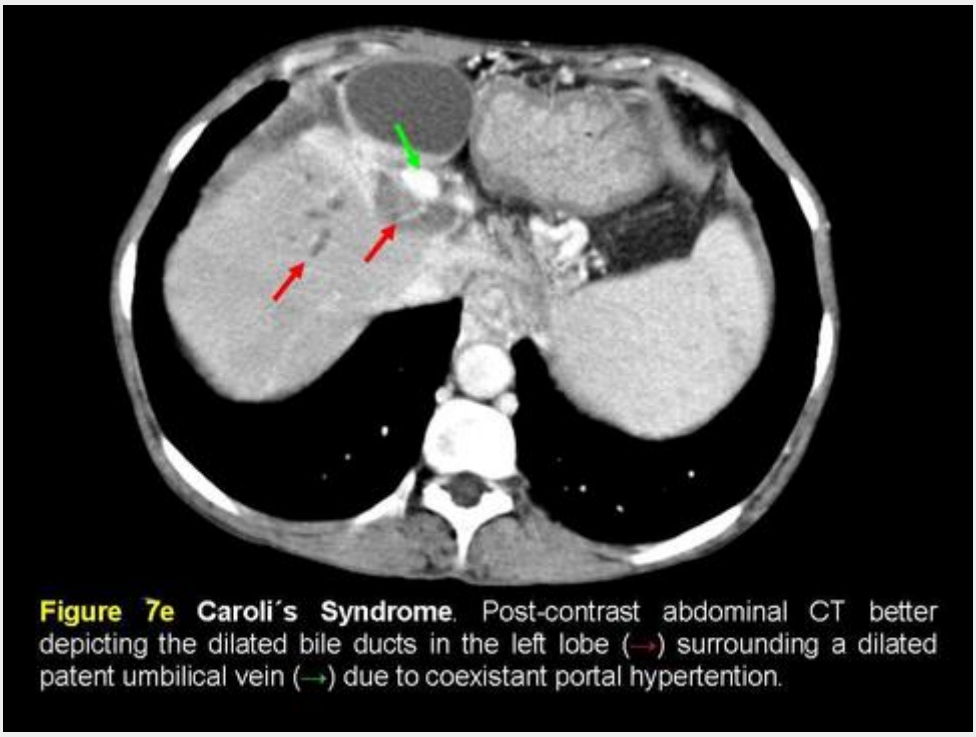


**Figure 7e Caroli´s Syndrome**. Post-contrast abdominal CT better depicting the dilated bile ducts in the left lobe (→) surrounding a dilated patent umbilical vein (→) due to coexistant portal hypertention.

**diapositivo45.jpg**

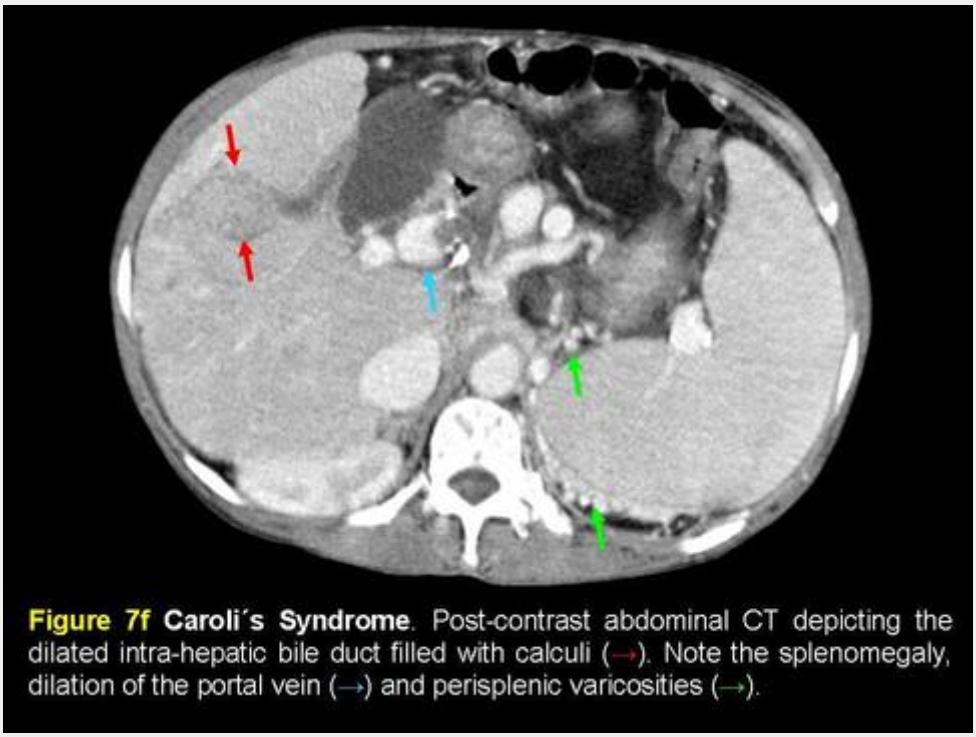


**Figure 7f Caroli´s Syndrome**. Post-contrast abdominal CT depicting the dilated intra-hepatic bile duct filled with calculi (→). Note the splenomegaly, dilation of the portal vein (→) and perisplenic varicosities (→).

**Caroli´s Syndrome**

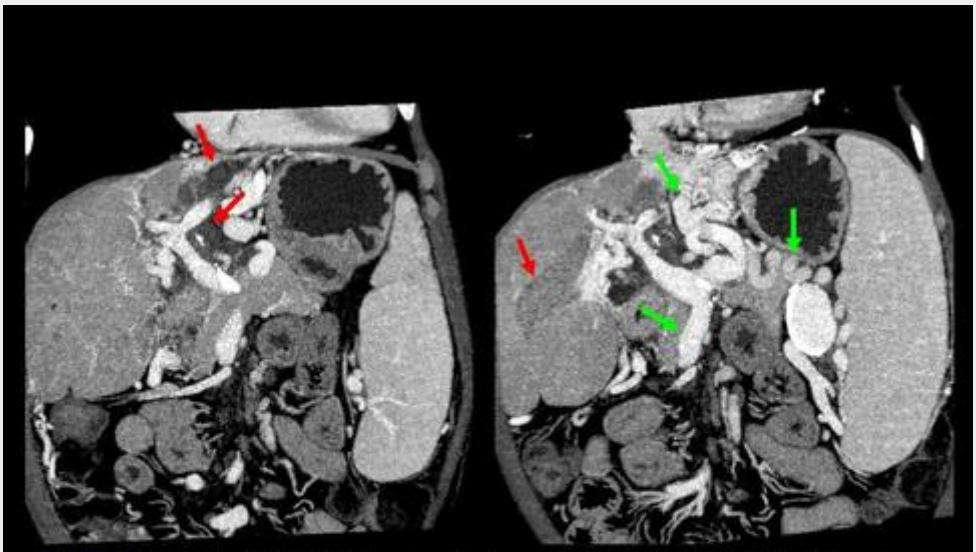


**Figure 7g Caroli´s Syndrome**. Post-contrast abdominal CT. Reformated oblique MIP images depicting the dilated intra-hepatic bile ducts, some of which filled with calculi (→). Note the splenomegaly and the tortuosity and dilation of the portal, splenic and perigastric veins (→) due to portal hypertension.

**diapositivo47.jpg**

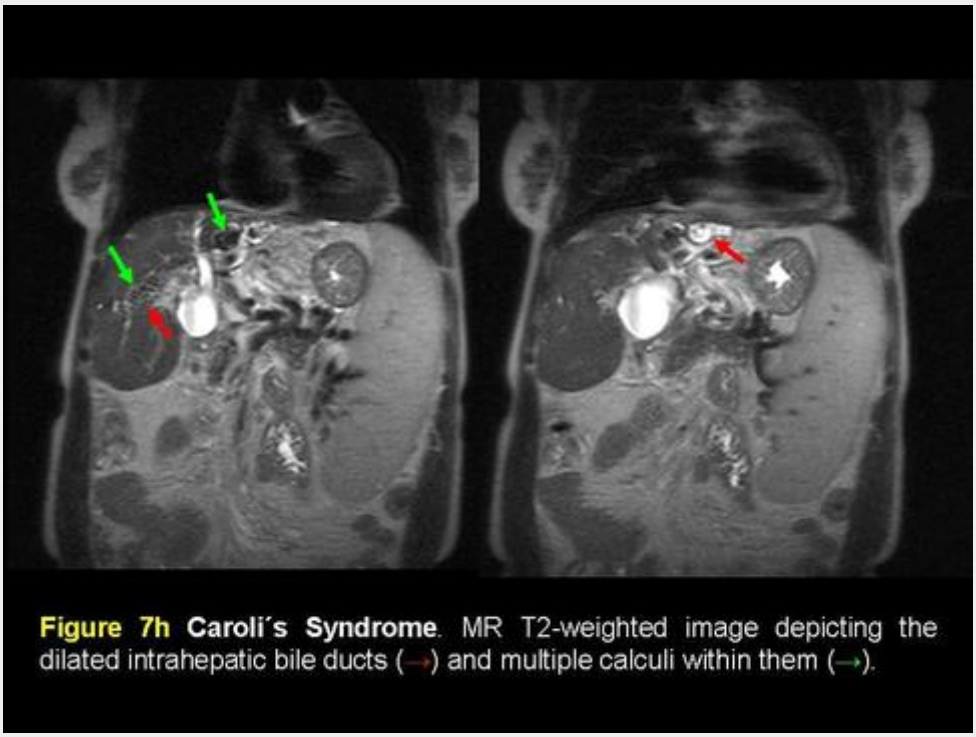


**Figure 7h Caroli´s Syndrome**. MR T2-weighted image depicting the dilated intrahepatic bile ducts (→) and multiple calculi within them (→).

**diapositivo48.jpg**

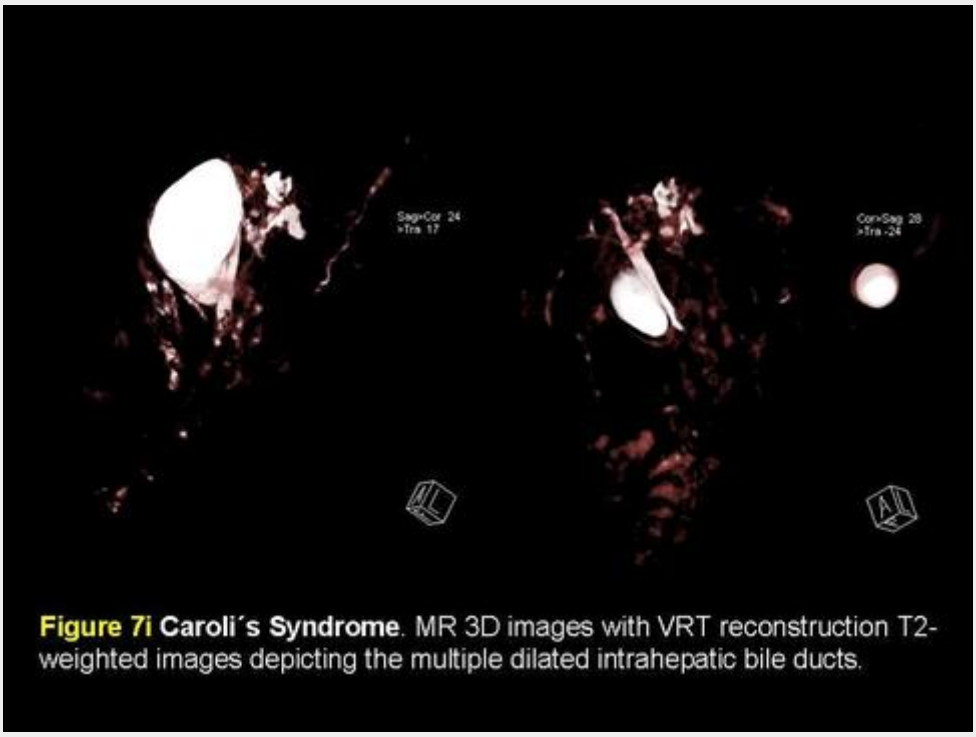



**Figure 7i Caroli´s Syndrome**. MR 3D images with VRT reconstruction T2-weighted images depicting the multiple dilated intrahepatic bile ducts.

**diapositivo50.jpg**

## 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**

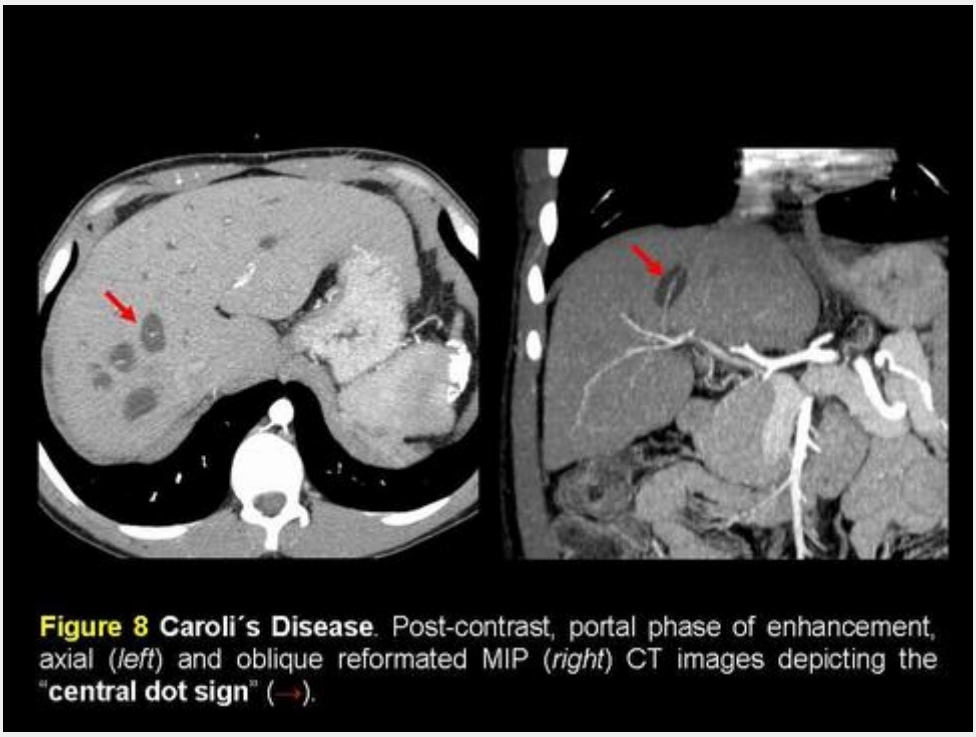
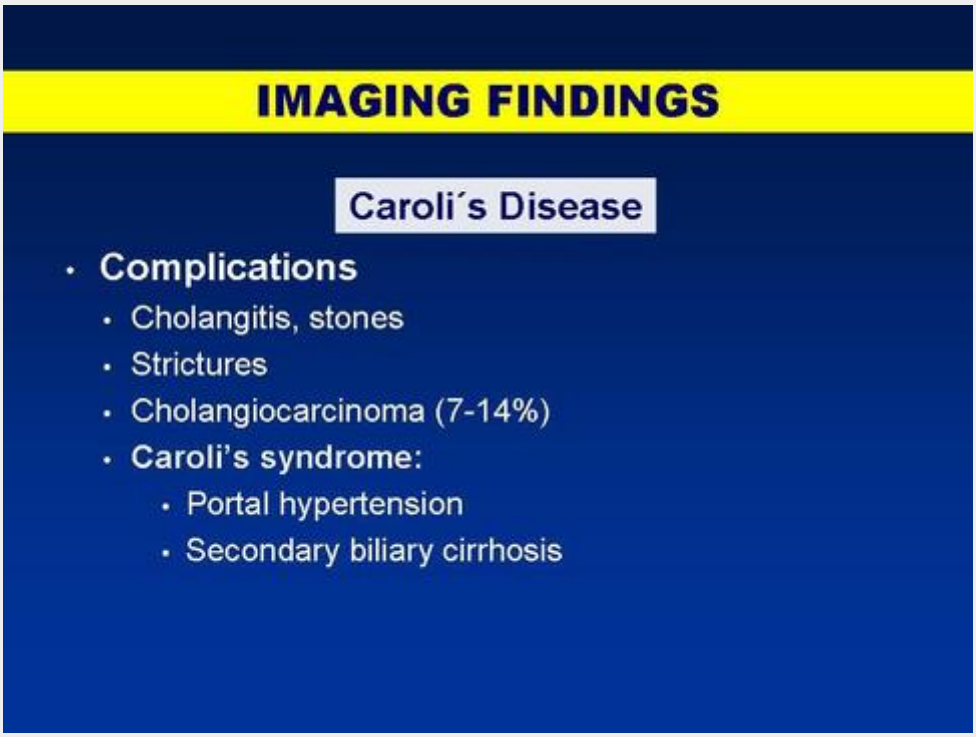


**Figure 8 Caroli´s Disease**. Post-contrast, portal phase of enhancement, axial (*left*) and oblique reformated MIP (*right*) CT images depicting the "**central dot sign**" (→).

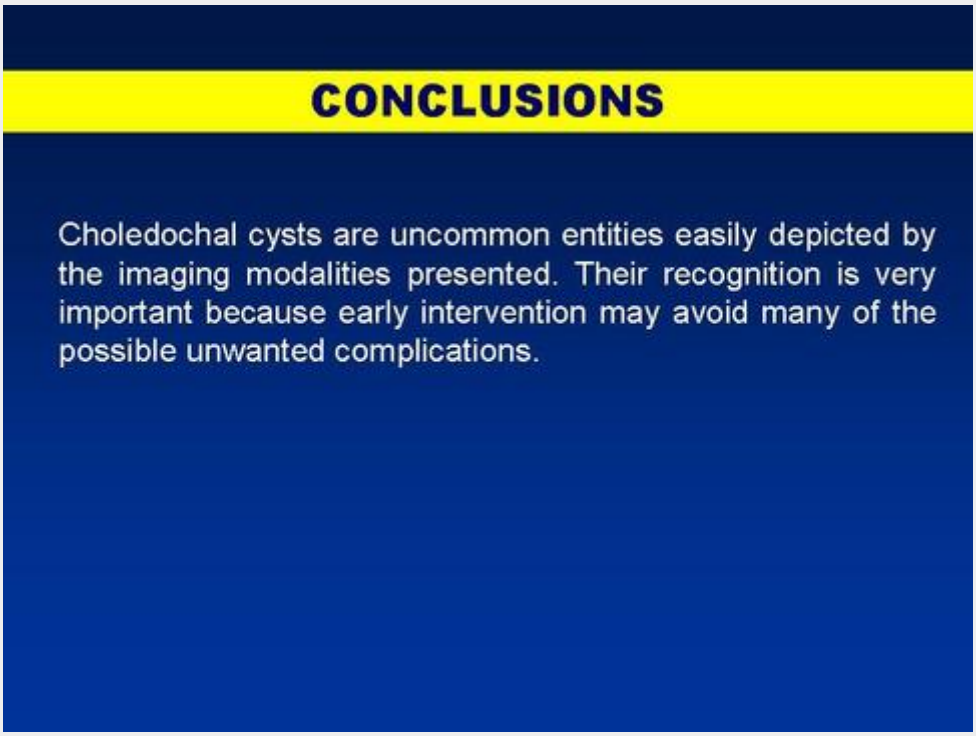
**diapositivo52.jpg**




**4. Conclusion**

Conclusion

**diapositivo53.jpg**




**5. References**

References

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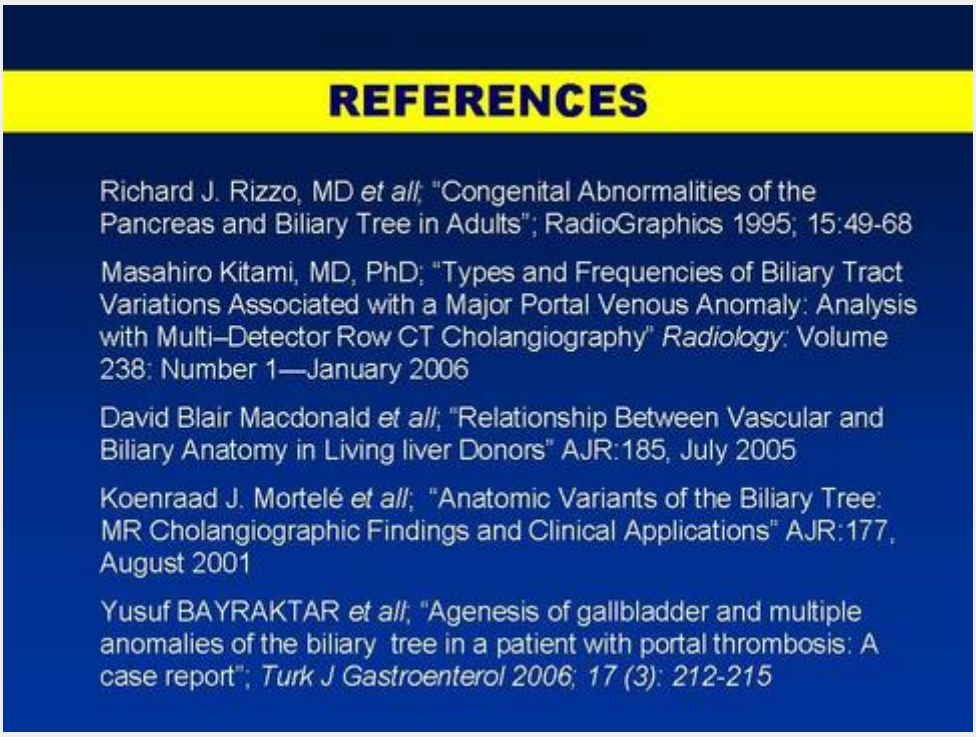


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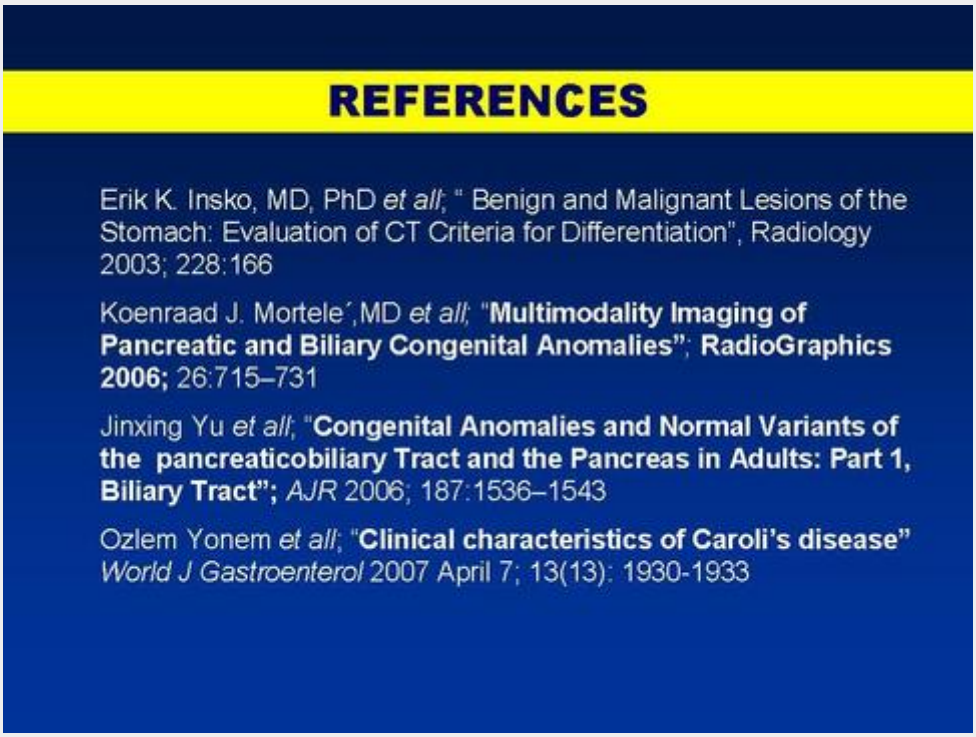

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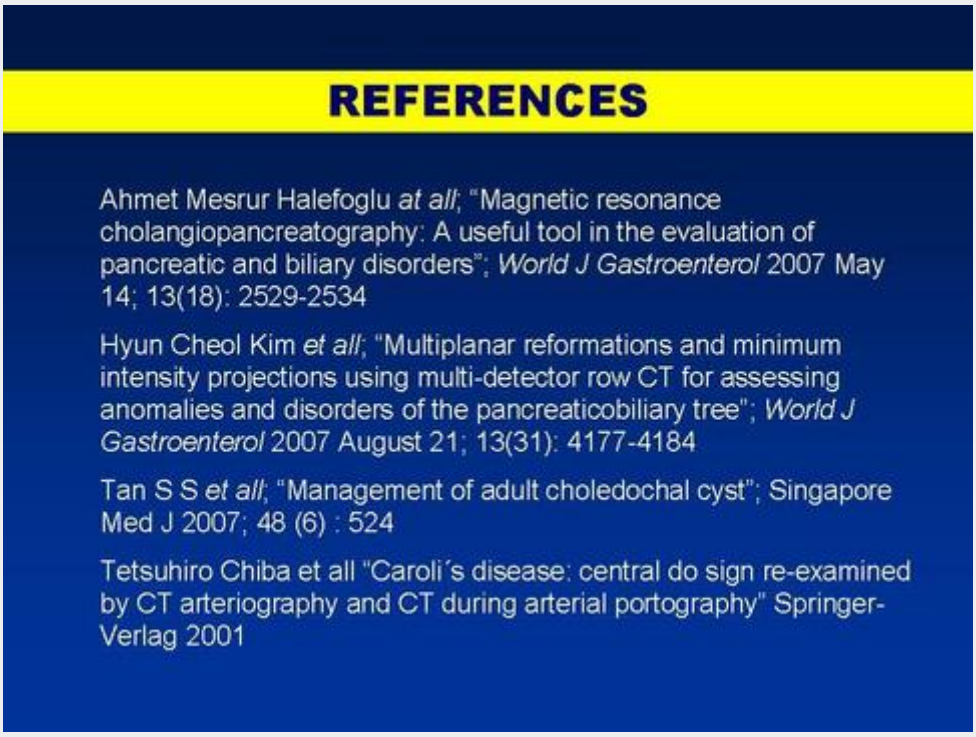
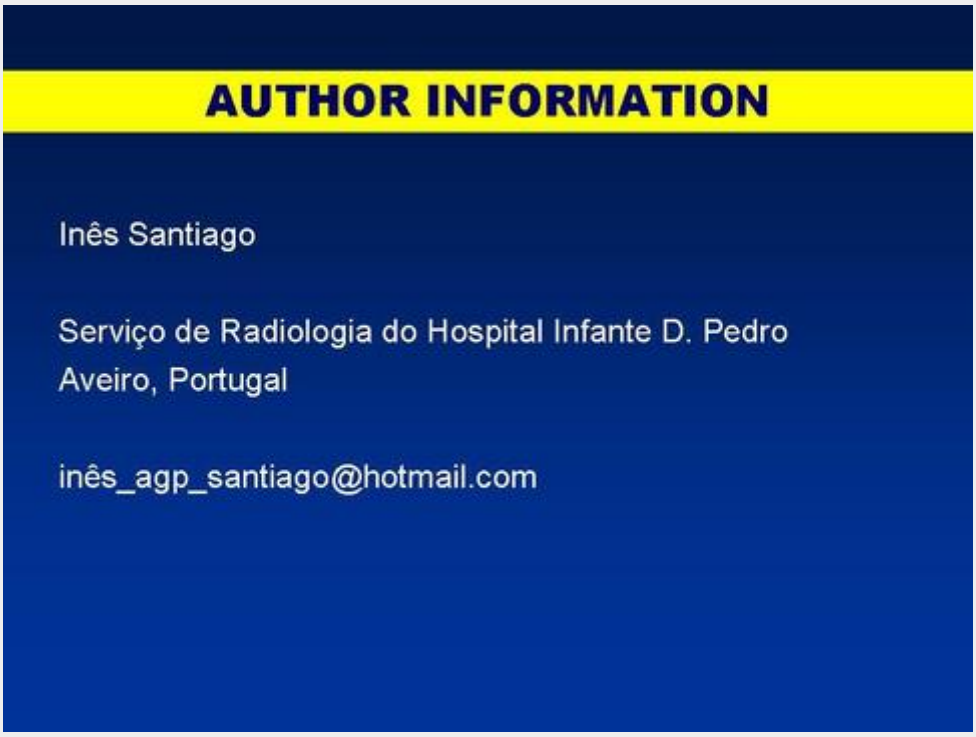



**6. Author Information**

Author Information

**Author information**

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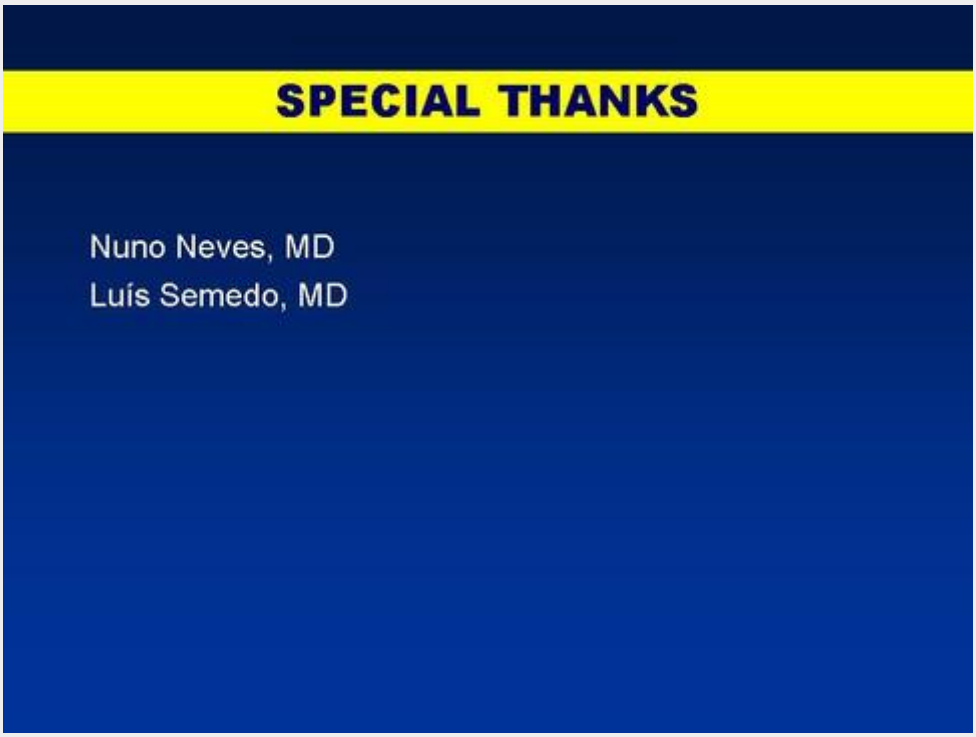
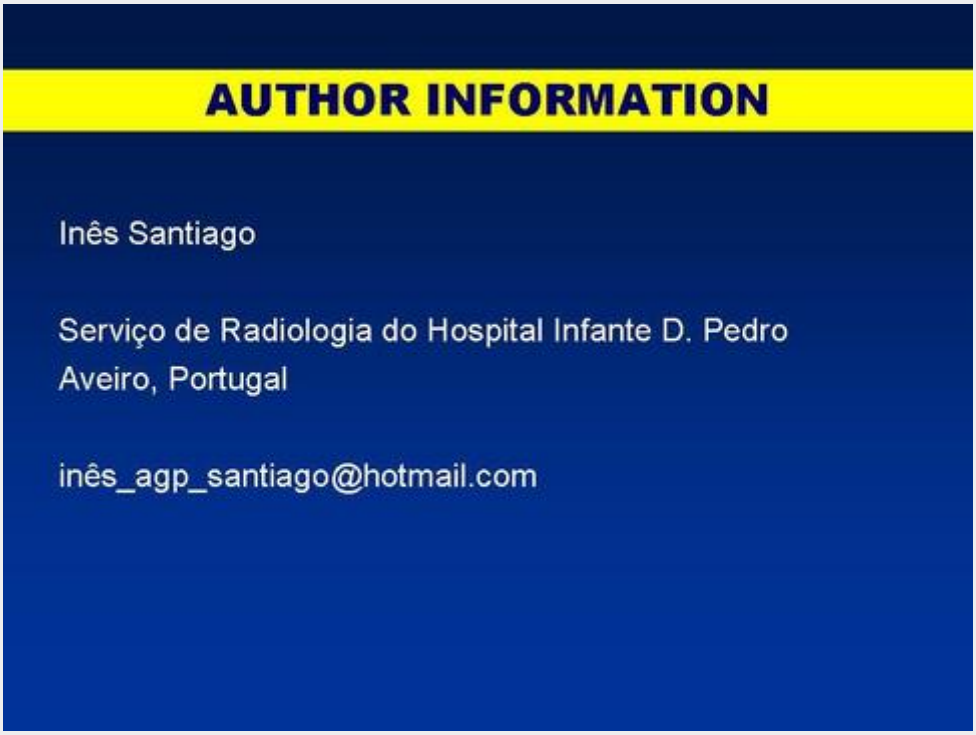


## 7. Mediafiles

### Author information




### Caroli´s Syndrome

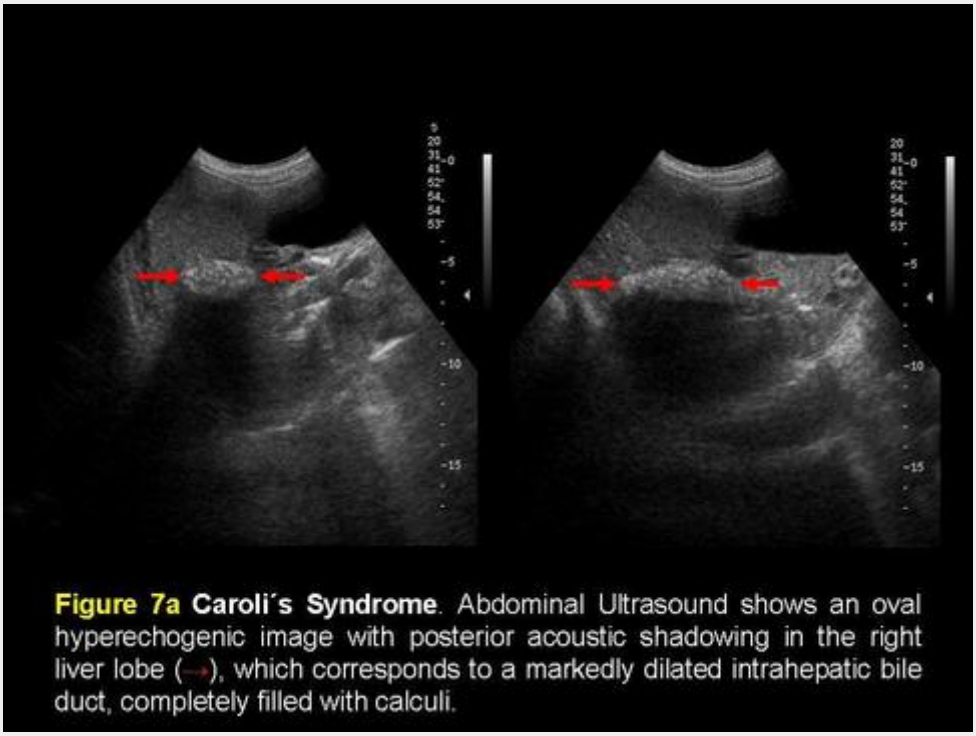


**Figure 7a Caroli´s Syndrome**. Abdominal Ultrasound shows an oval hyperechogenic image with posterior acoustic shadowing in the right liver lobe (→), which corresponds to a markedly dilated intrahepatic bile duct, completely filled with calculi.

## Caroli´s Syndrome

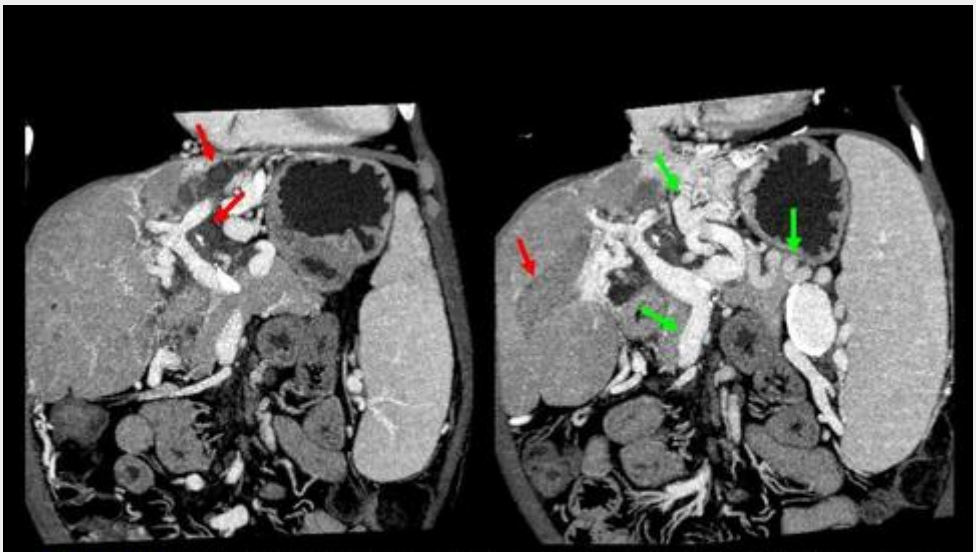


**Figure 7g Caroli´s Syndrome**. Post-contrast abdominal CT. Reformated oblique MIP images depicting the dilated intra-hepatic bile ducts, some of which filled with calculi (→). Note the splenomegaly and the tortuosity and dilation of the portal, splenic and perigastric veins (→) due to portal hypertension.

## Choledochocele

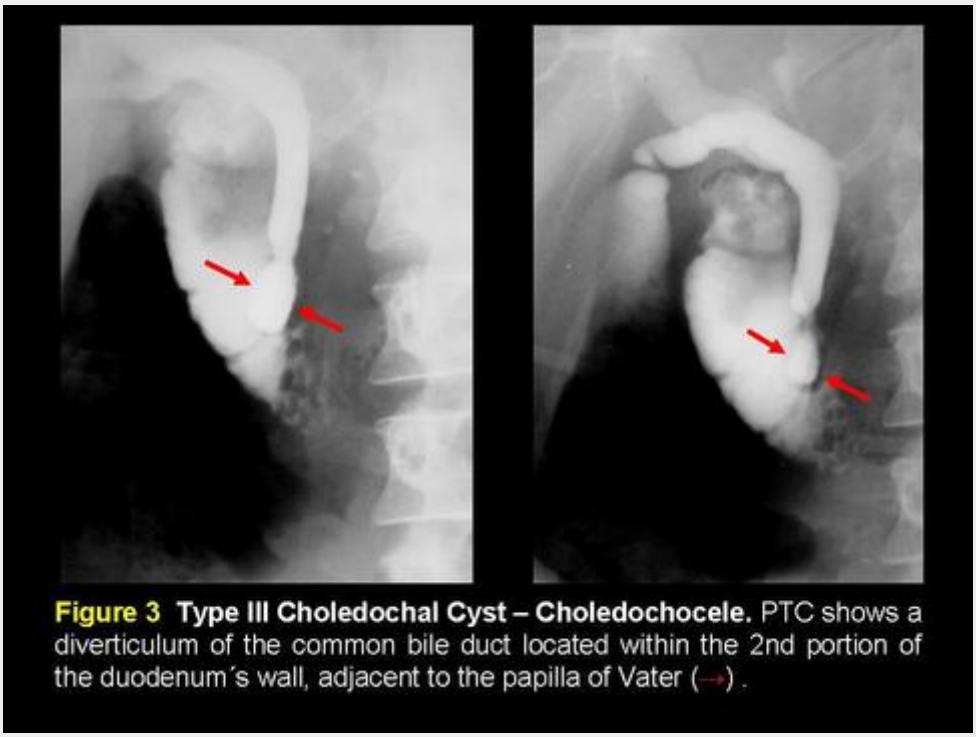
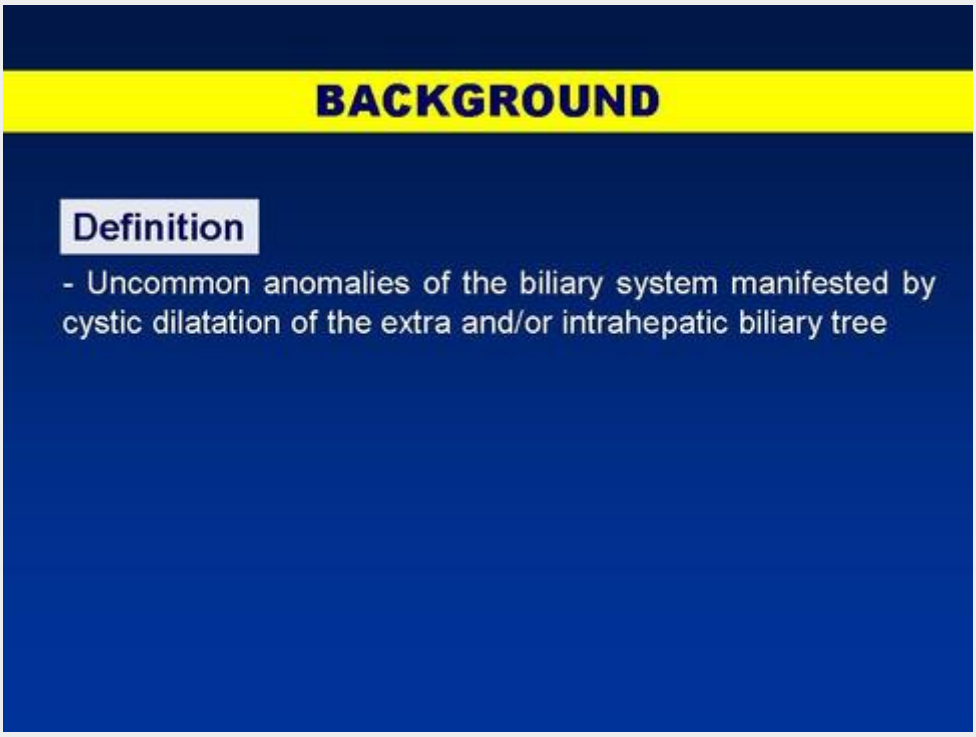


**Figure 3 Type III Choledochal Cyst – Choledochocele.** PTC shows a diverticulum of the common bile duct located within the 2nd portion of the duodenum´s wall, adjacent to the papilla of Vater (→) .

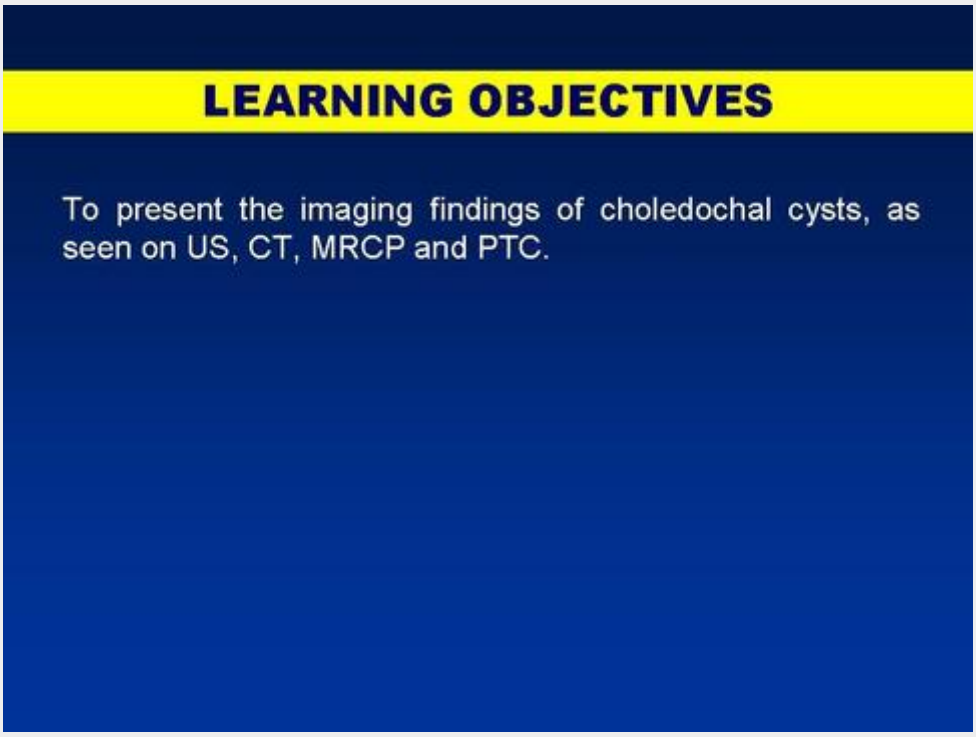
**Definition of choledochal cysts**




**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**

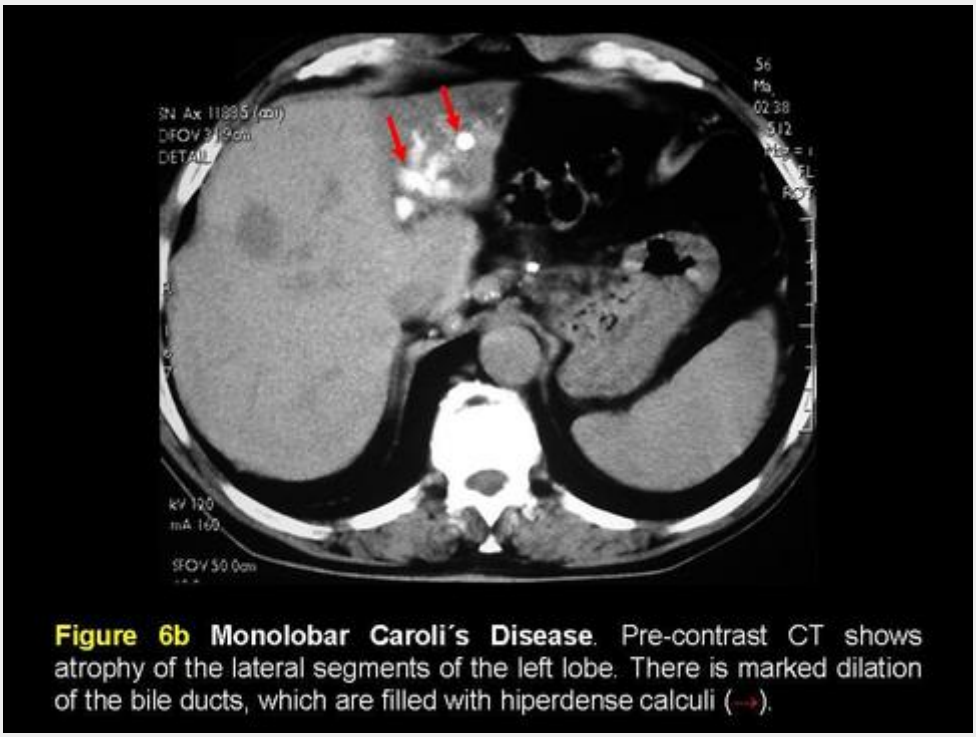
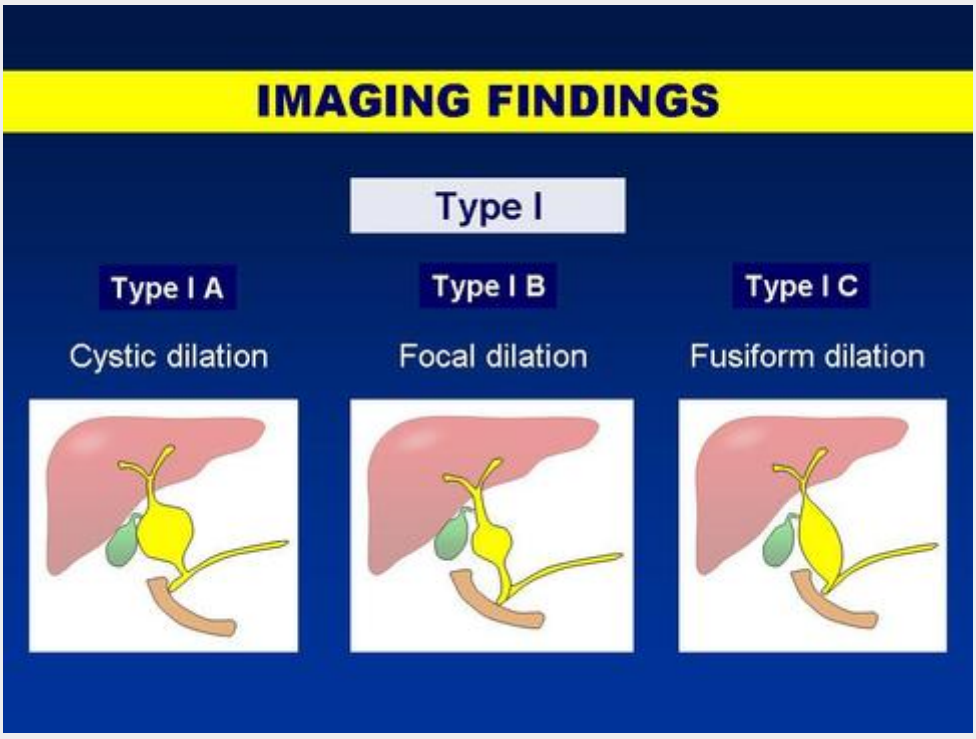


**Figure 6b Monolobar Caroli´s Disease**. Pre-contrast CT shows atrophy of the lateral segments of the left lobe. There is marked dilation of the bile ducts, which are filled with hiperdense calculi (→).

**Special thanks**


**Type I**



**Type IC**

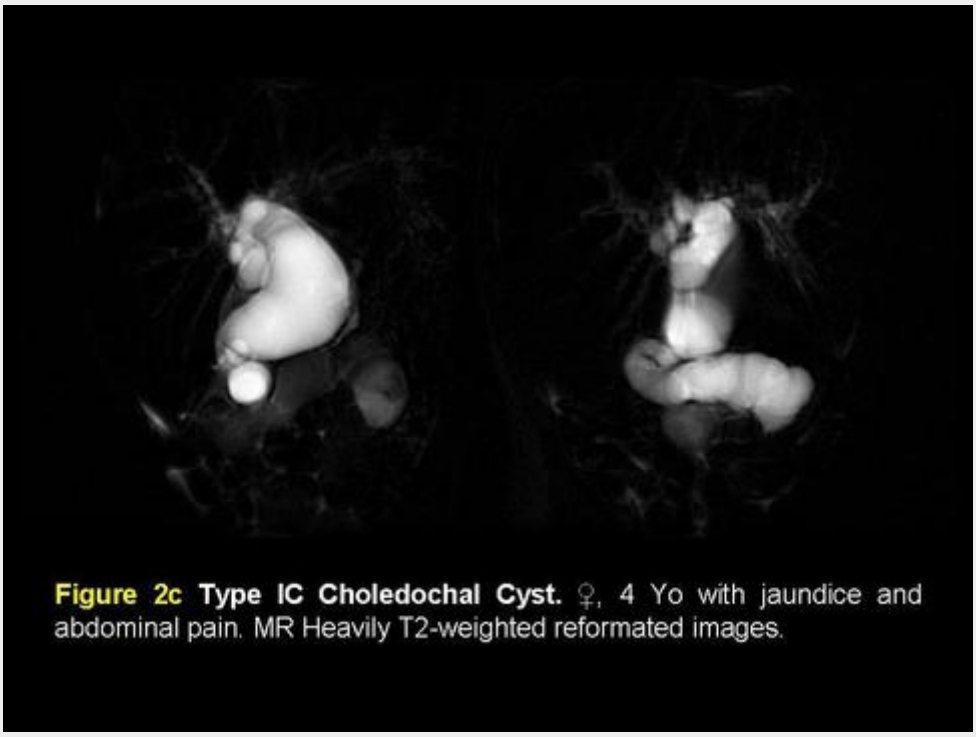
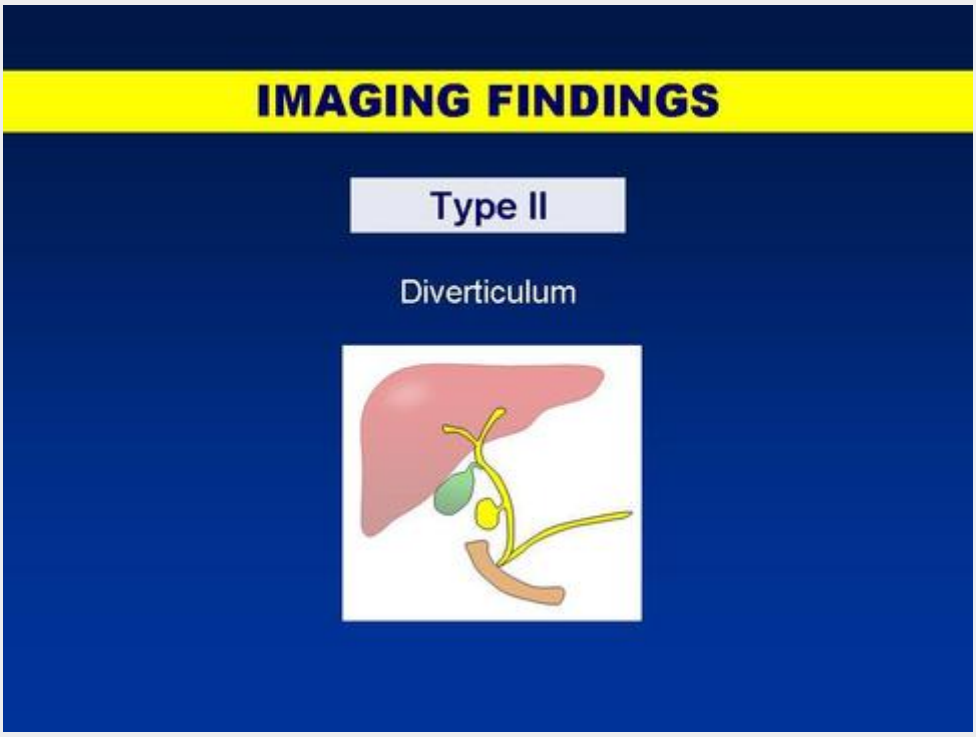


**Figure 2c Type IC Choledochal Cyst.** ♀, 4 Yo with jaundice and abdominal pain. MR Heavily T2-weighted reformated images.

**Type IC Choledochal Cyst**

**Type II**

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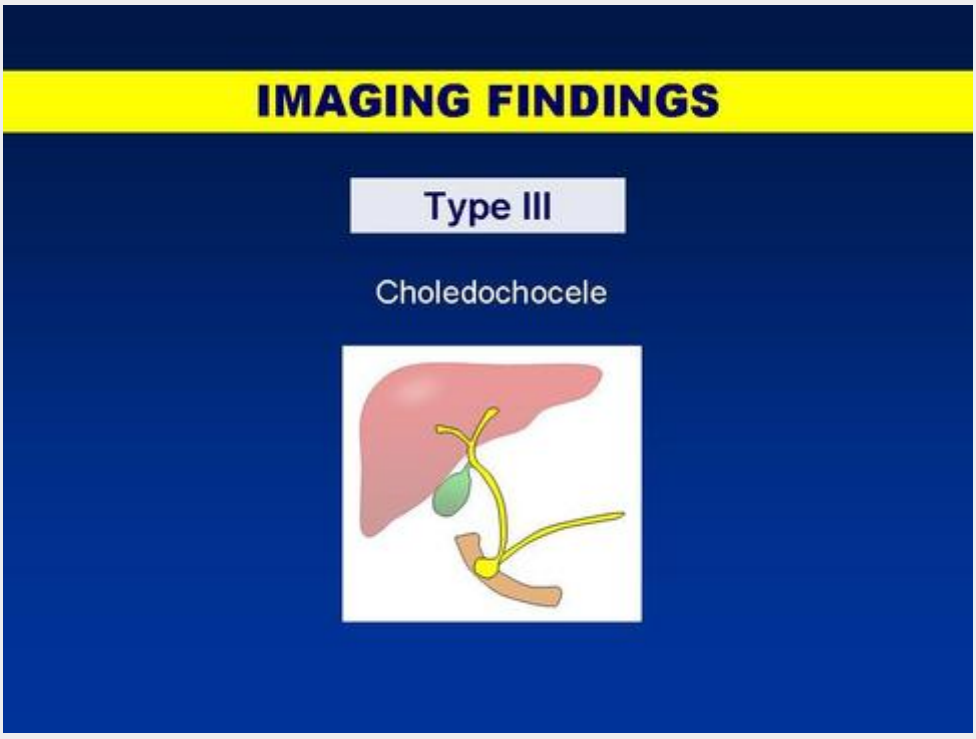
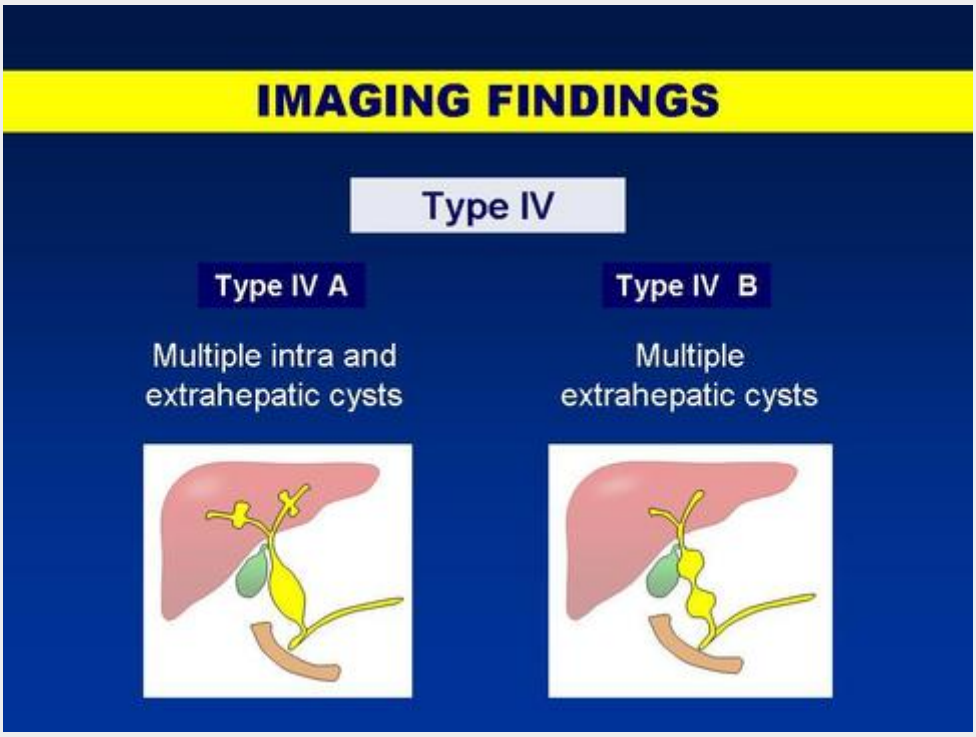


**Type IV**




**Type IVA**

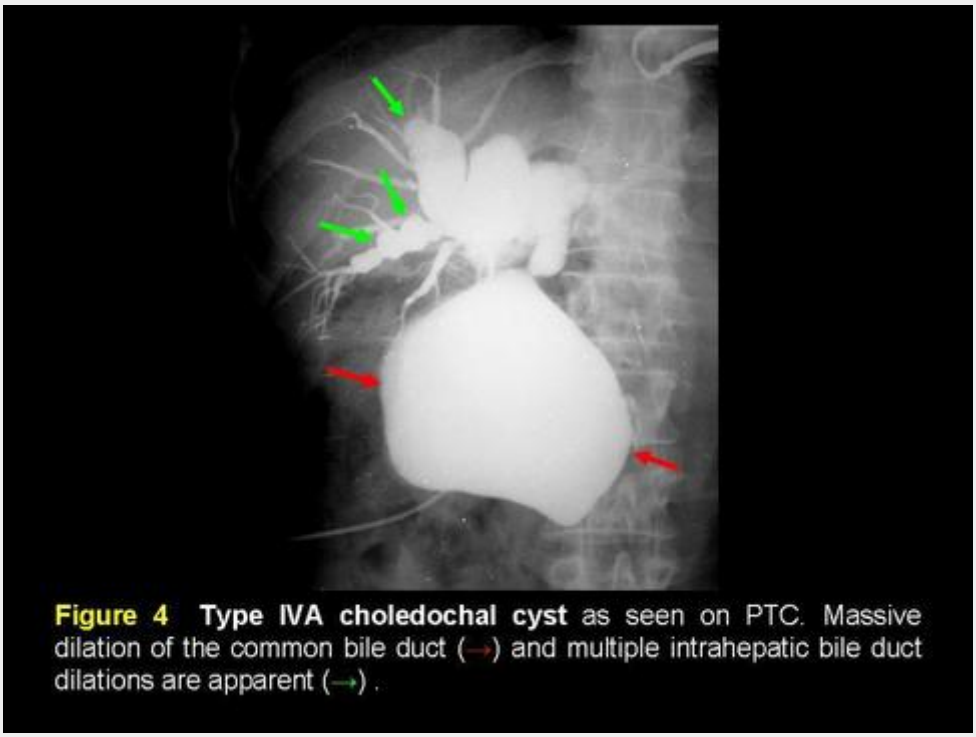
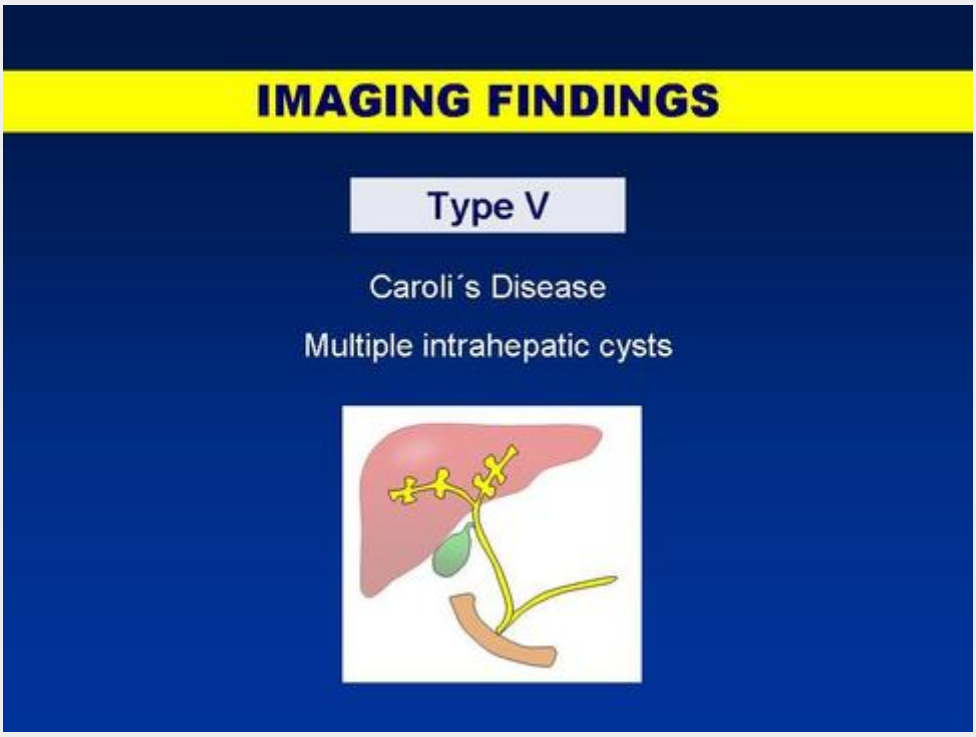


**Figure 4** **Type IVA choledochal cyst** as seen on PTC. Massive dilation of the common bile duct (→) and multiple intrahepatic bile duct dilations are apparent (→).

**Type V**

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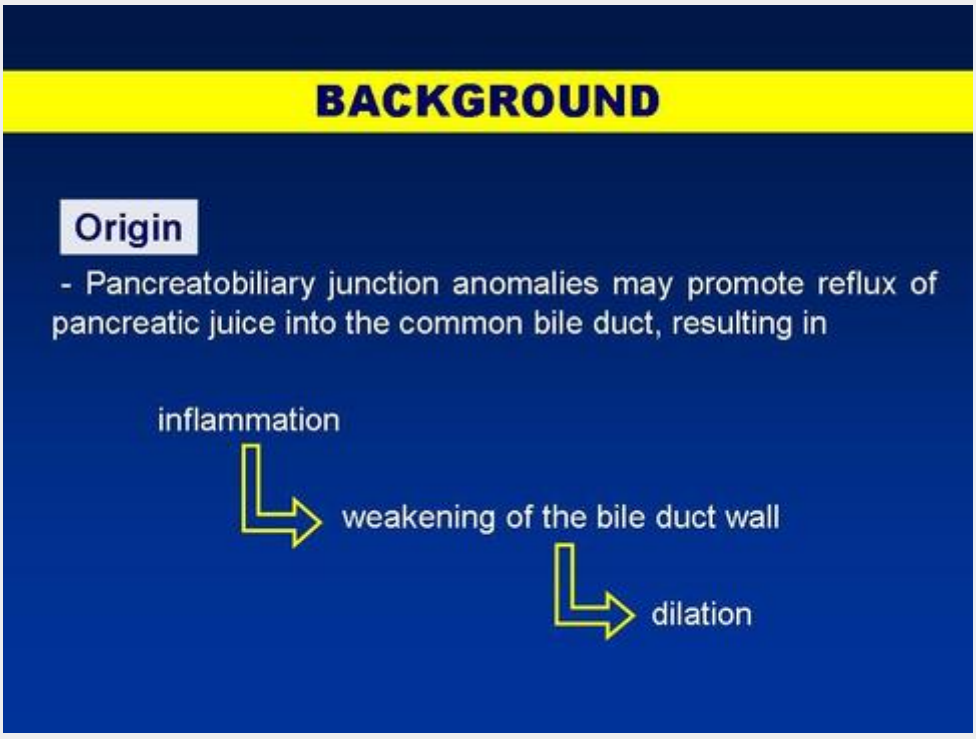

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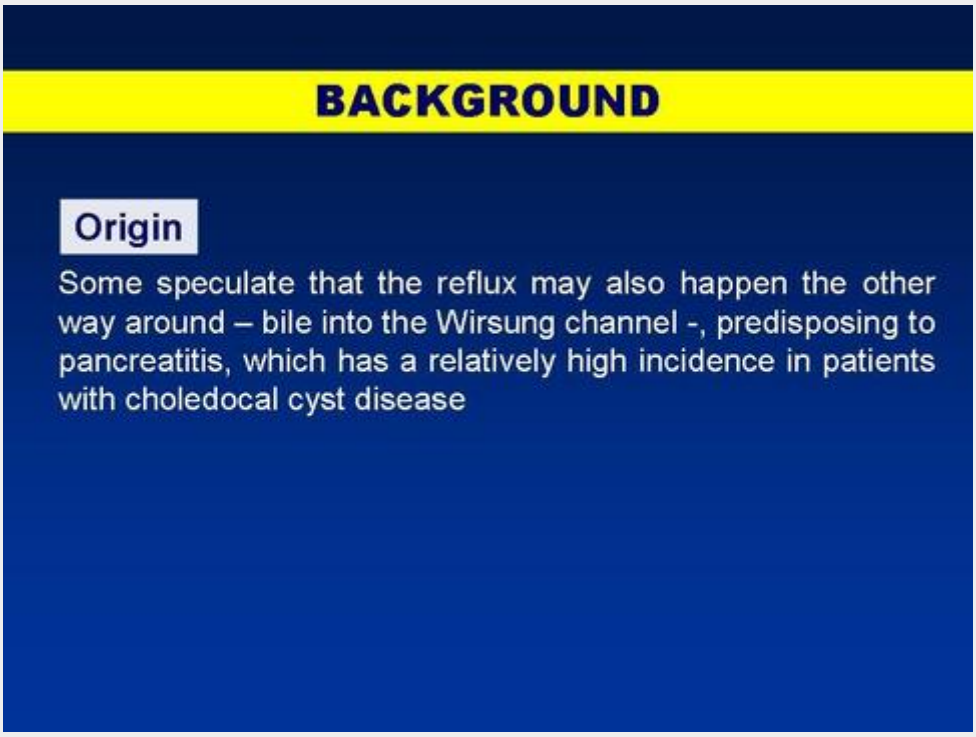


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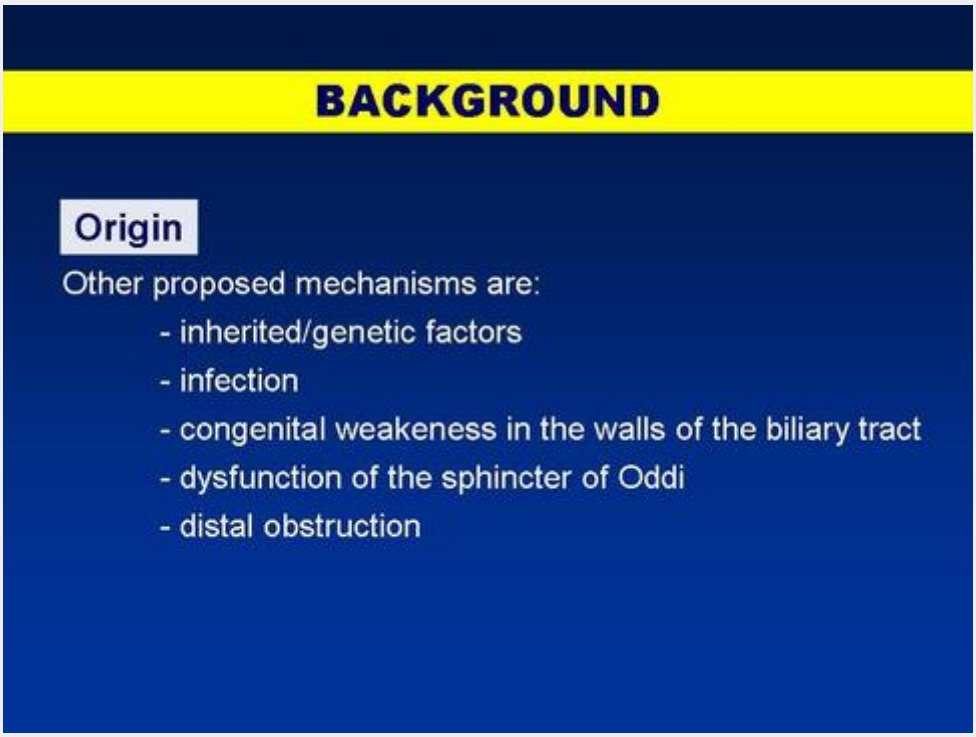

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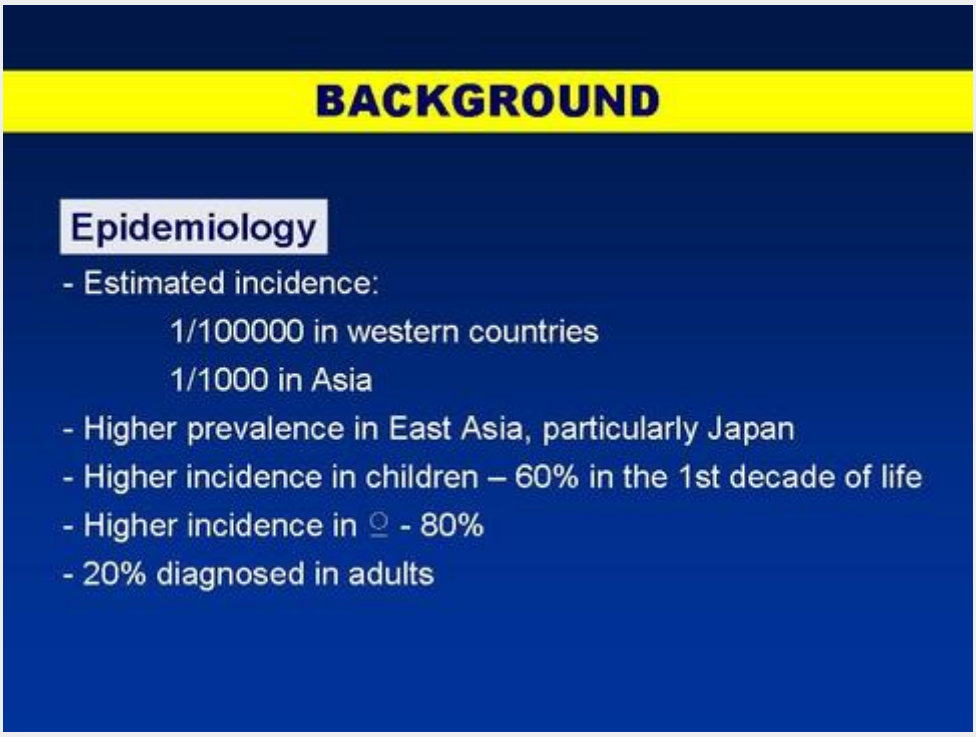


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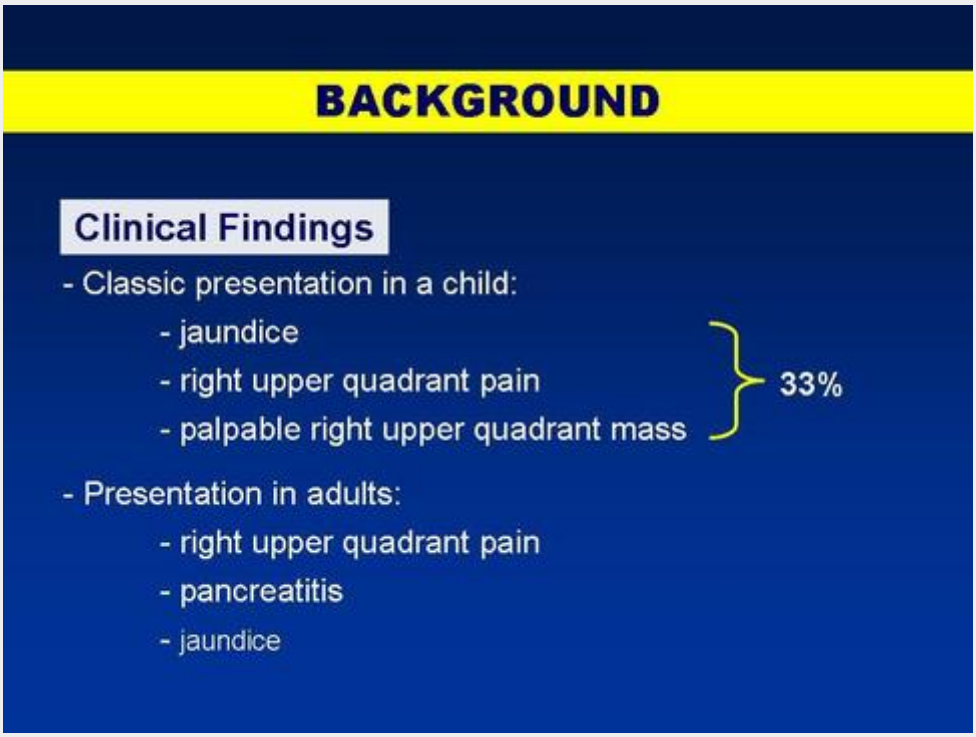

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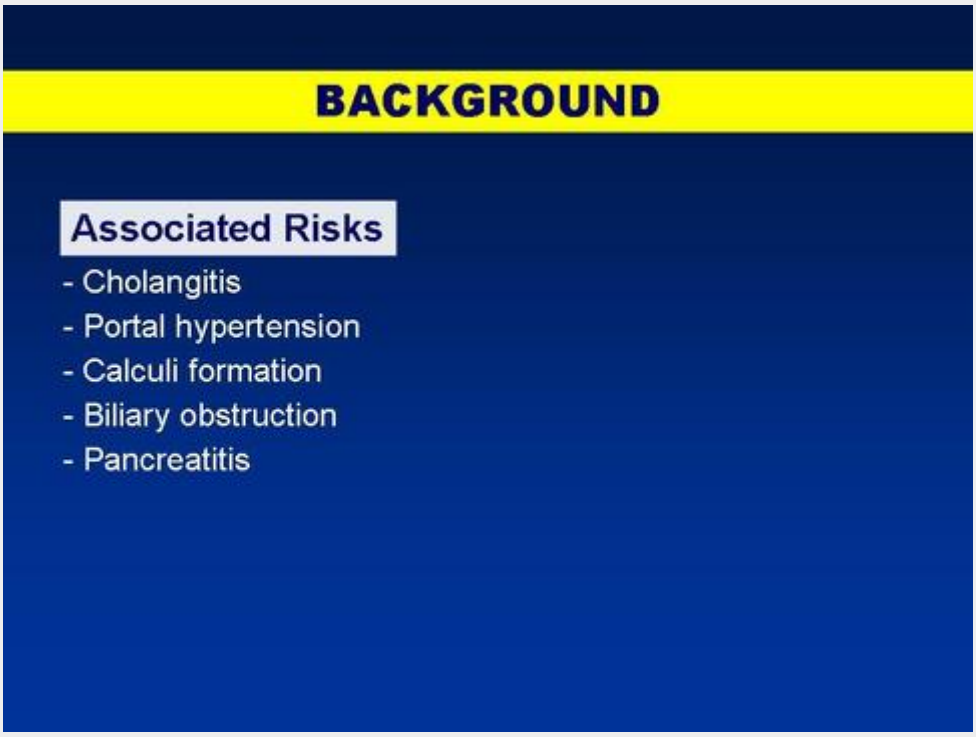


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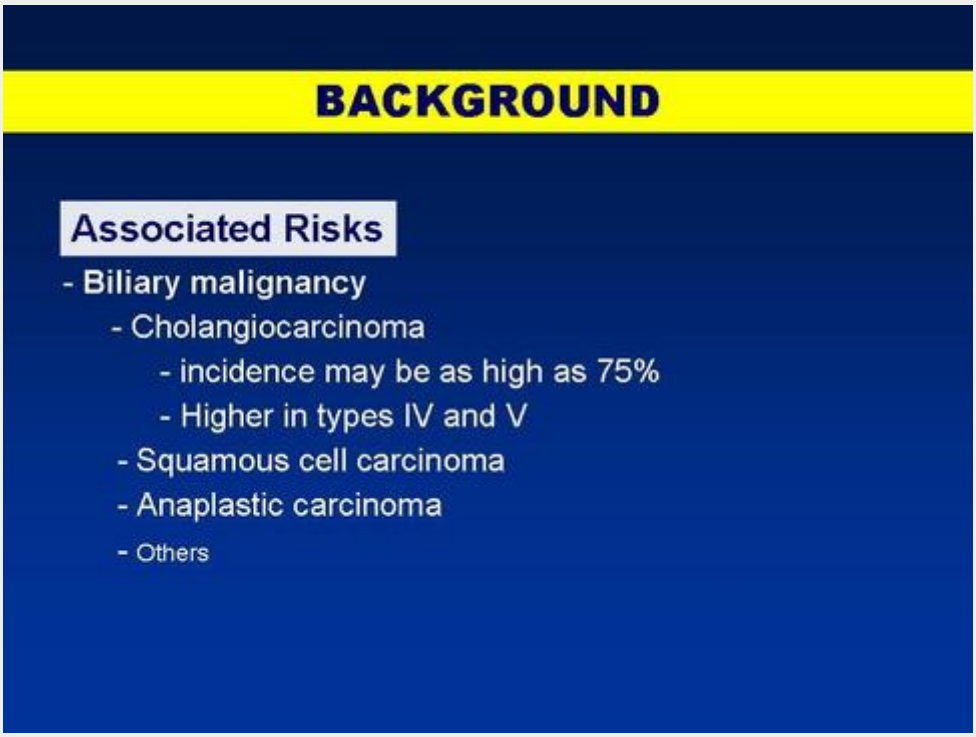

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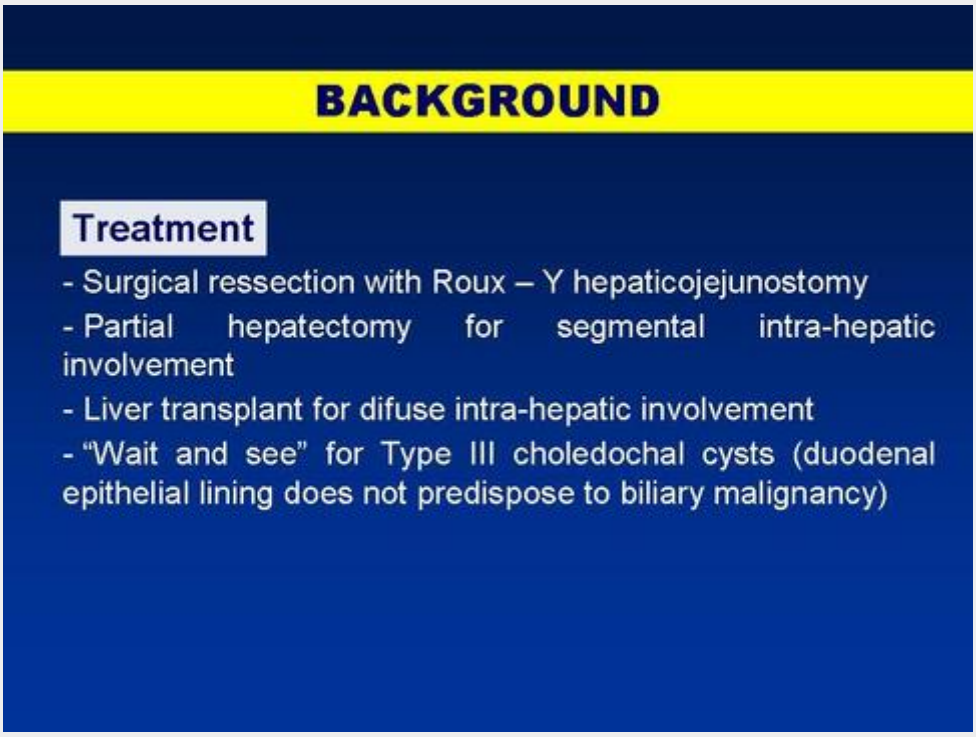


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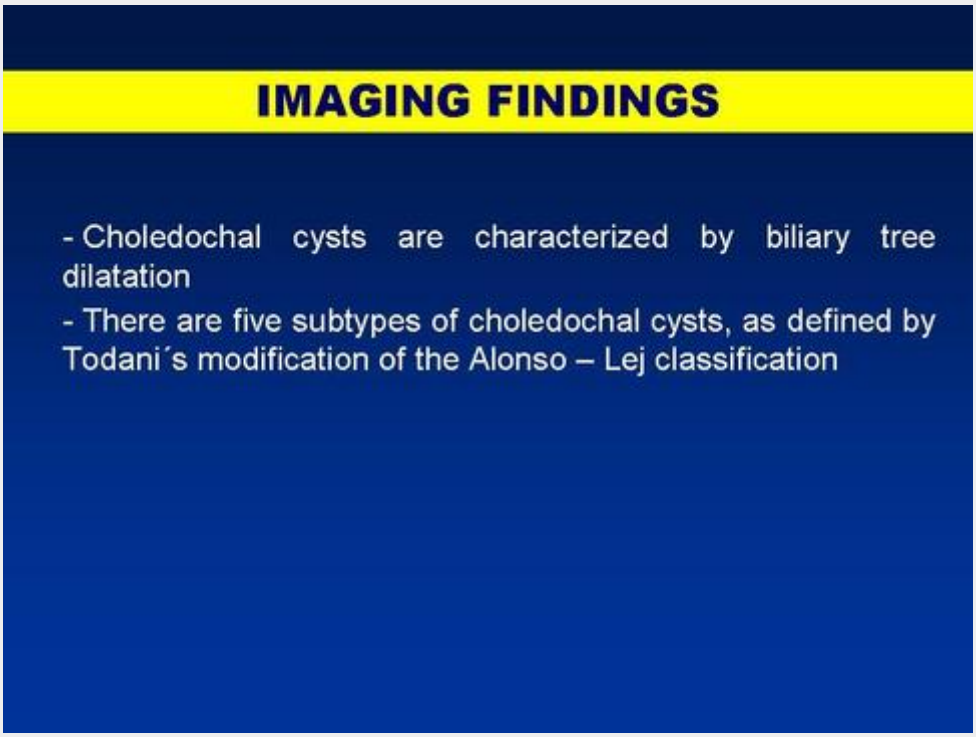

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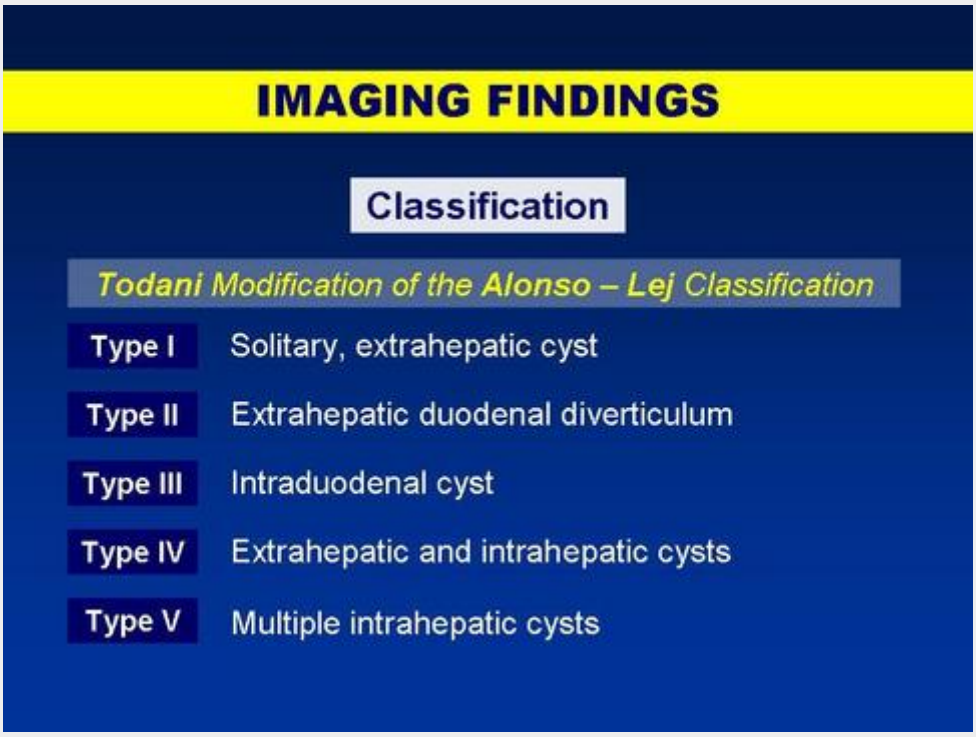


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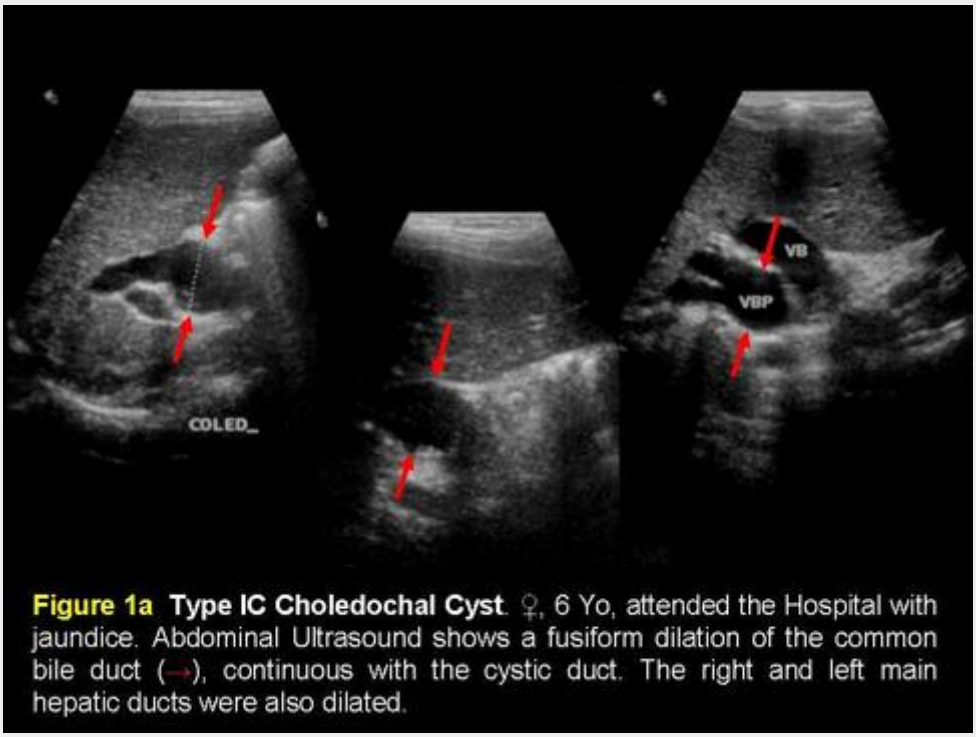



**Figure 1a Type IC Choledochal Cyst**. ♀, 6 Yo, attended the Hospital with jaundice. Abdominal Ultrasound shows a fusiform dilation of the common bile duct (→), continuous with the cystic duct. The right and left main hepatic ducts were also dilated.

**diapositivo16.jpg**

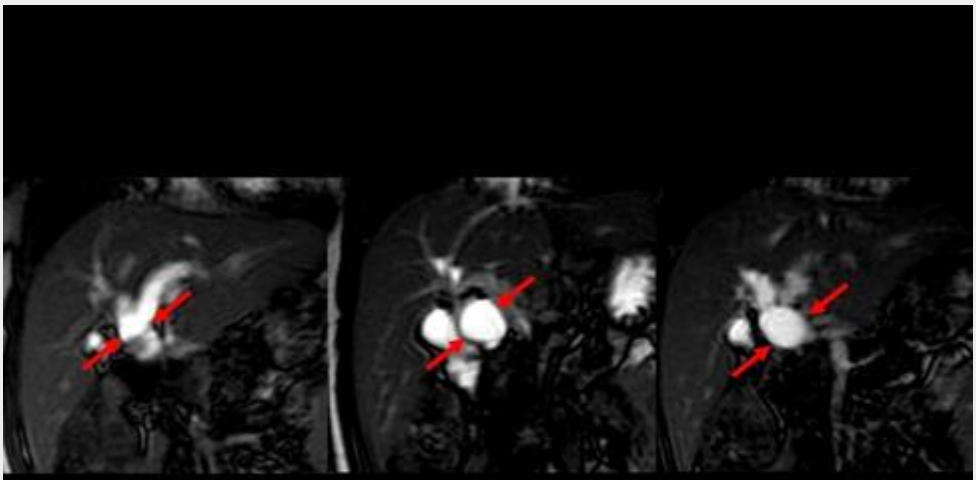


**Figure 1b Type IC Choledochal Cyst.** Magnetic Ressonance SSFP sequencies show a fusiform dilation of the common hepatic and common bile ducts. The cystic duct drains into the dilated extrahepatic bile duct.

**diapositivo17.jpg**

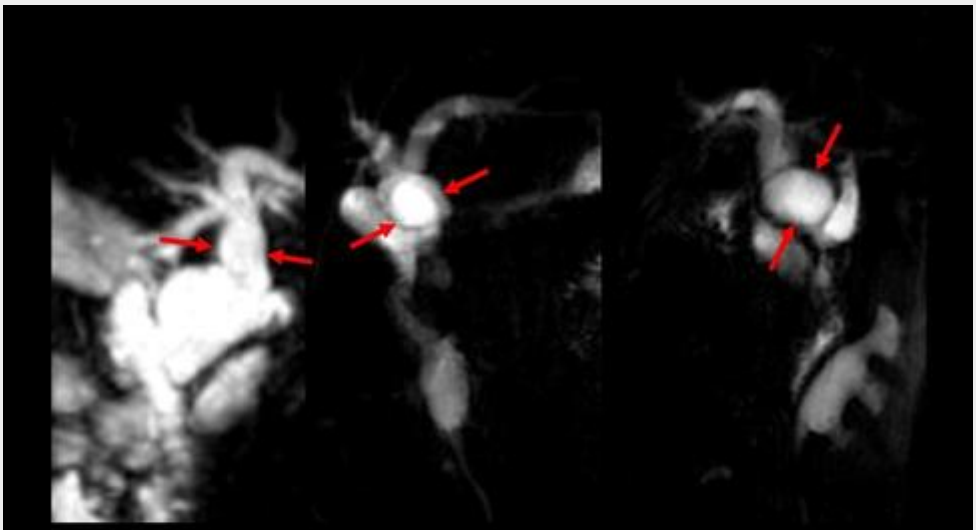


**Figure 1c Type IC Choledochal Cyst**. MR T2 reformatted images show a fusiform dilation of the common hepatic and common bile ducts. The cystic duct drains to the dilated extrahepatic bile duct. These findings correspond to a Type IC choledochal cyst, according to the Todani classification.

**diapositivo18.jpg**

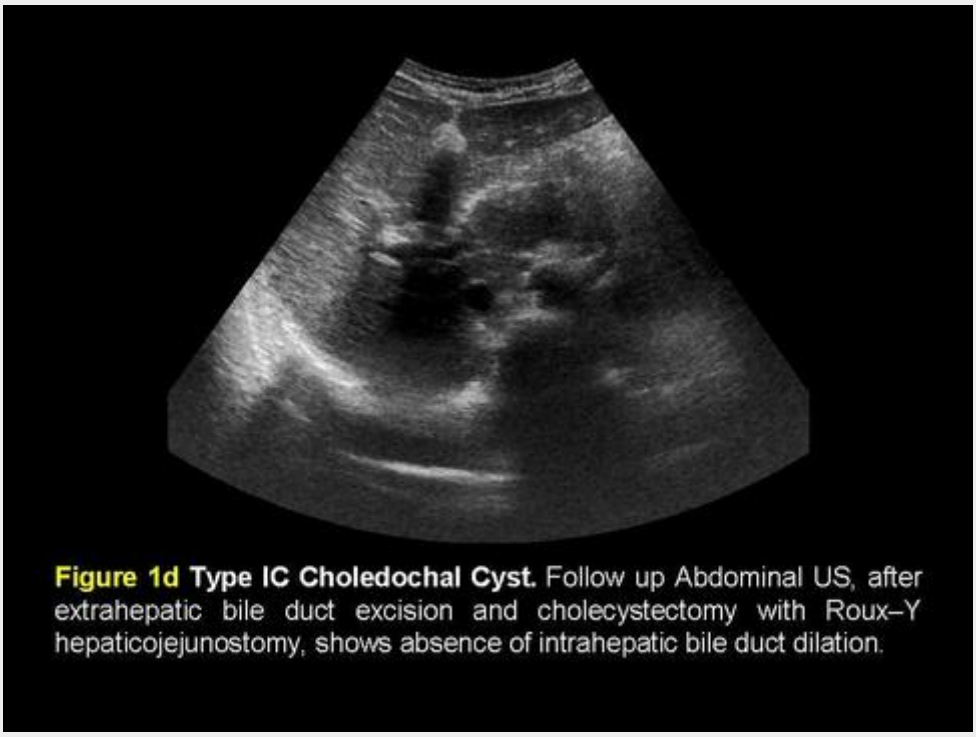


**Figure 1d Type IC Choledochal Cyst.** Follow up Abdominal US, after extrahepatic bile duct excision and cholecystectomy with Roux–Y hepaticojejunostomy, shows absence of intrahepatic bile duct dilation.

**diapositivo19.jpg**

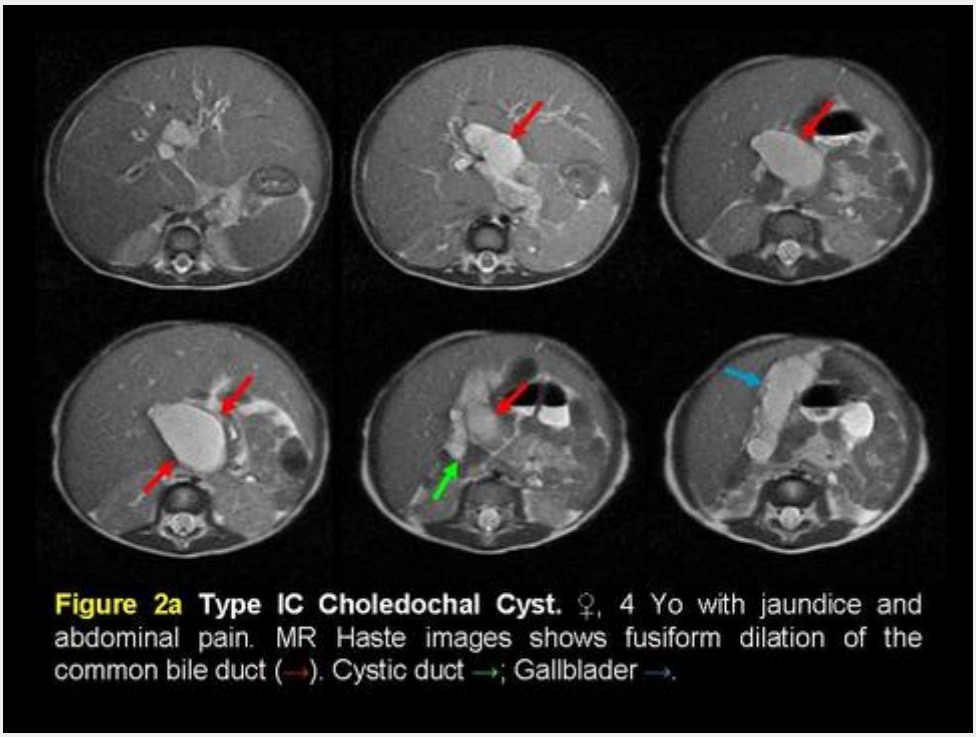


**Figure 2a Type IC Choledochal Cyst.** ♀, 4 Yo with jaundice and abdominal pain. MR Haste images shows fusiform dilation of the common bile duct (→). Cystic duct →; Gallblader →.

**diapositivo20.jpg**

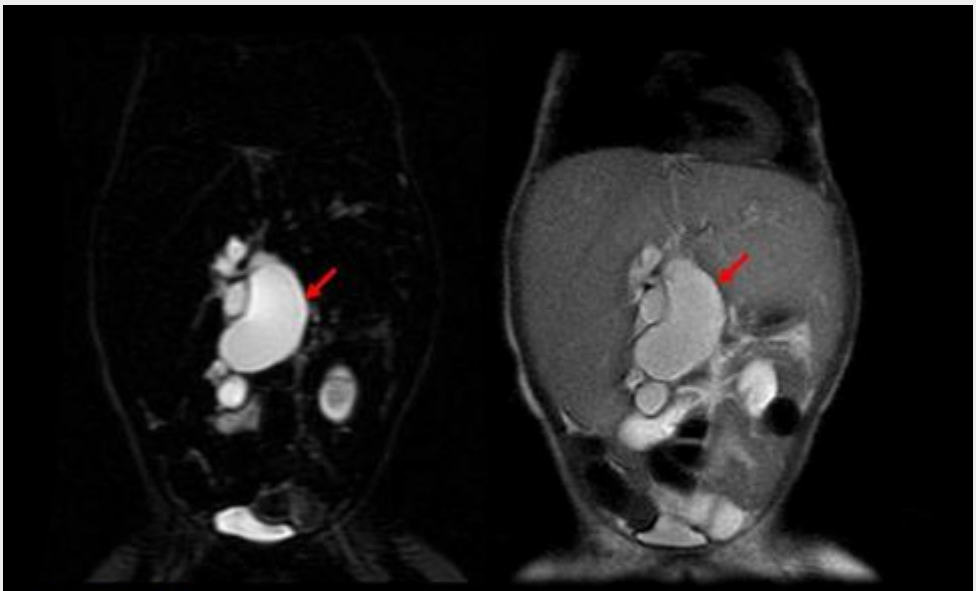


**Figure 2b Type IC Choledochal Cyst.** ♀, 4 Yo. Jaundice and abdominal pain. SSFP (***left***) and Haste (***right***) MR images show fusiform dilation of the common bile duct, to which the cystc duct drains (→).

**diapositivo23.jpg**

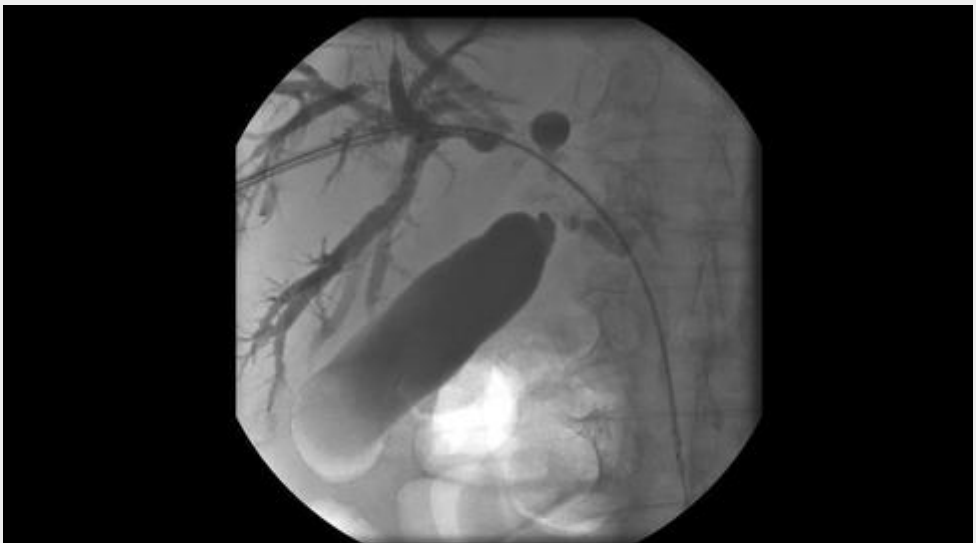
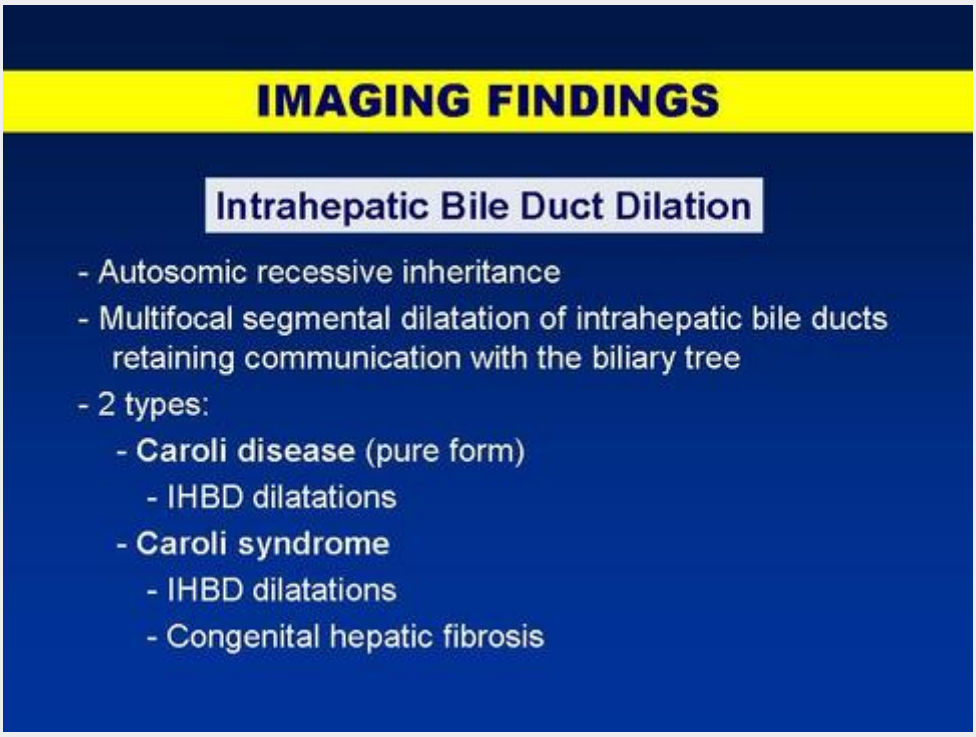


**Figure 3a Type II Choledochal Cyst - Diverticulum.** ♂, 76 Yo. Cholangiocarcinoma – Klatskin tumor. Percutaneous transhepatic cholangiography (PTC) performed to paliate biliary obstruction showed a diverticulum of the common hepatic duct, located above the insertion of the cystic duct, draining to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

**diapositivo30.jpg**

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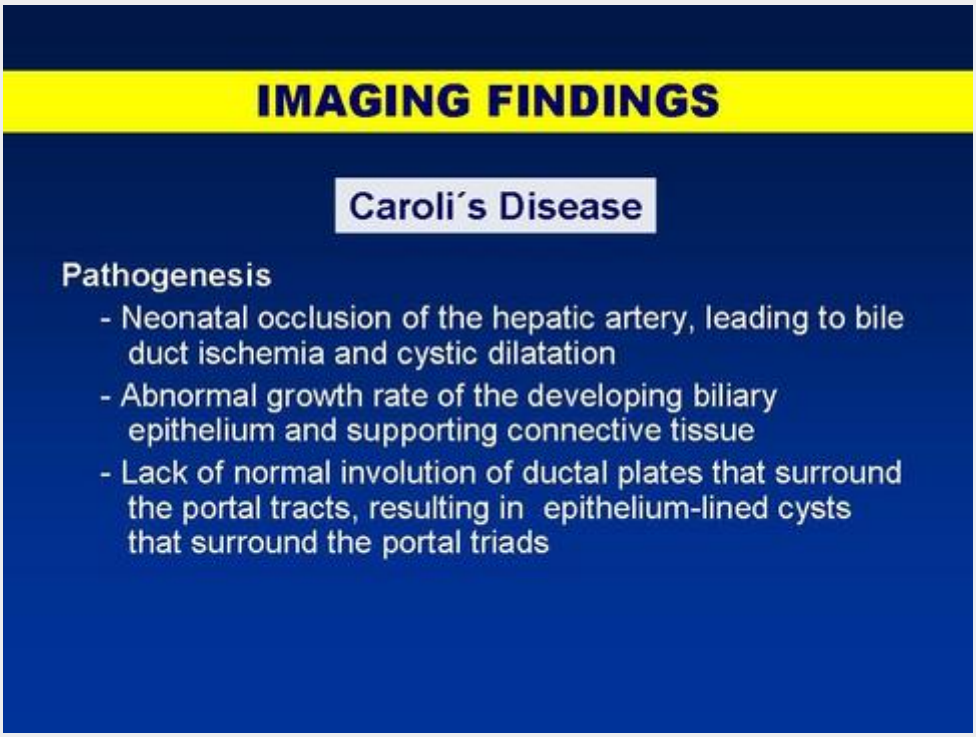

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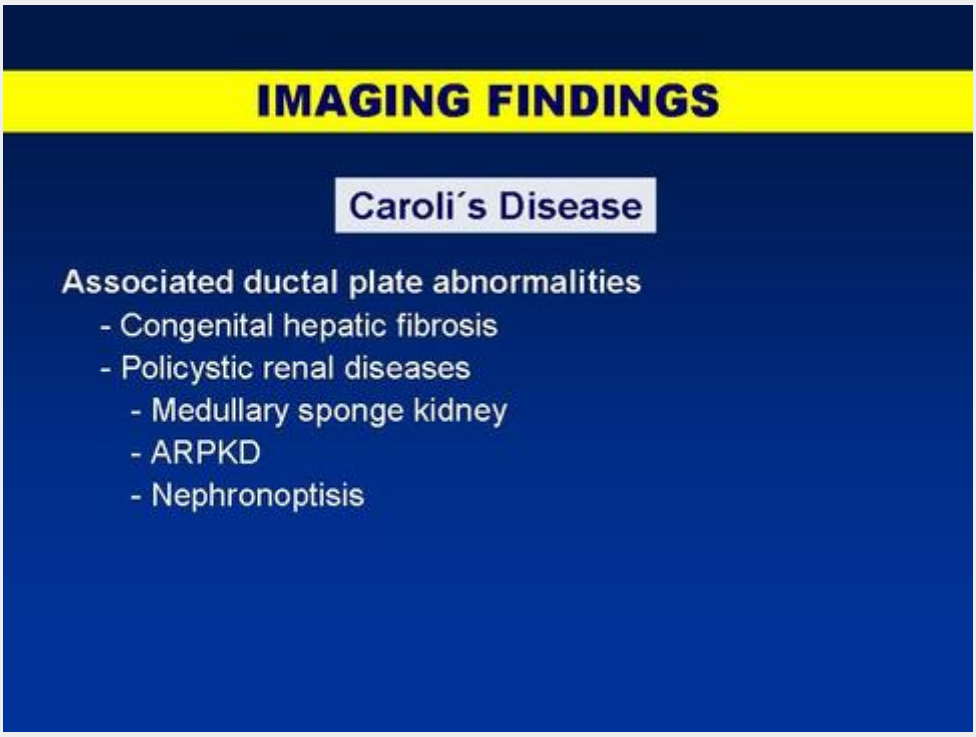


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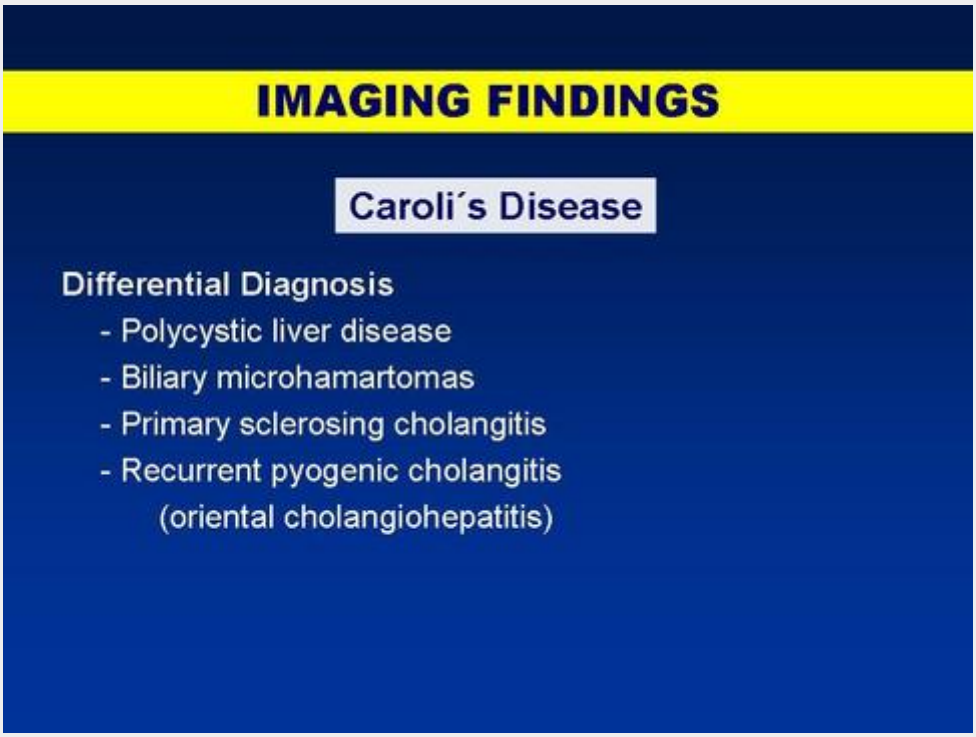

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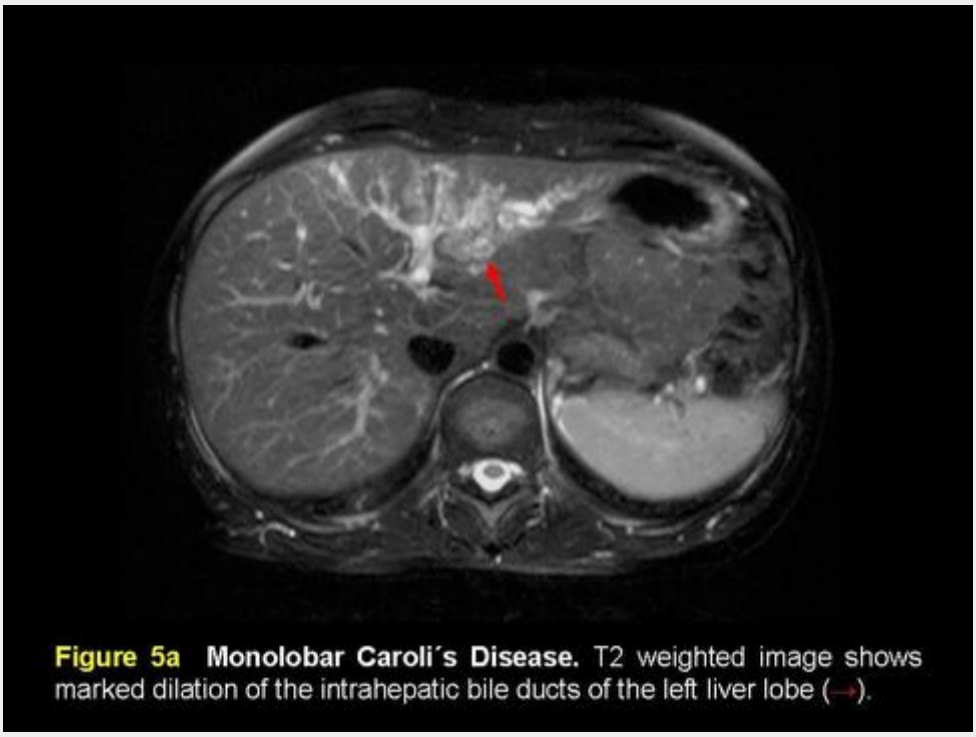


**Figure 5a Monolobar Caroli´s Disease.** T2 weighted image shows marked dilation of the intrahepatic bile ducts of the left liver lobe (→).

**diapositivo35.jpg**

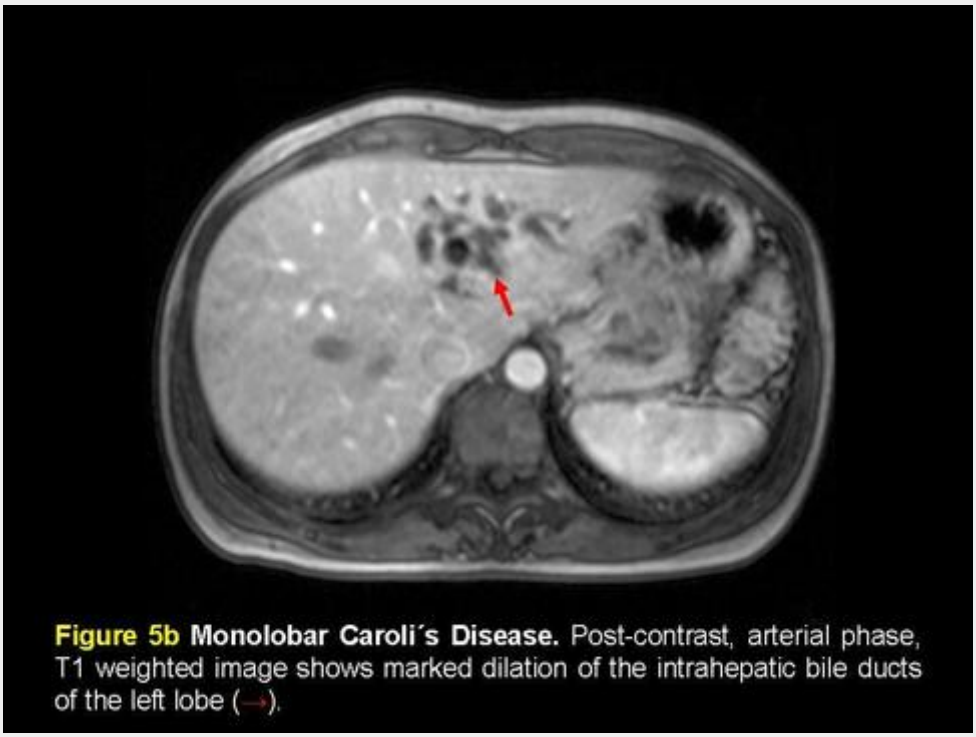


**Figure 5b Monolobar Caroli´s Disease.** Post-contrast, arterial phase, T1 weighted image shows marked dilation of the intrahepatic bile ducts of the left lobe (→).

**diapositivo36.jpg**

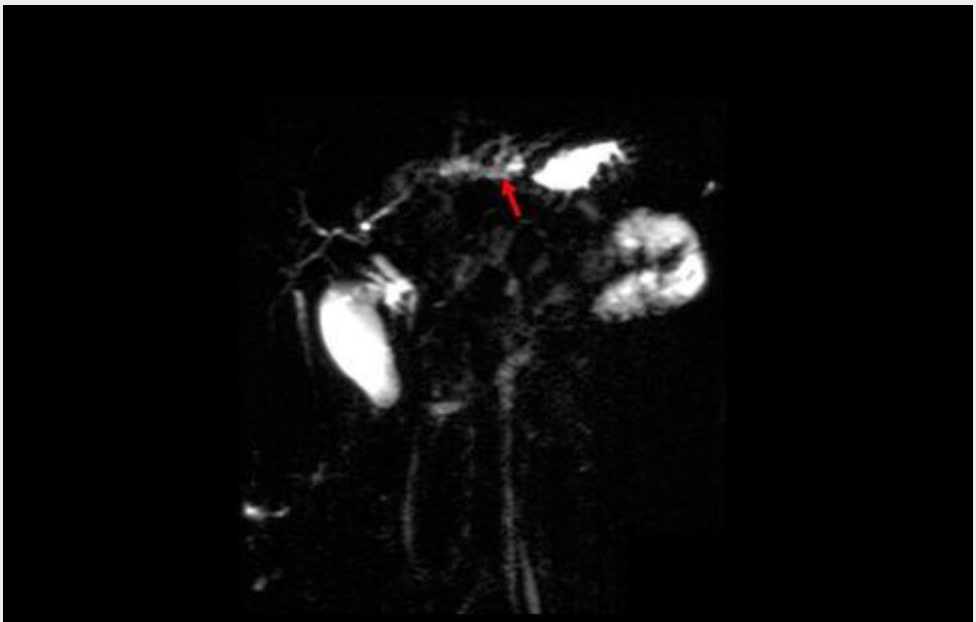


**Figure 5c Monolobar Caroli´s Disease.** Heavily T2-weighted image, projection technique, depicting the dilated left lobe intrahepatic bile ducts (→).

**diapositivo37.jpg**

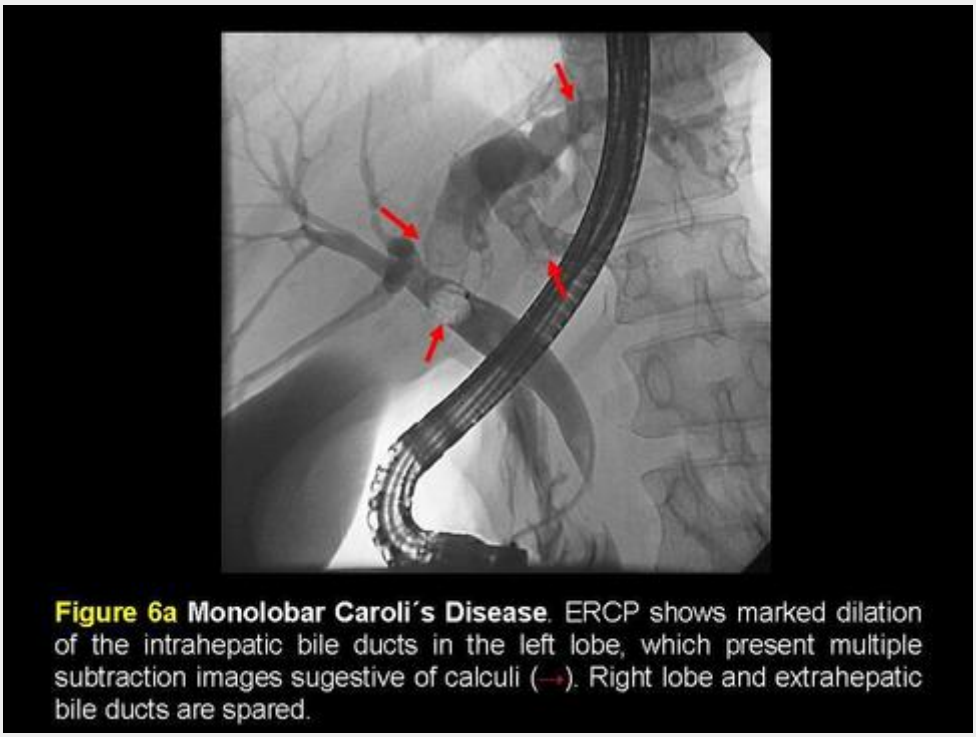


**Figure 6a Monolobar Caroli´s Disease**. ERCP shows marked dilation of the intrahepatic bile ducts in the left lobe, which present multiple subtraction images sugestive of calculi (→). Right lobe and extrahepatic bile ducts are spared.

**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**

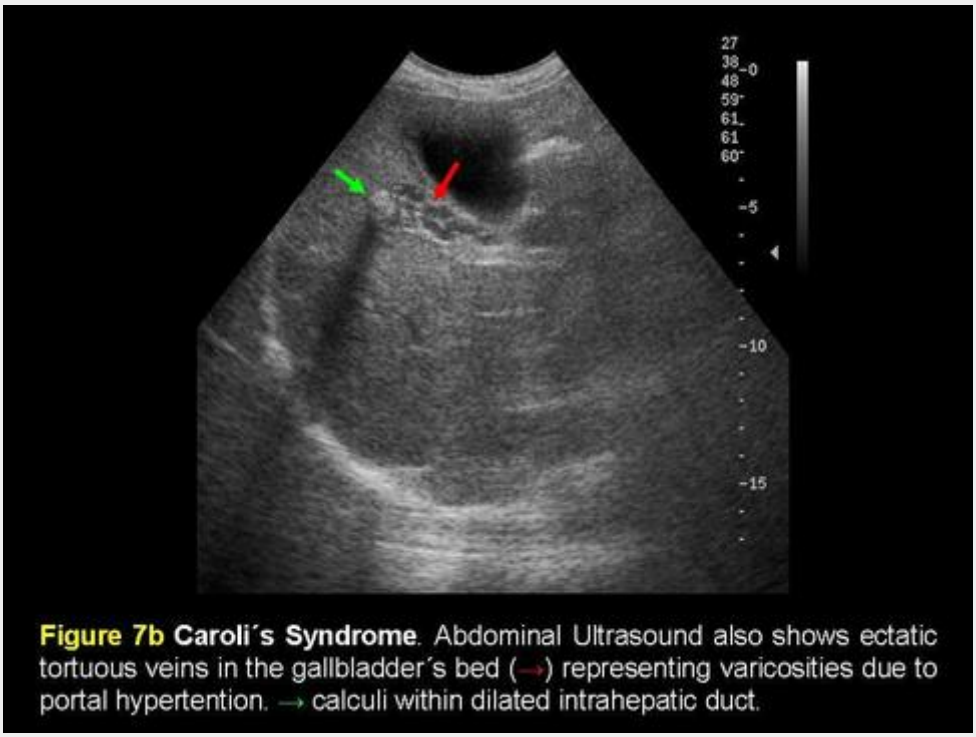



**Figure 7b Caroli´s Syndrome**. Abdominal Ultrasound also shows ectatic tortuous veins in the gallbladder´s bed (→) representing varicosities due to portal hypertention. → calculi within dilated intrahepatic duct.

**diapositivo42.jpg**

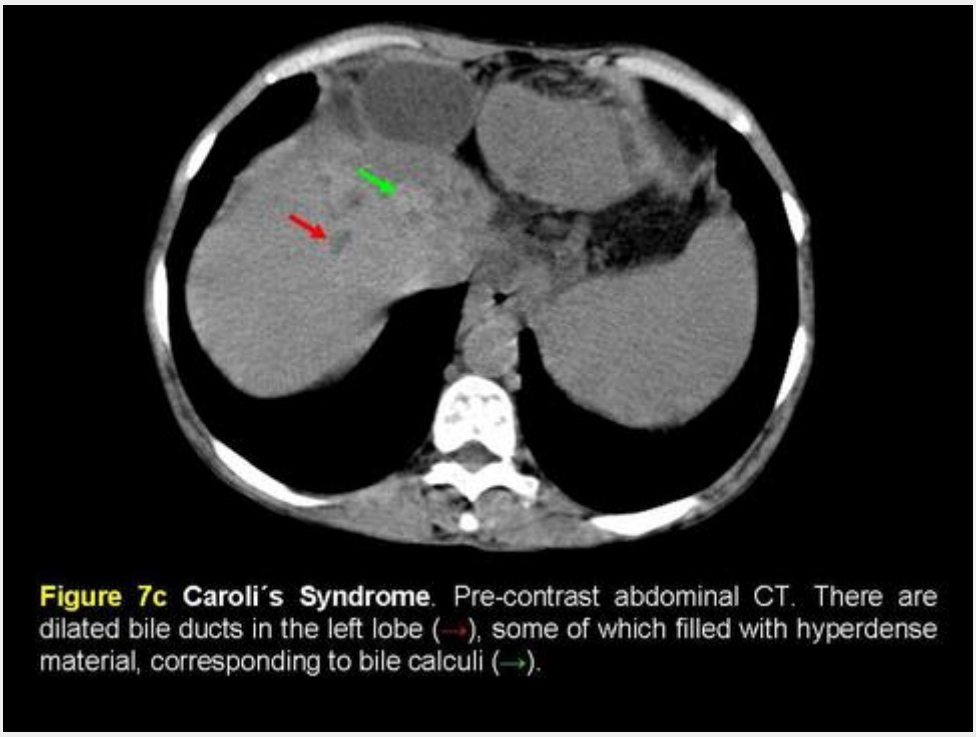


**Figure 7c Caroli´s Syndrome**. Pre-contrast abdominal CT. There are dilated bile ducts in the left lobe (→), some of which filled with hyperdense material, corresponding to bile calculi (→).

**diapositivo43.jpg**

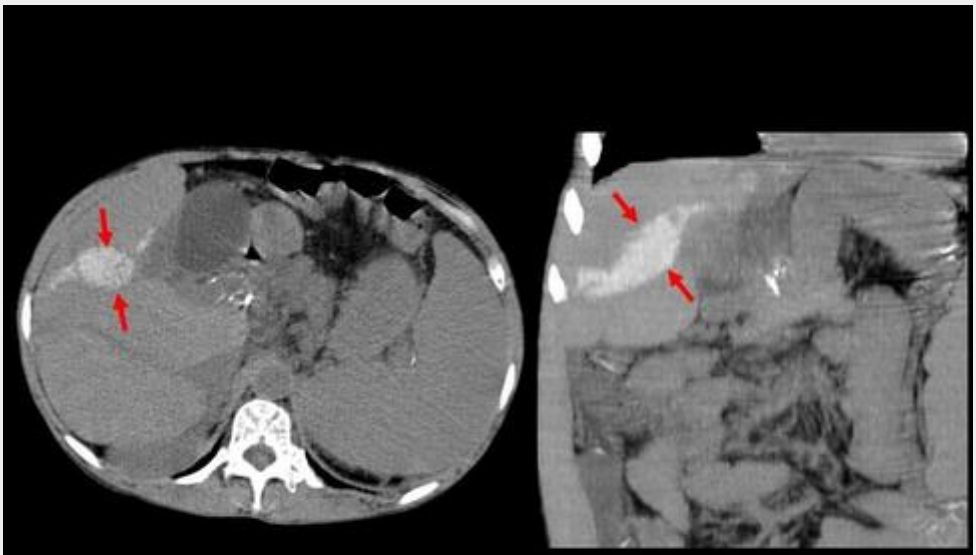


**Figure 7d Caroli´s Syndrome**. Pre-contrast abdominal CT. Axial (*left*) and oblique reformated (*right*) images. There is a markedly dilated bile duct in the right lobe, completely filled with hyperdense material, corresponding to bile calculi (→).

**diapositivo44.jpg**

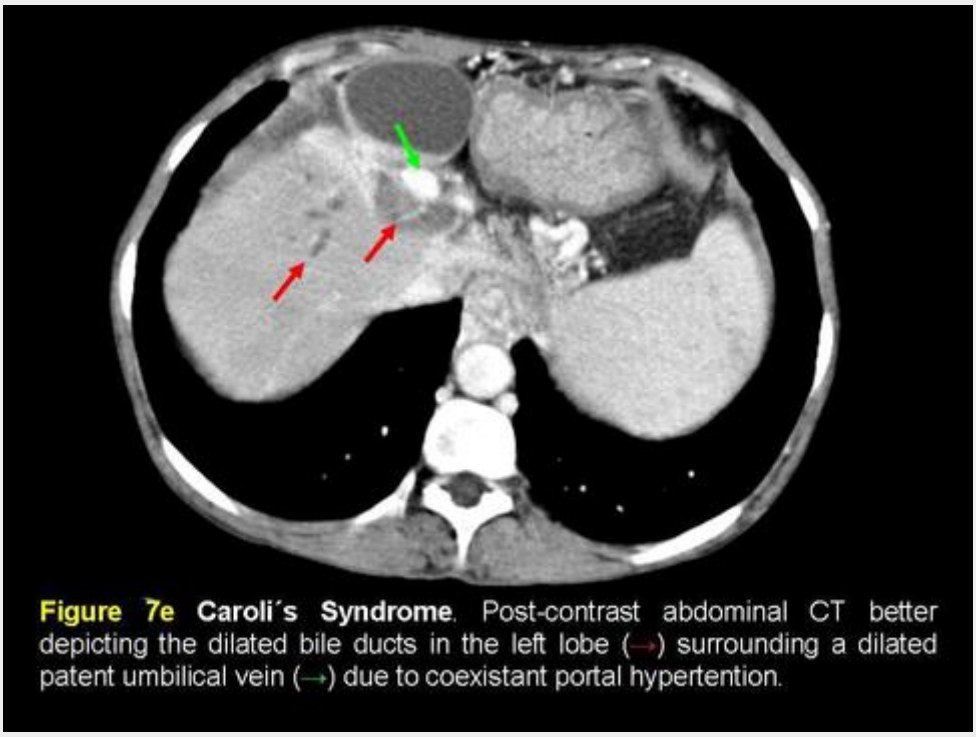


**Figure 7e Caroli´s Syndrome**. Post-contrast abdominal CT better depicting the dilated bile ducts in the left lobe (→) surrounding a dilated patent umbilical vein (→) due to coexistant portal hypertention.

**diapositivo45.jpg**

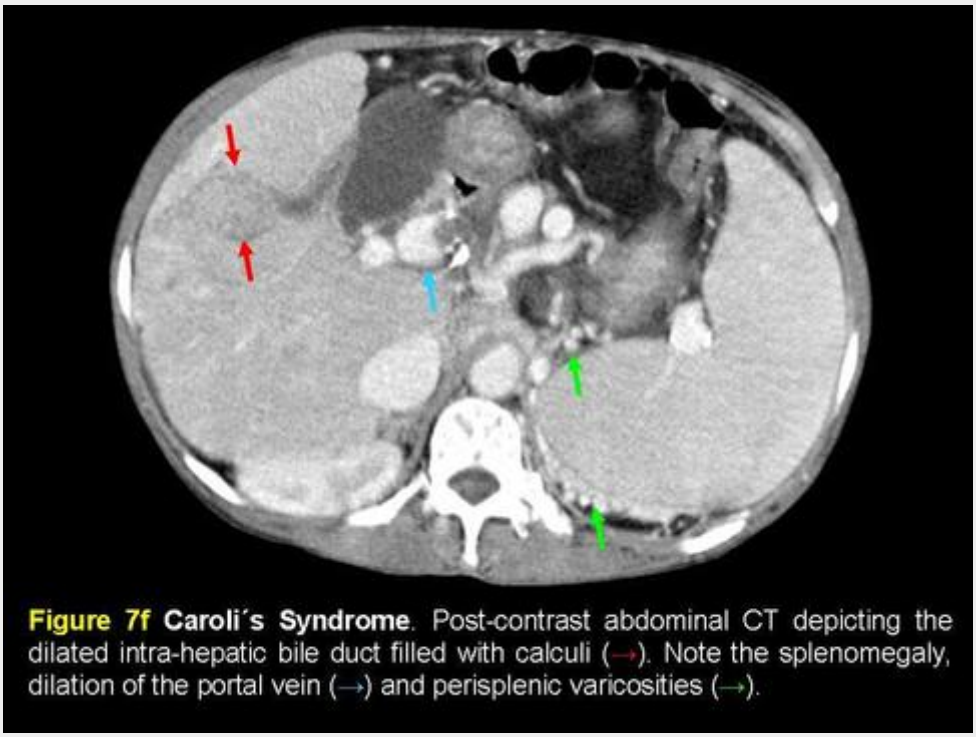


**Figure 7f Caroli´s Syndrome**. Post-contrast abdominal CT depicting the dilated intra-hepatic bile duct filled with calculi (→). Note the splenomegaly, dilation of the portal vein (→) and perisplenic varicosities (→).

**diapositivo47.jpg**

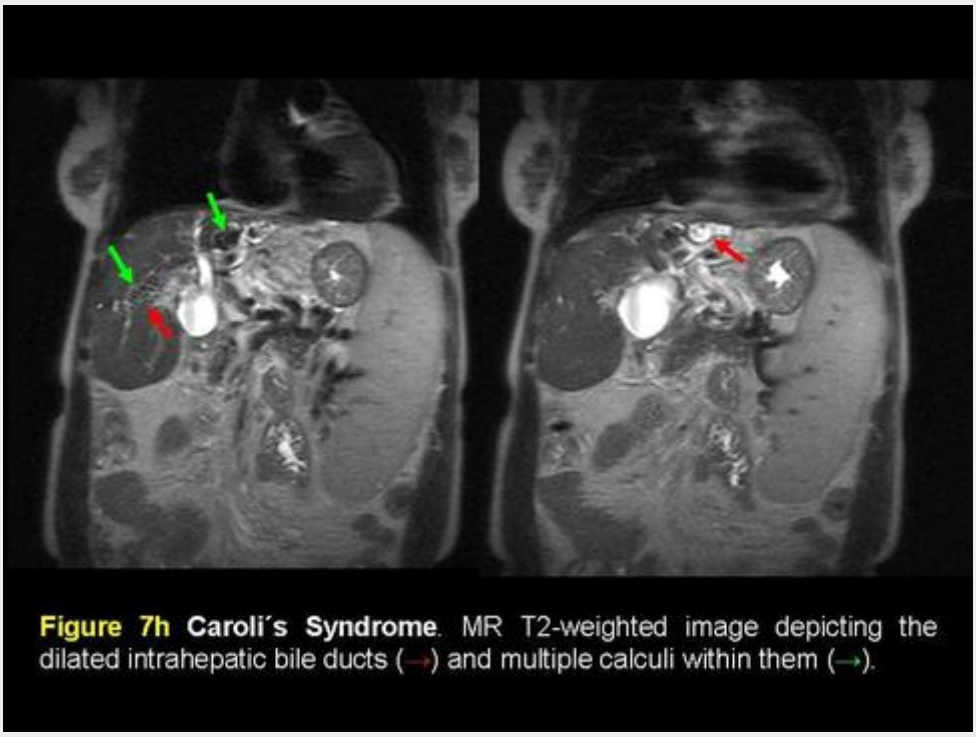


**Figure 7h Caroli´s Syndrome**. MR T2-weighted image depicting the dilated intrahepatic bile ducts (→) and multiple calculi within them (→).

**diapositivo48.jpg**

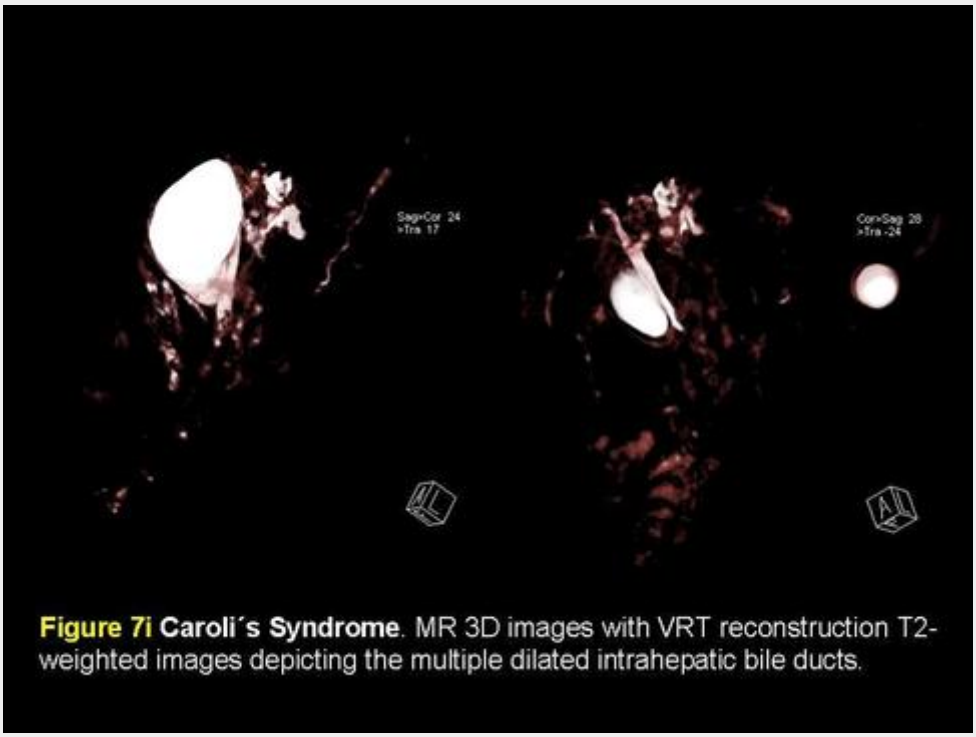


**Figure 7i Caroli´s Syndrome**. MR 3D images with VRT reconstruction T2-weighted images depicting the multiple dilated intrahepatic bile ducts.

**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**

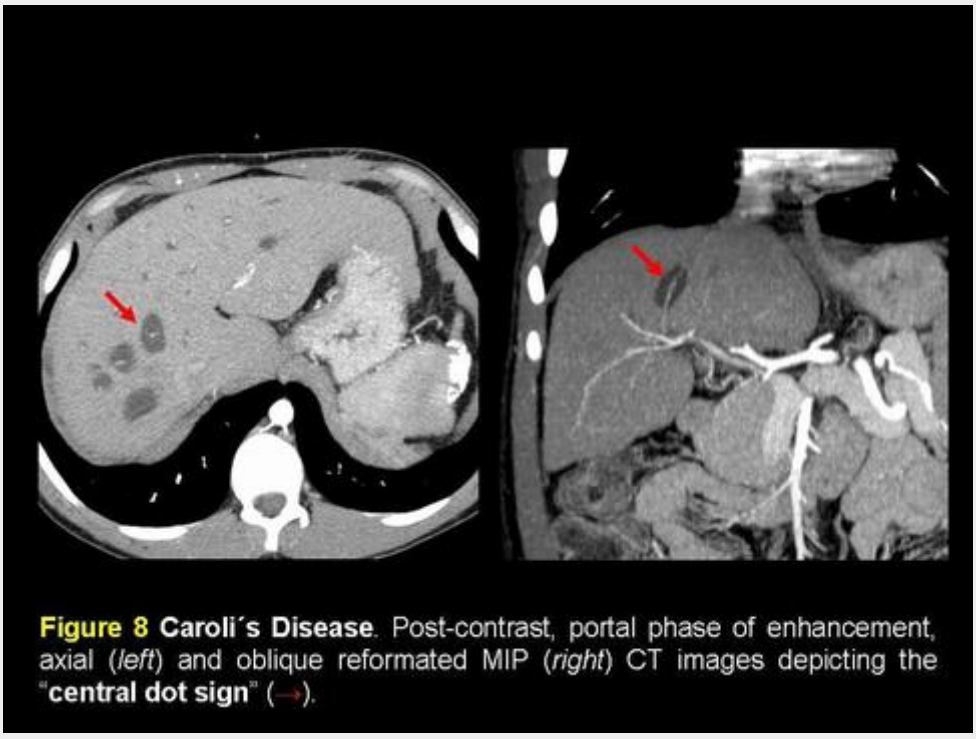
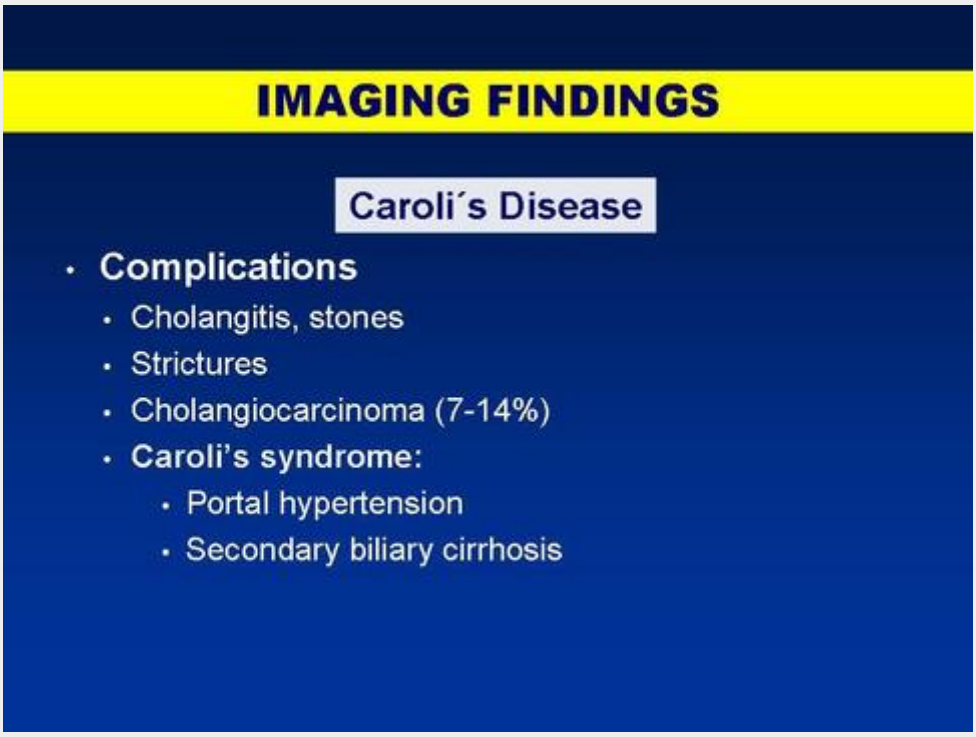
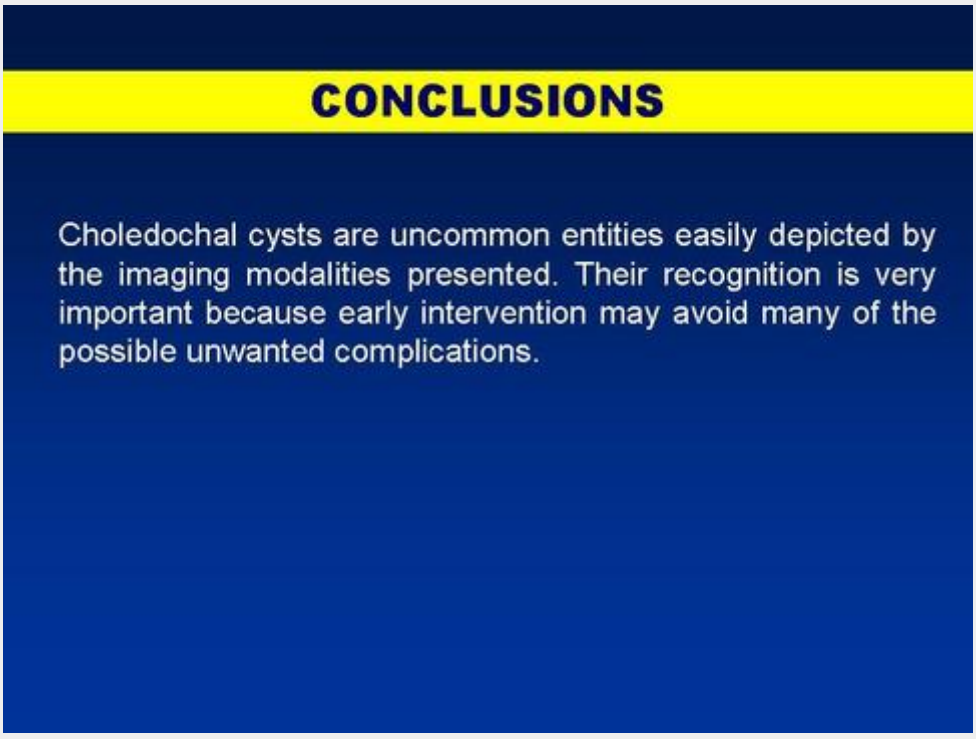


**Figure 8 Caroli´s Disease**. Post-contrast, portal phase of enhancement, axial (*left*) and oblique reformated MIP (*right*) CT images depicting the "**central dot sign**" (→).

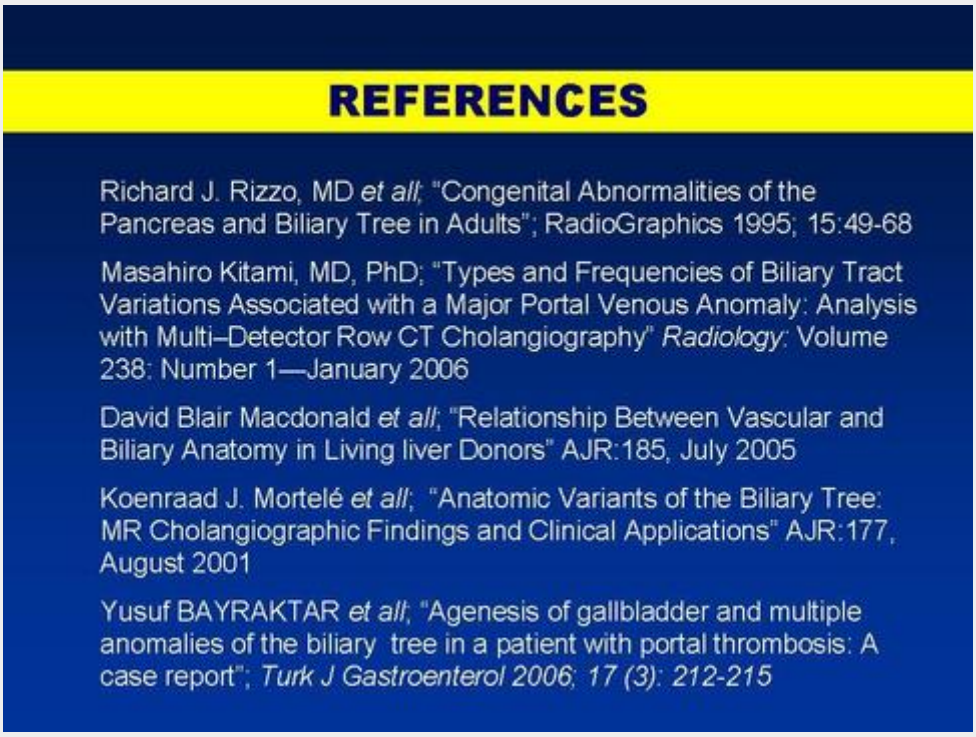
**diapositivo52.jpg**



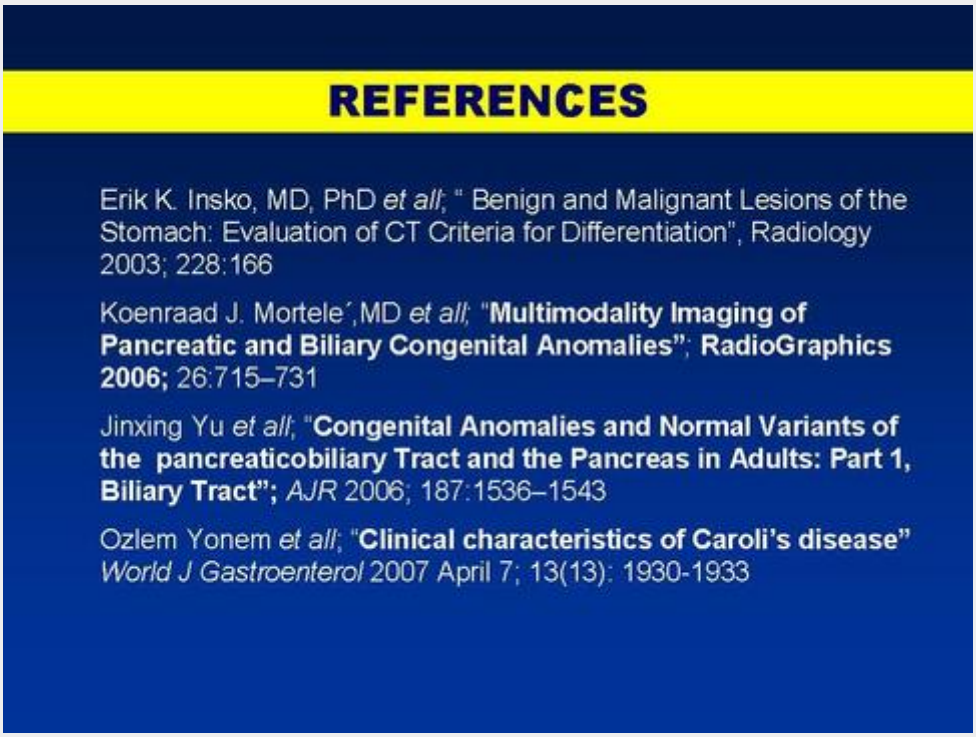

**diapositivo53.jpg**



**diapositivo55.jpg**




**diapositivo56.jpg**



**diapositivo57.jpg**