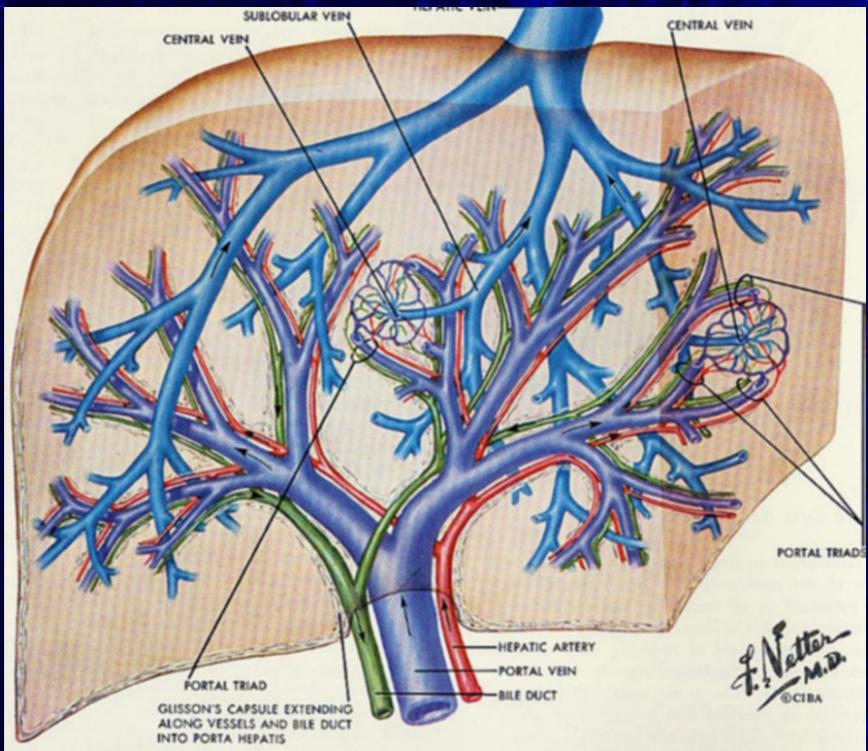
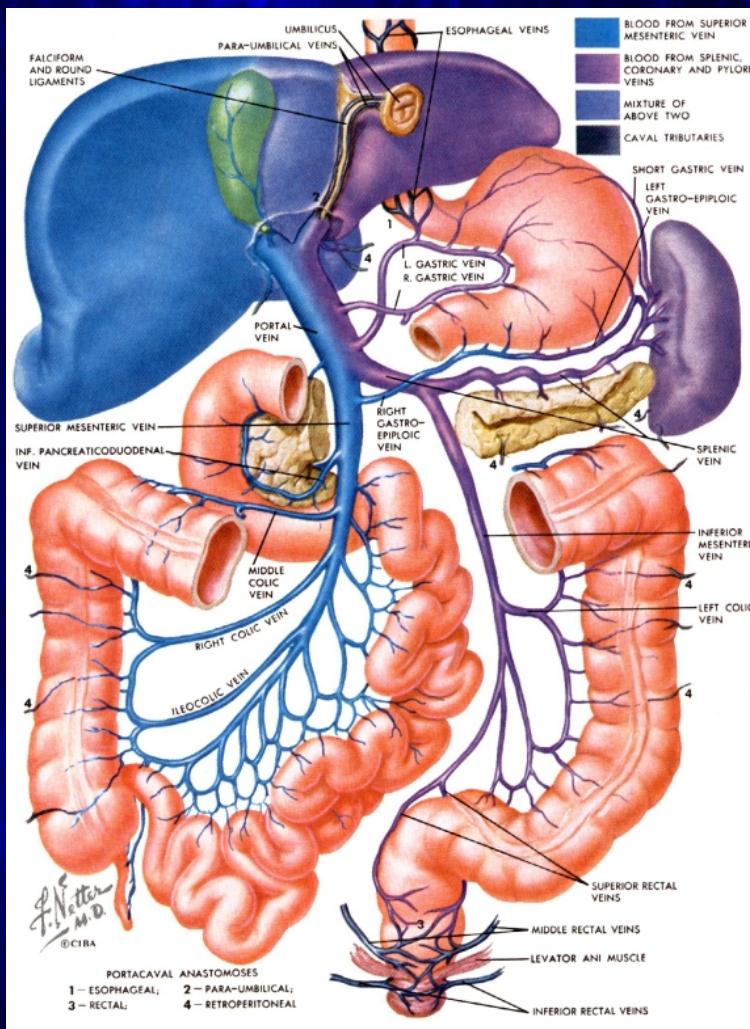


# Portala interventioner vid malignitet

Wojciech Ćwikiel

Interventionell Radiologi  
Universitets Sjukhuset, Lund

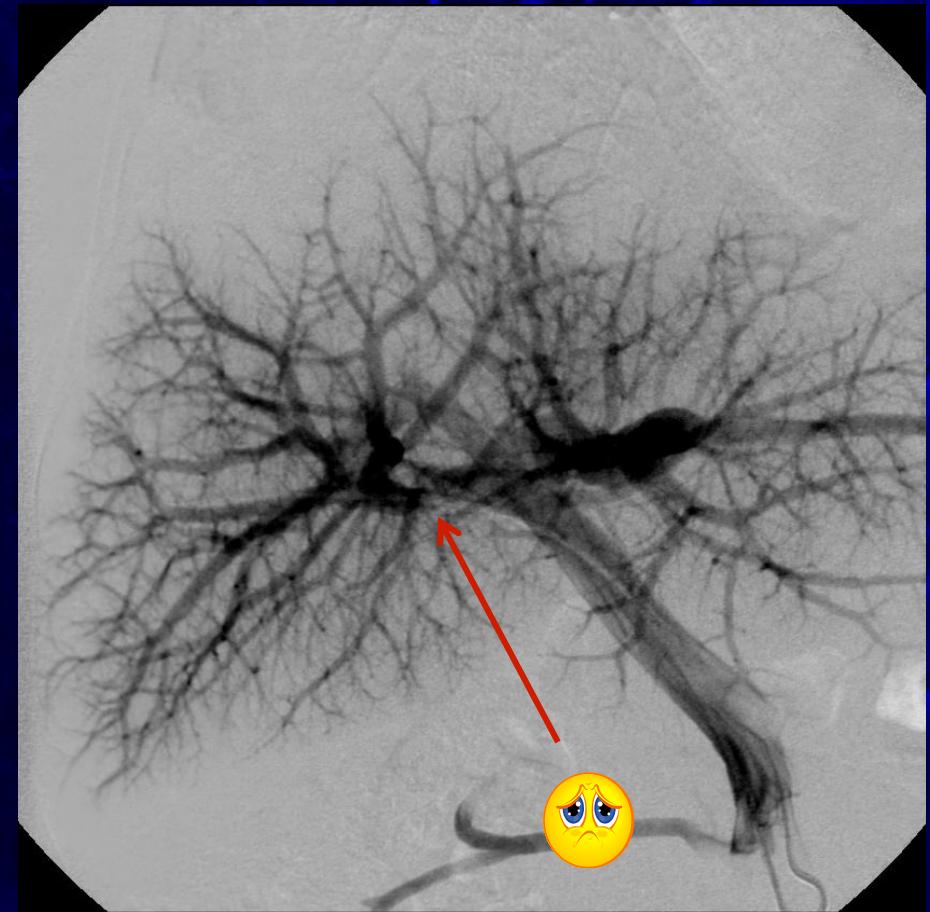
# Vena porta



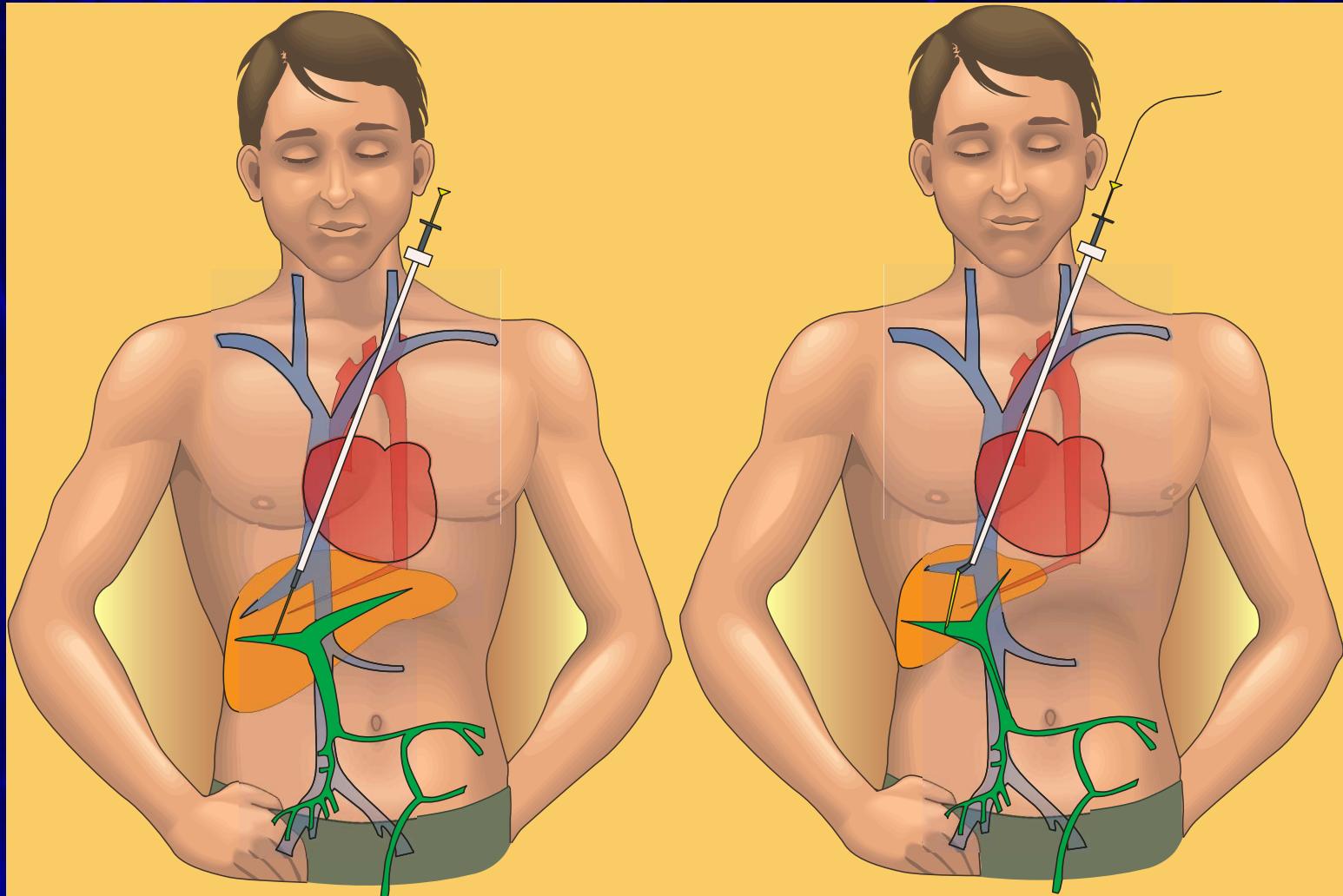
# Access till vena porta

- perkutan transhepatisk
- transjugulär transhepatisk
- perkutan genom mjälte
- perkutan "transumbilical"
- peroperativ
- genom befintliga shuntar

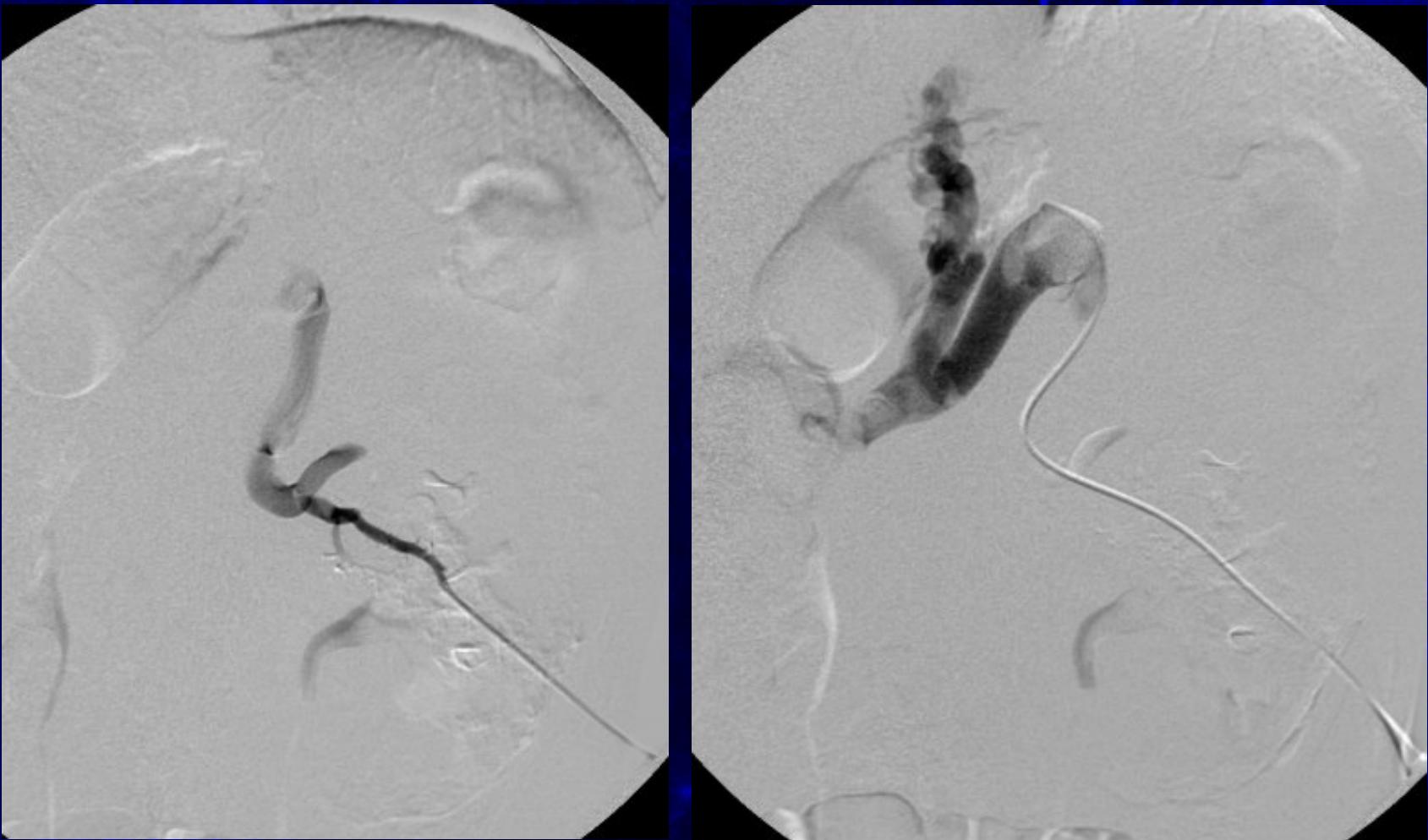
# Perkutan transhepatisk access



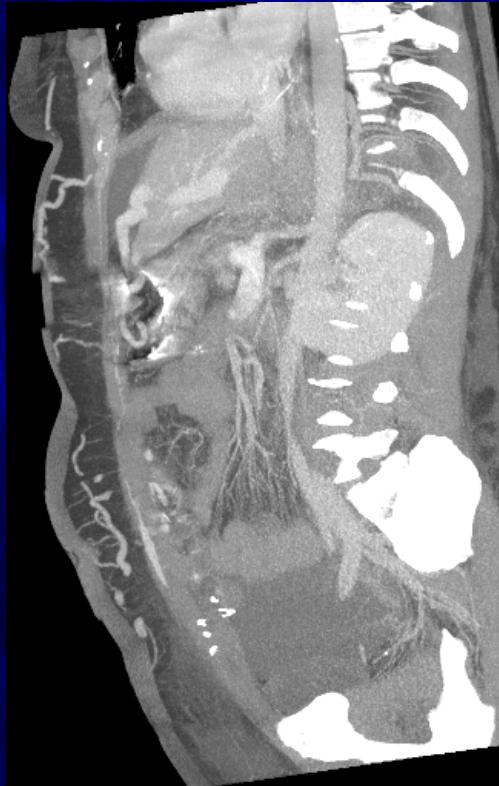
# Transjugular access



# Perkutan trans-splenisk access



# Genom vena paraumbilicalis



# Syfte med portala interventioner vid malignitet

- palliation (rekanalisering)
  - minska blödningsrisken
  - behandla venös tarmischemi
- preoperativ embolisering
  - minska operativ blödning
  - induktion av volymsökning av en leverlob
  - stänga av patologiska shuntar

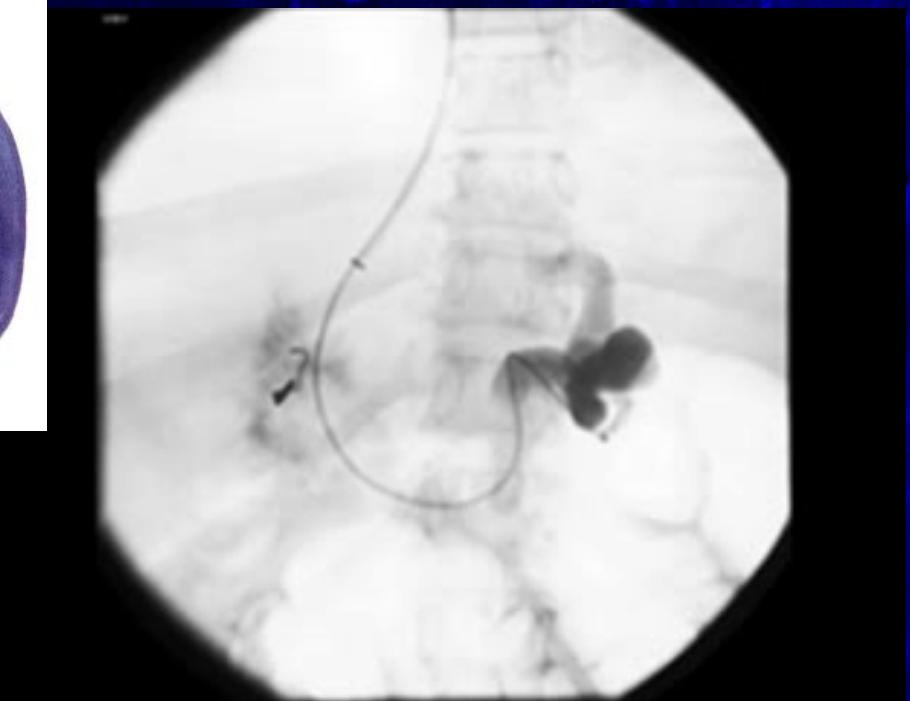
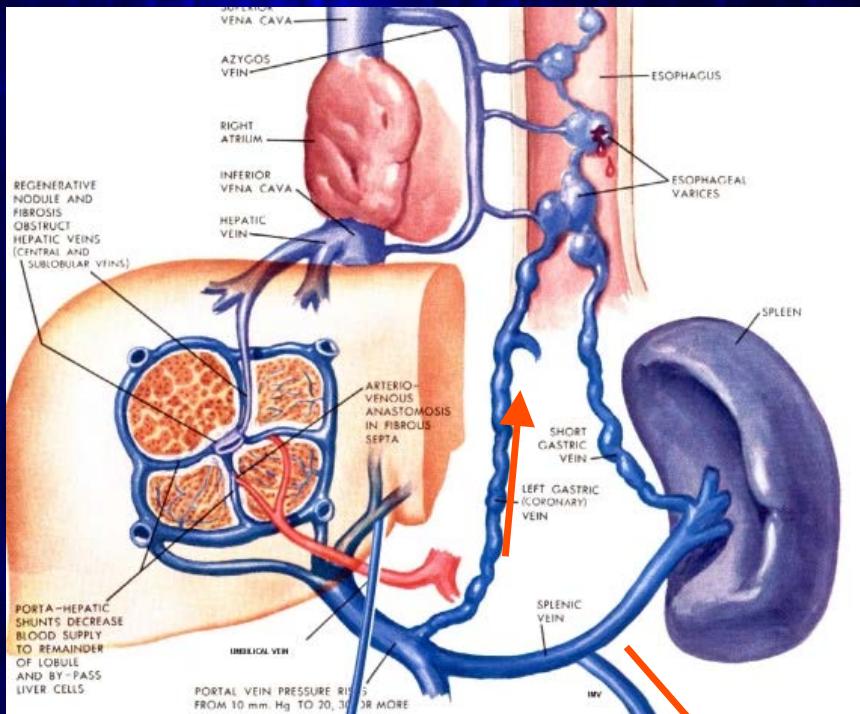
# Vena porta obstruktion vid malignitet

- tumörkompression
- tumörinväxt/överväxt
- trombos (tu relaterad koagulationsrubbning)
- efter tumörkirurgi

# Symptom vid v porta (grenar) obstruktion

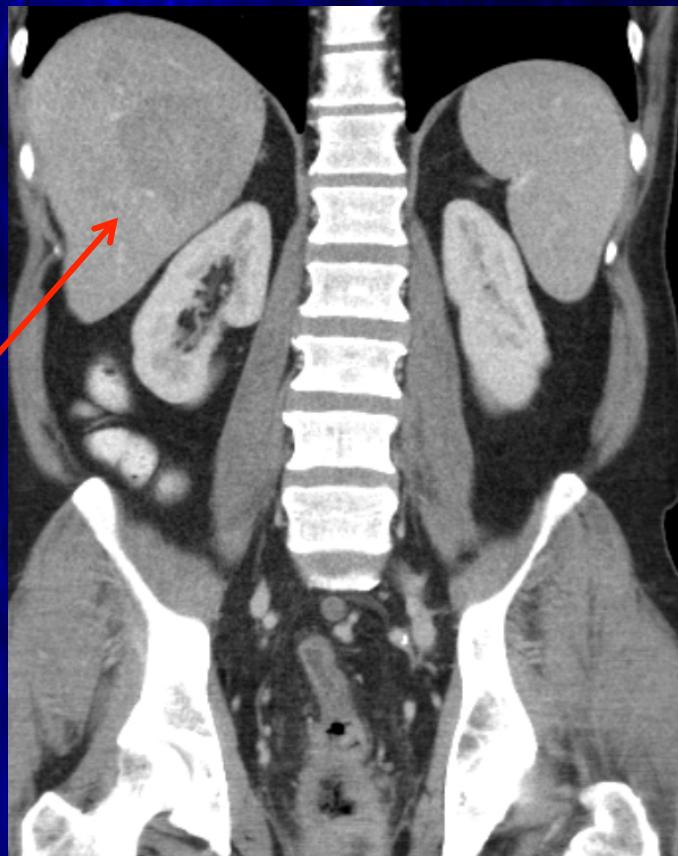
- blödningar från kollateraler
- ascites
- darm ischemi/gangrän
- (leverdysfunktion)

# Flöde vid vena porta obstruktion



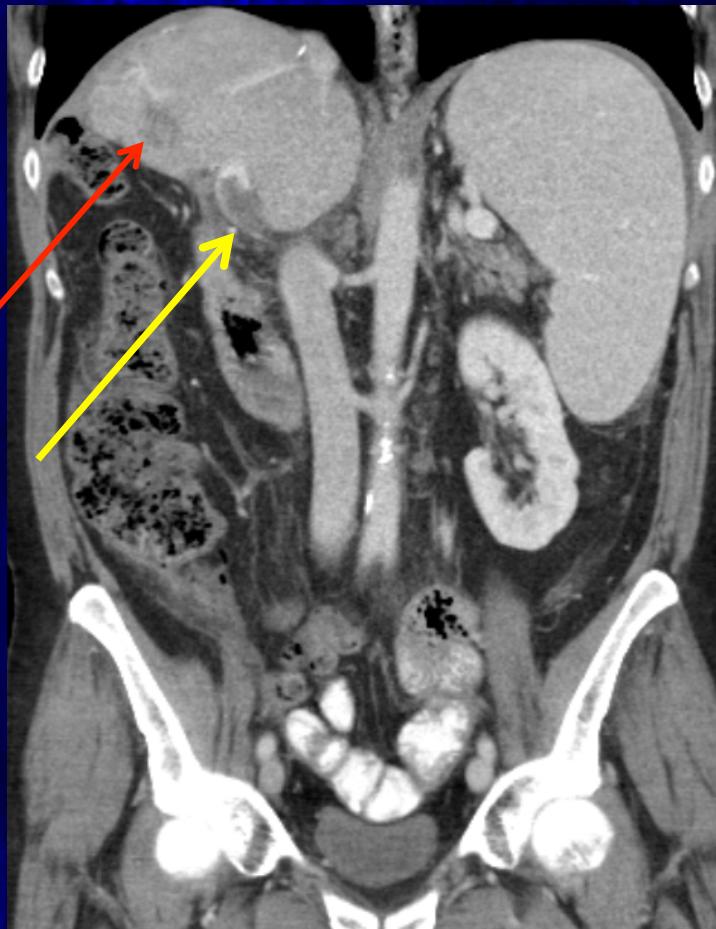
# Vena porta trombos vid malignitet

- preoperativt



# Vena porta trombos vid malignitet

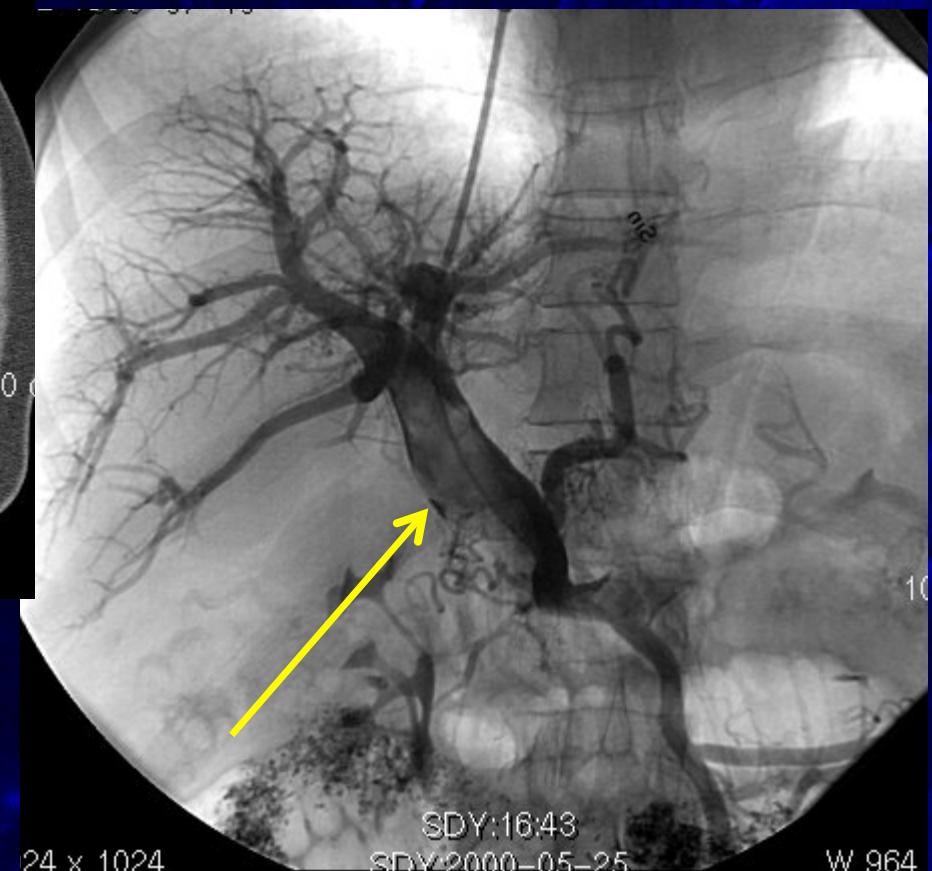
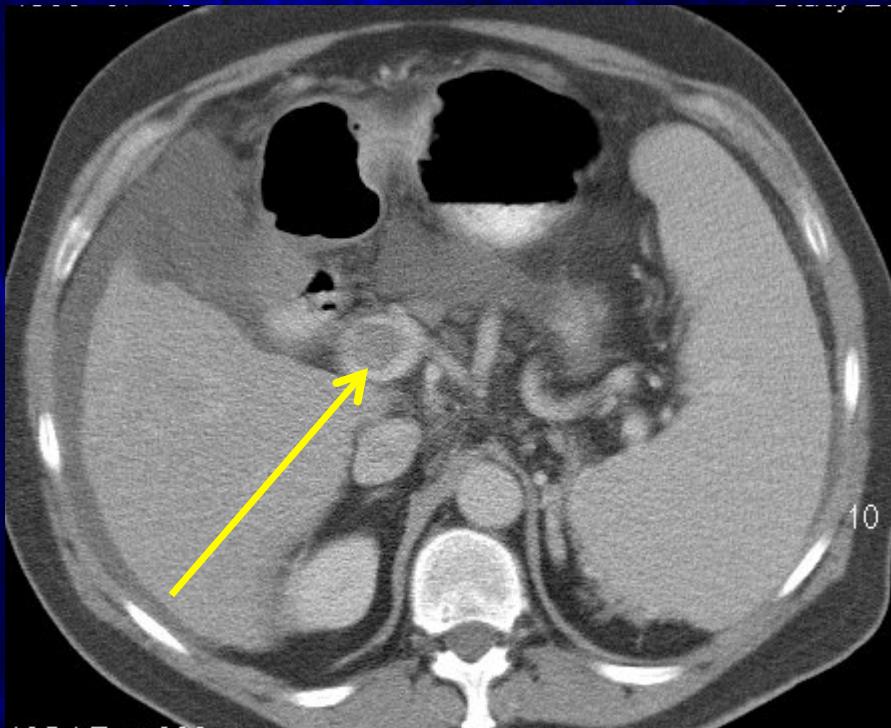
- recidiv och PV trombos (efter 18 månader)



# Intervention vid vena porta trombos

- trombolys via kateter
- trombfragmentering, borttagning
- stent

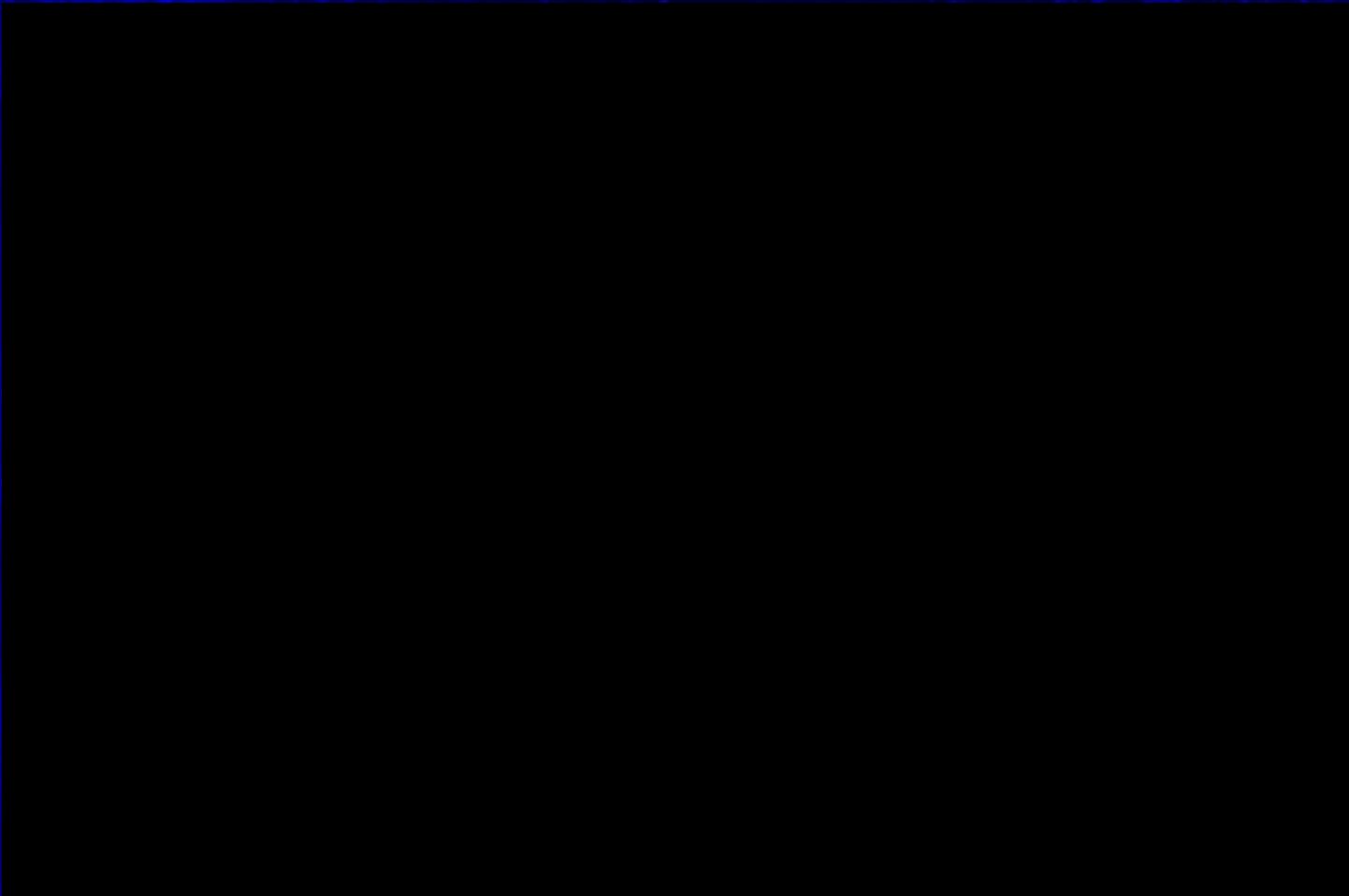
# Vena porta trombos



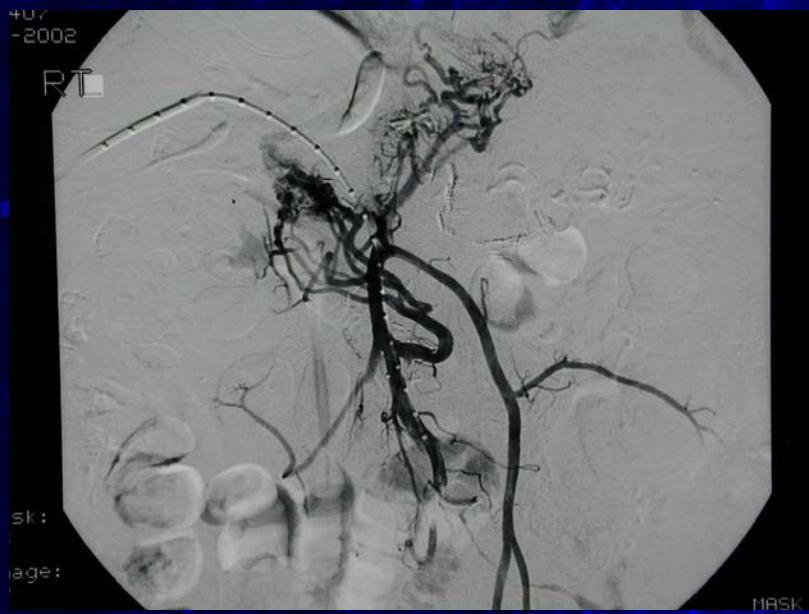
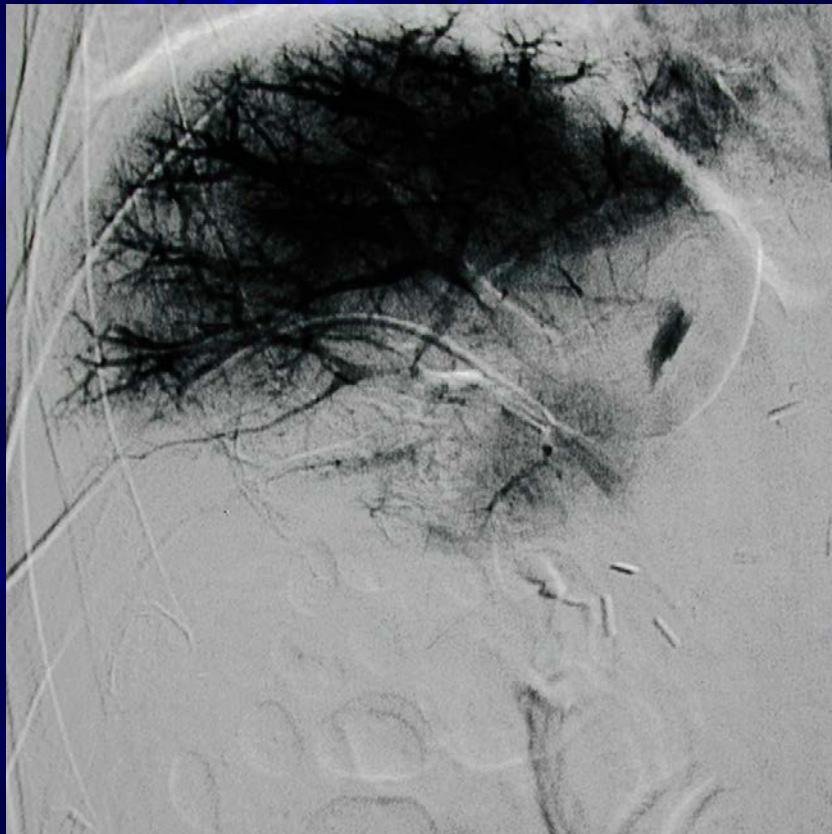
24 x 1024

SDY:16:43  
SDV:2000-05-25  
W 964

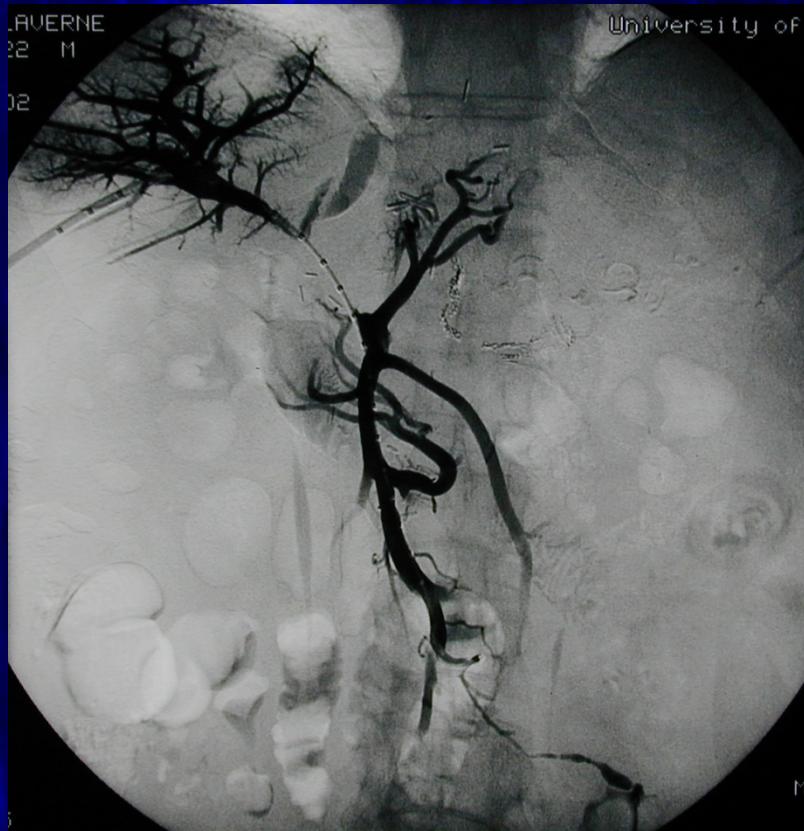
Efter 24 t trombolys (transjugulär access)



# Extra-hepatisk PV ocklusion



# Extra-hepatisk PV ocklusion



*Gradient 16 mm HG*



*Gradient 1 mm HG*

# Ocklusion SMV

Patient med carcinoid metastaser i mesenteriet

- buksmärtor
- viktnedgång
- ascites tappning 2 x vecka

# Ocklusion SMV

Universitetssjukhuset Lund



Universitetssjukhuset Lund



1024 x 1024

SDY:0944  
SDY,2001-06-21

W 610 L 502

1024 x 1024

SDY:0944  
SDY,2001-06-21

W 612 L 412

# Ocklusion SMV

Universitetssjukhuset Lund



1024 x 1024

SDY:09:44  
SDY:2001-06-21

W 812 L 412

1024 x 1024

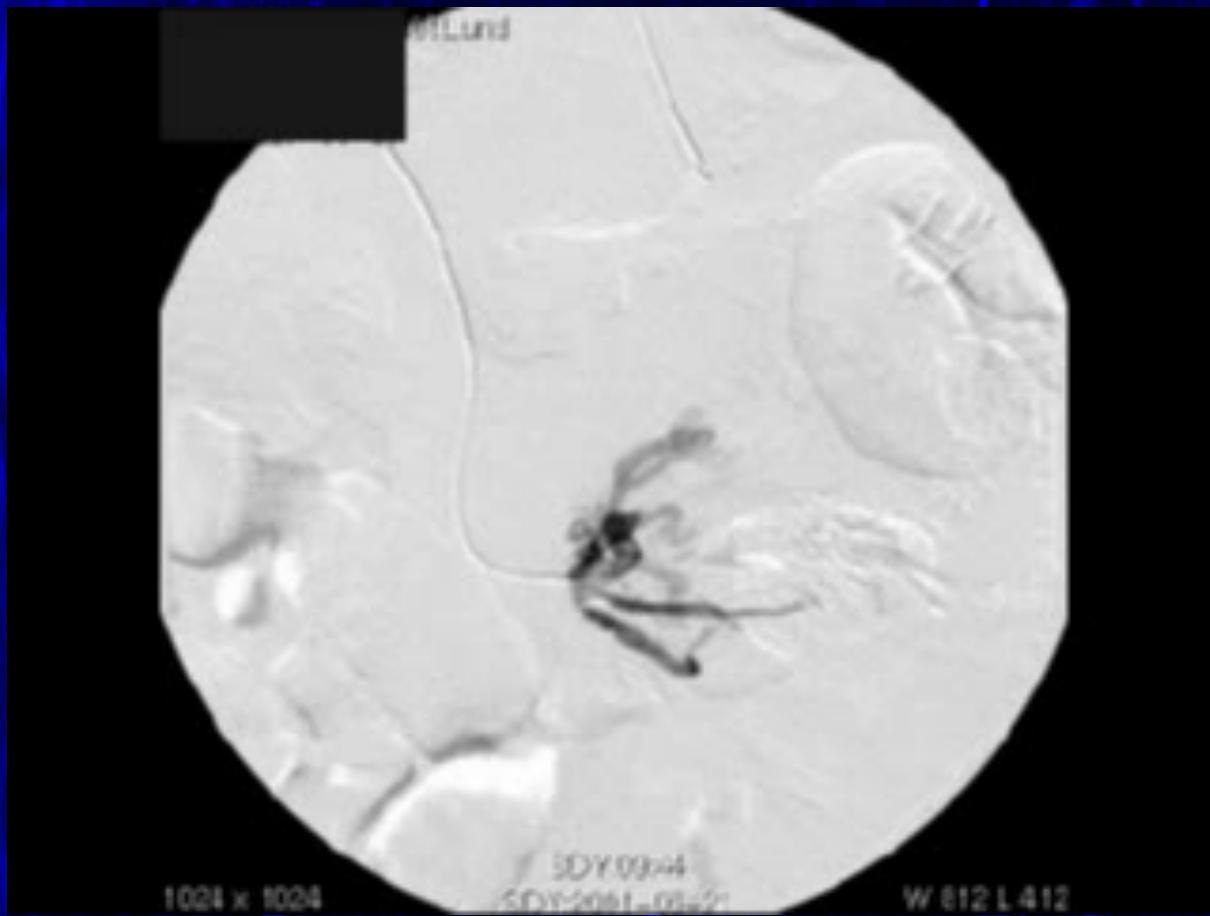
SDY:09:44  
SDY:2001-06-21

W 974 L 531

Universitetssjukhuset Lund



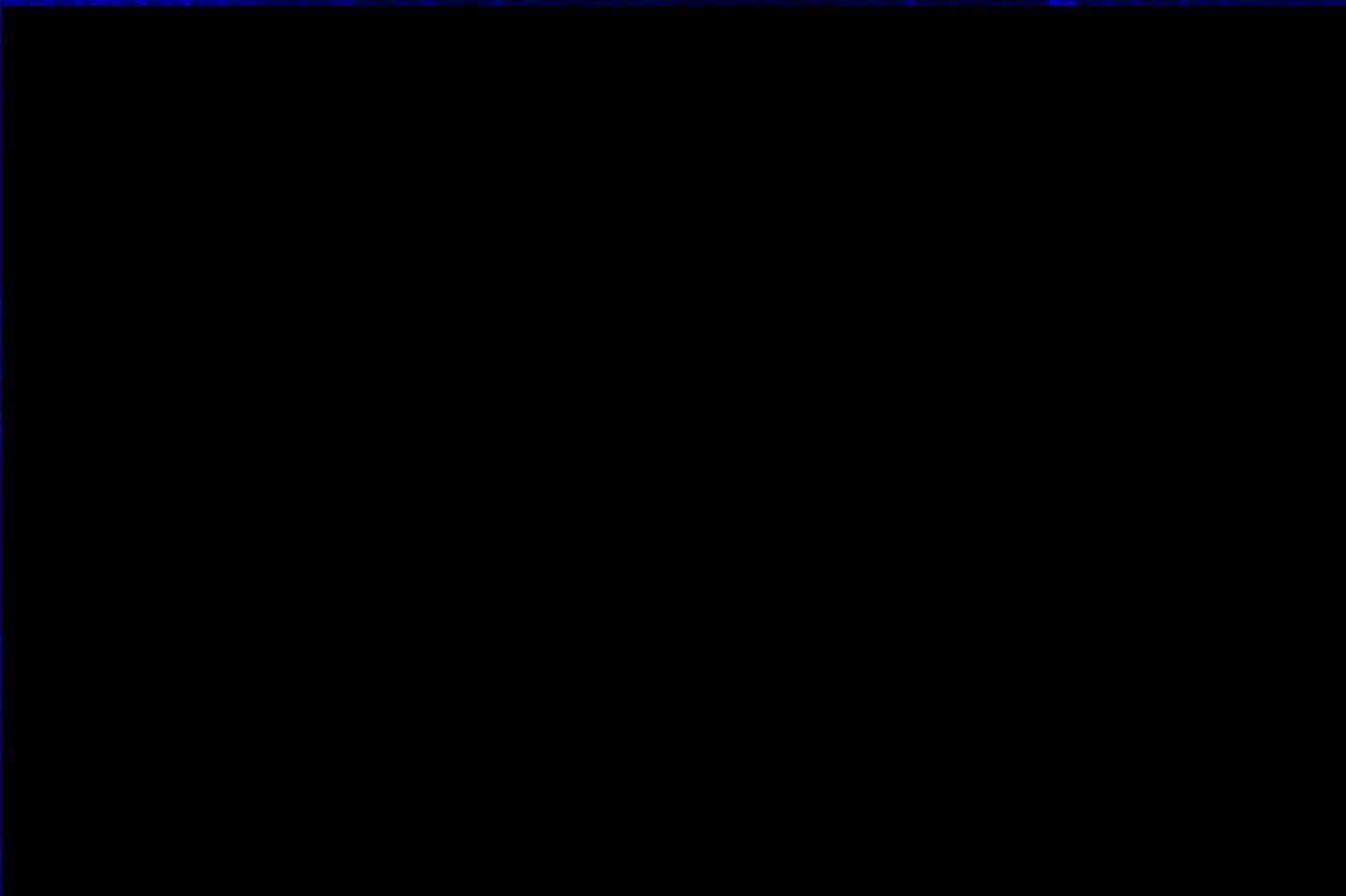
# Ocklusion SMV



# Stent



# Efter stenting



# 9 månader efter intervention

- inga buksmärter
- ingen ascites tappning

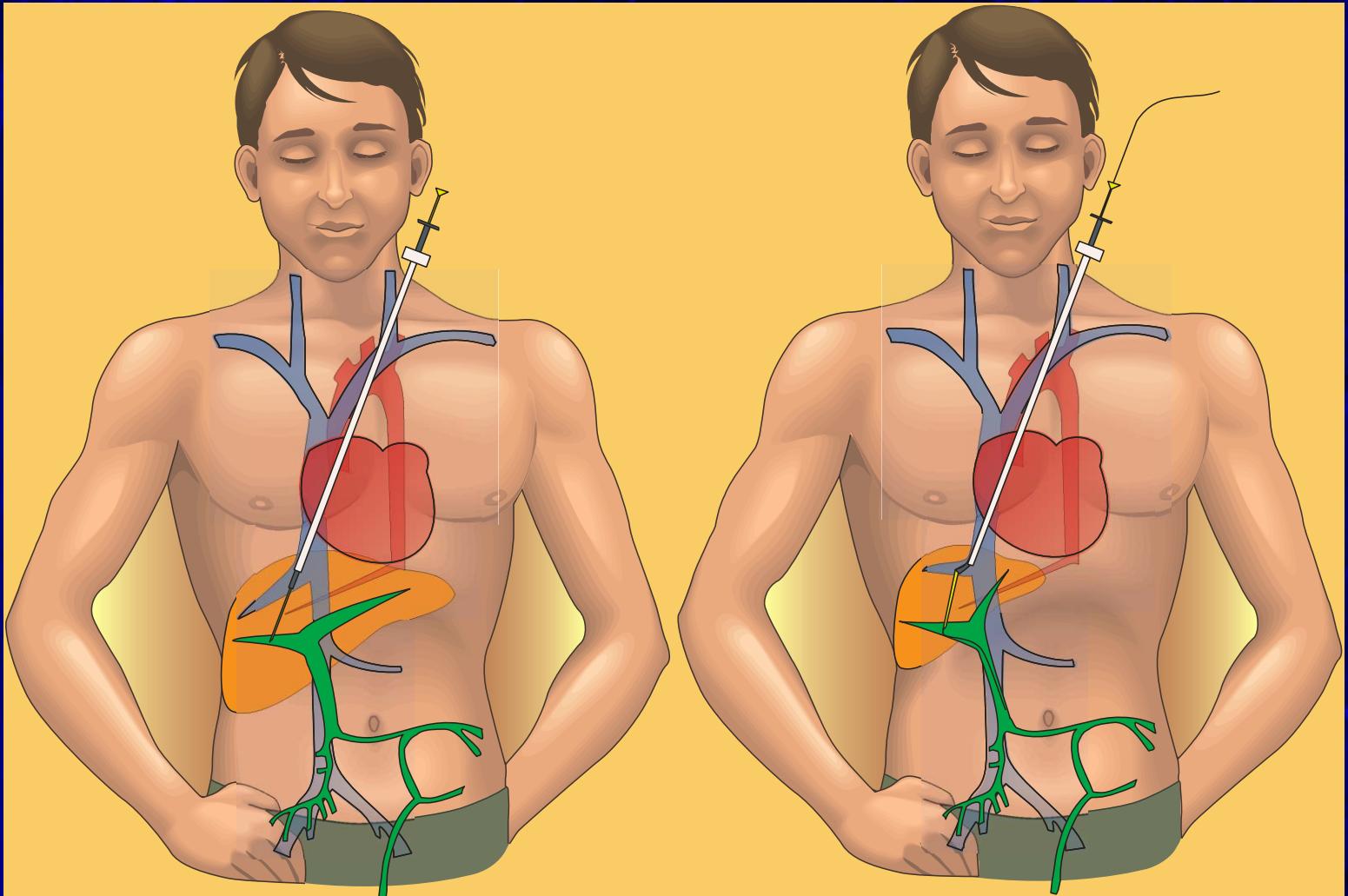
# TIPS

*(Transjugulär Intrahepatisk Portosystemisk Shunt)*

Indikation hos cancerpatienter:

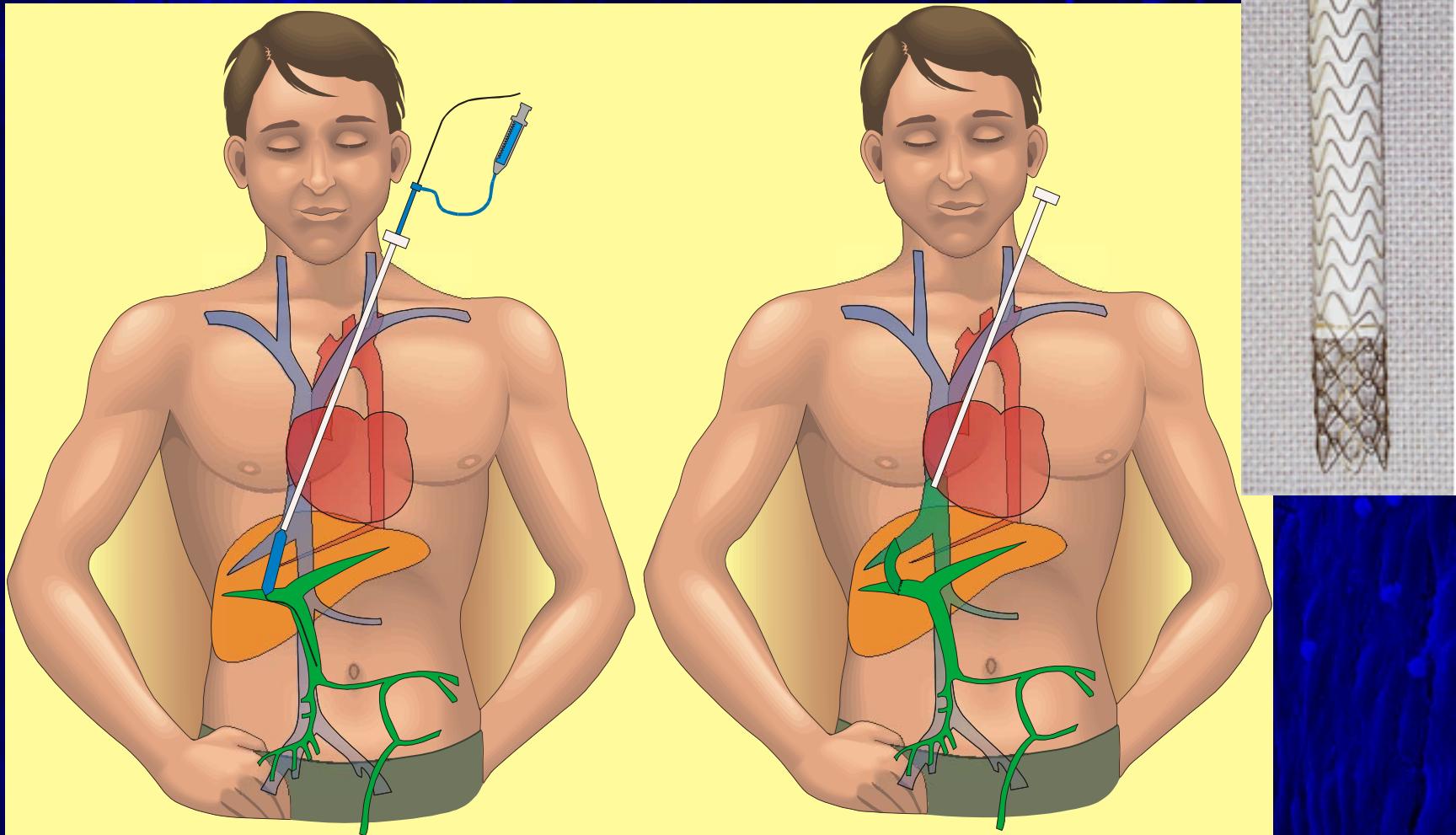
- vid symptomatisk portal hypertension:
  - blödningar från varicer
  - frekvent återkommande ascites
- för att befrämja flöde genom rekanaliserad vena porta/SMV

# Transjugular access



# TIPS

- dilatation och placering av stent-graft

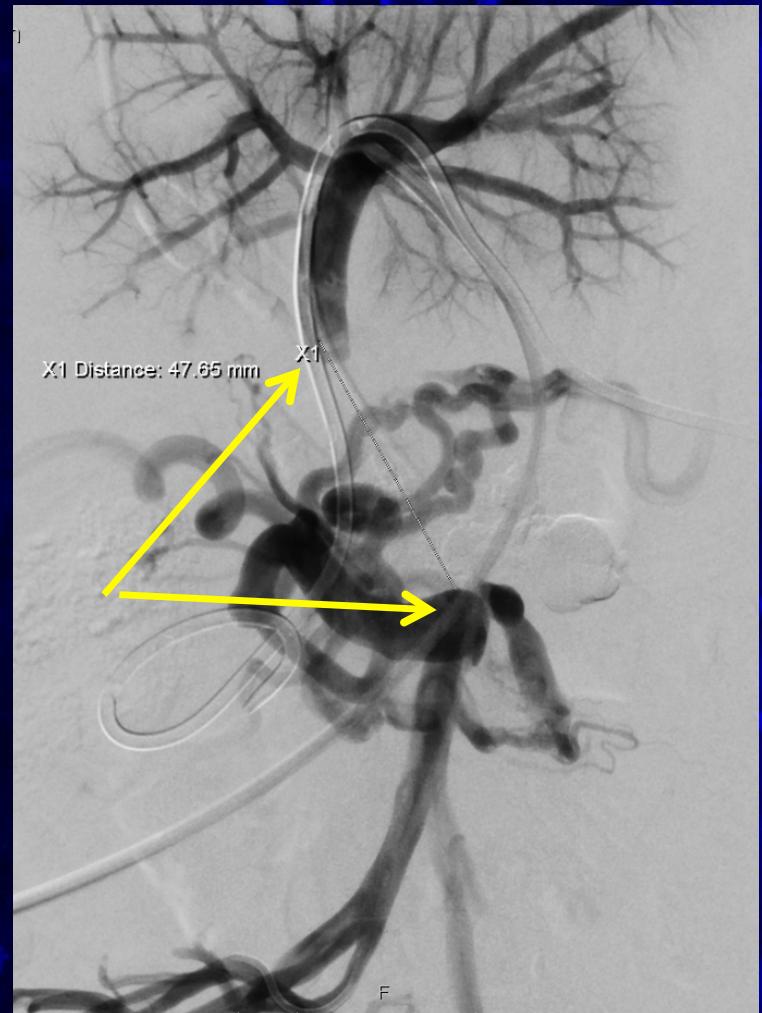
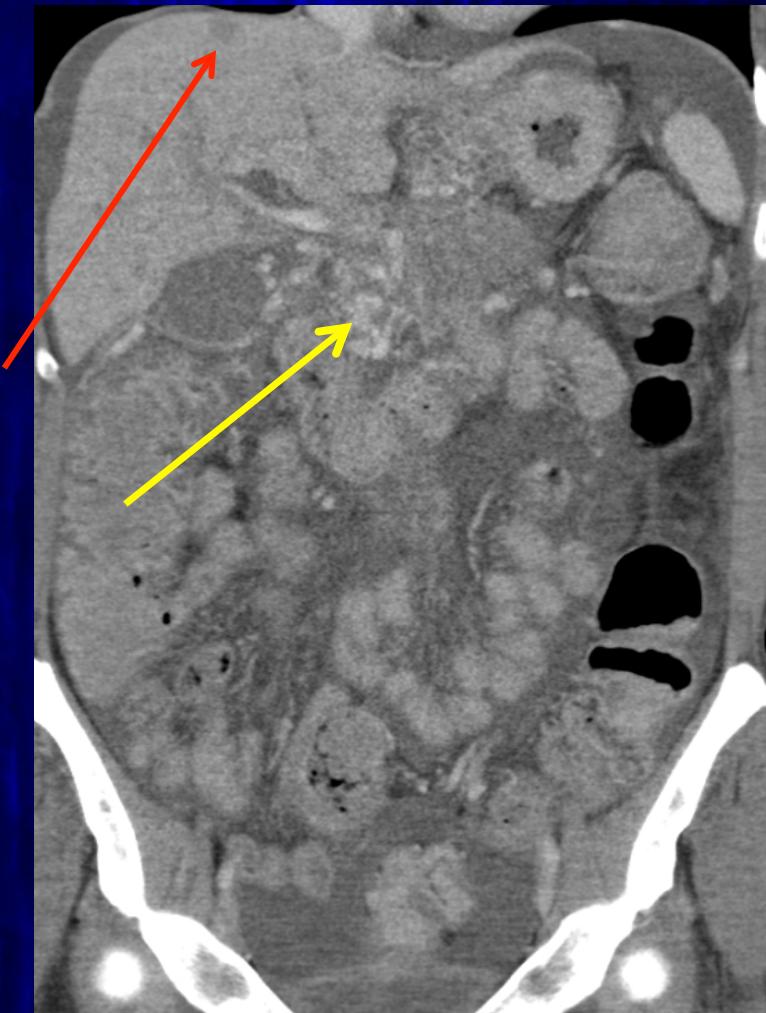


# Syfte av TIPS – minska gradient RA/PV

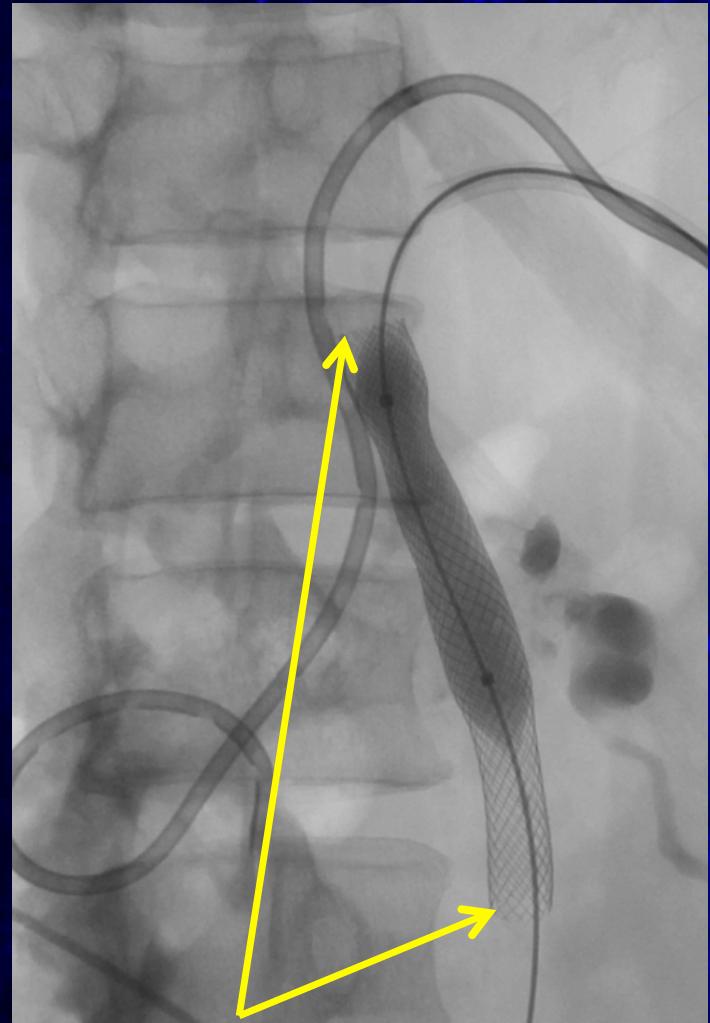
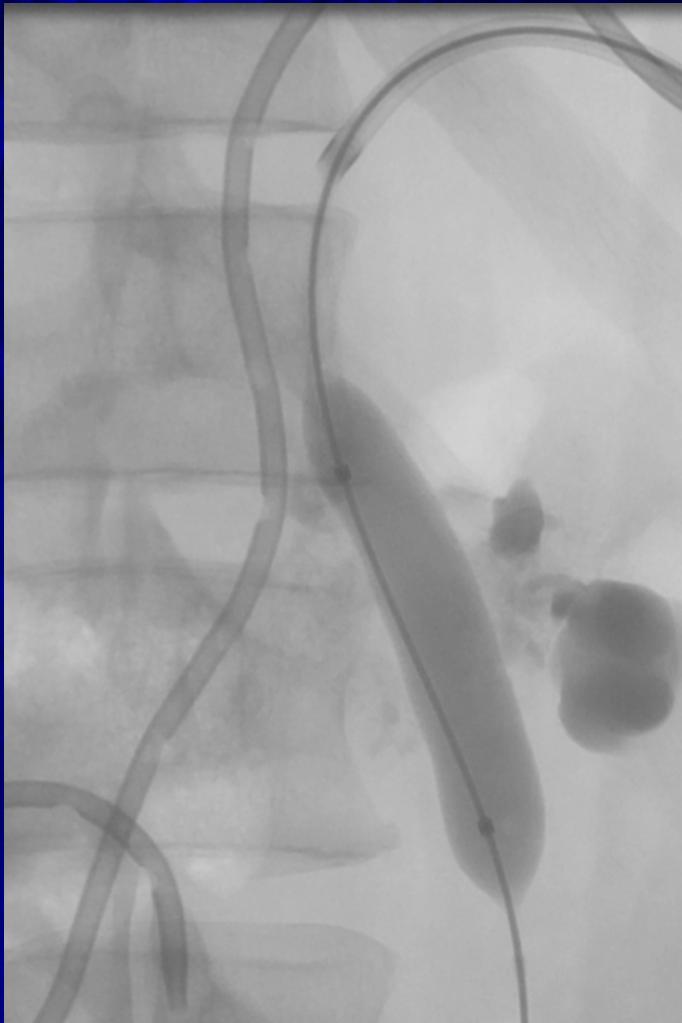


Transjugular intrahepatic portosystemic shunt for symptomatic portal hypertension in hepatocellular carcinoma with portal vein tumor thrombosis. *Liu L et al. Hepatol Res. 2013 May 17 [Epub ahead of print]*

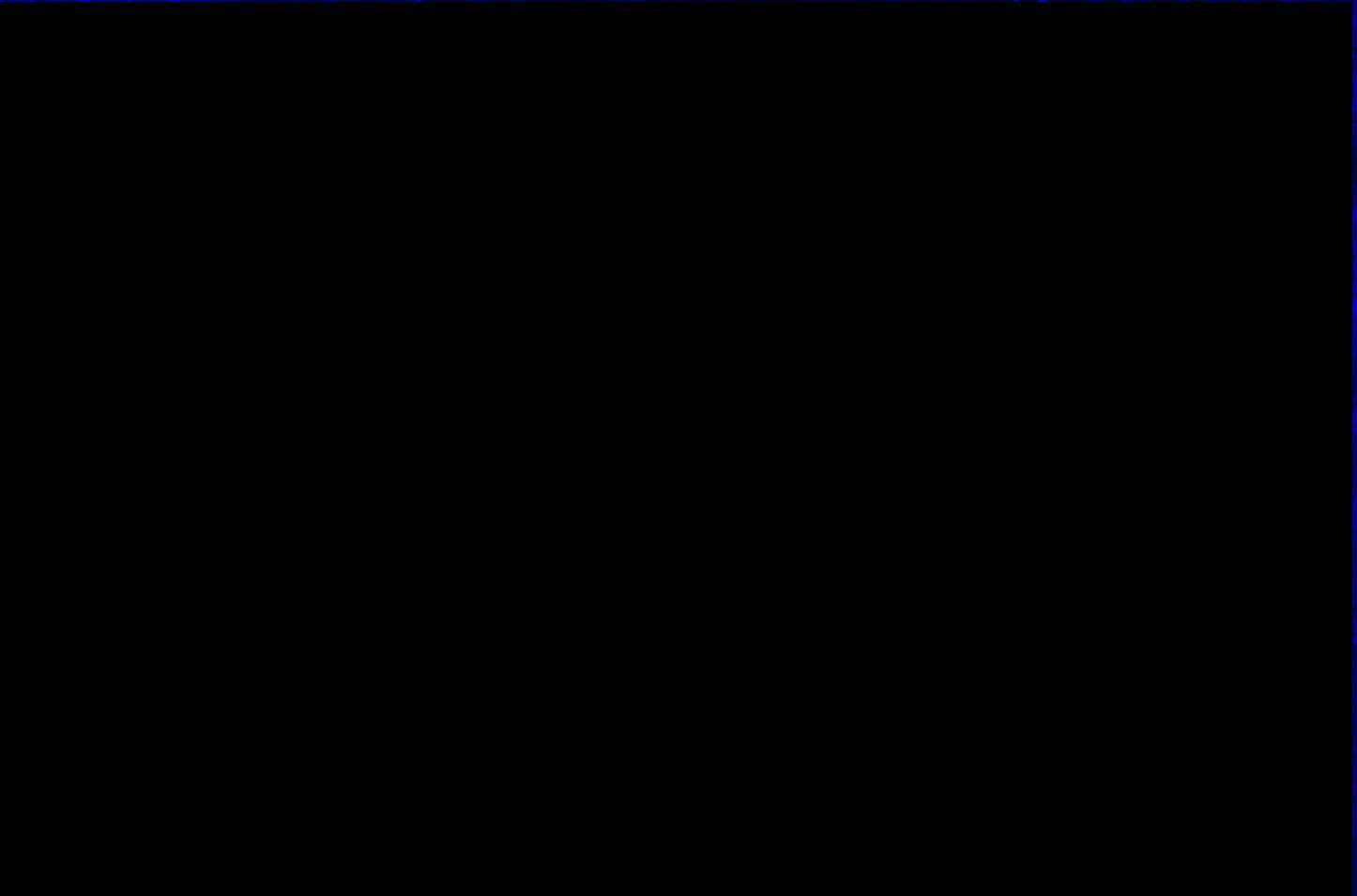
# PV ocklusion pancreas ca



# PV ocklusion pancreas ca

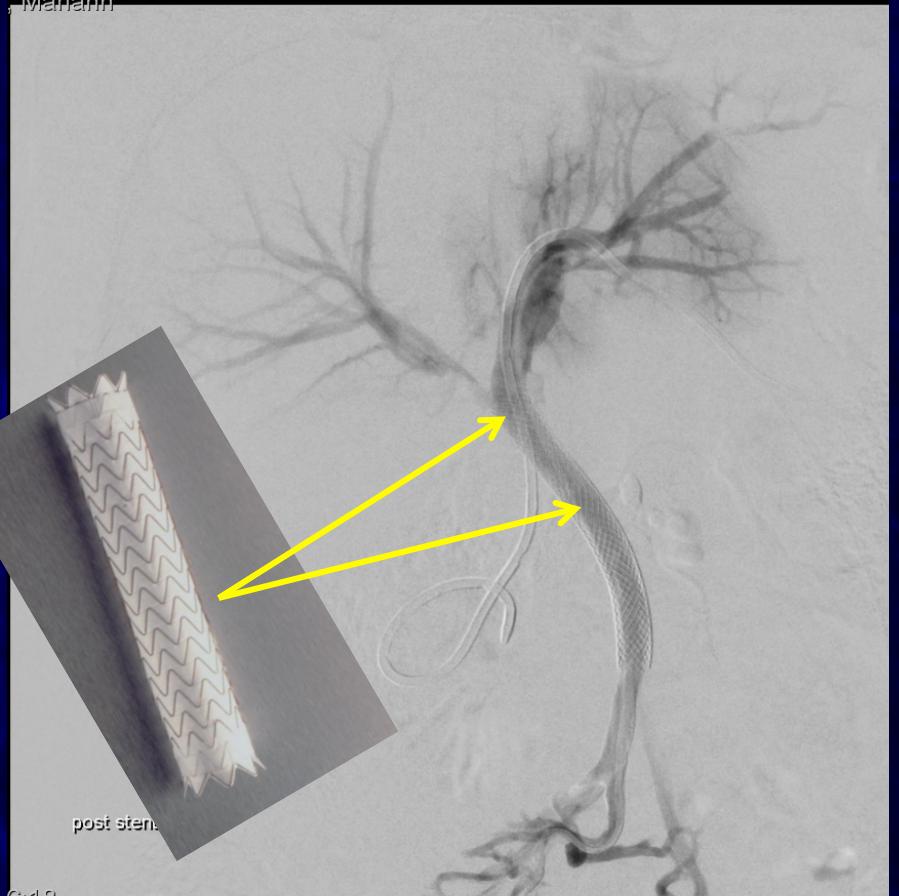


Efter stent + dilatation

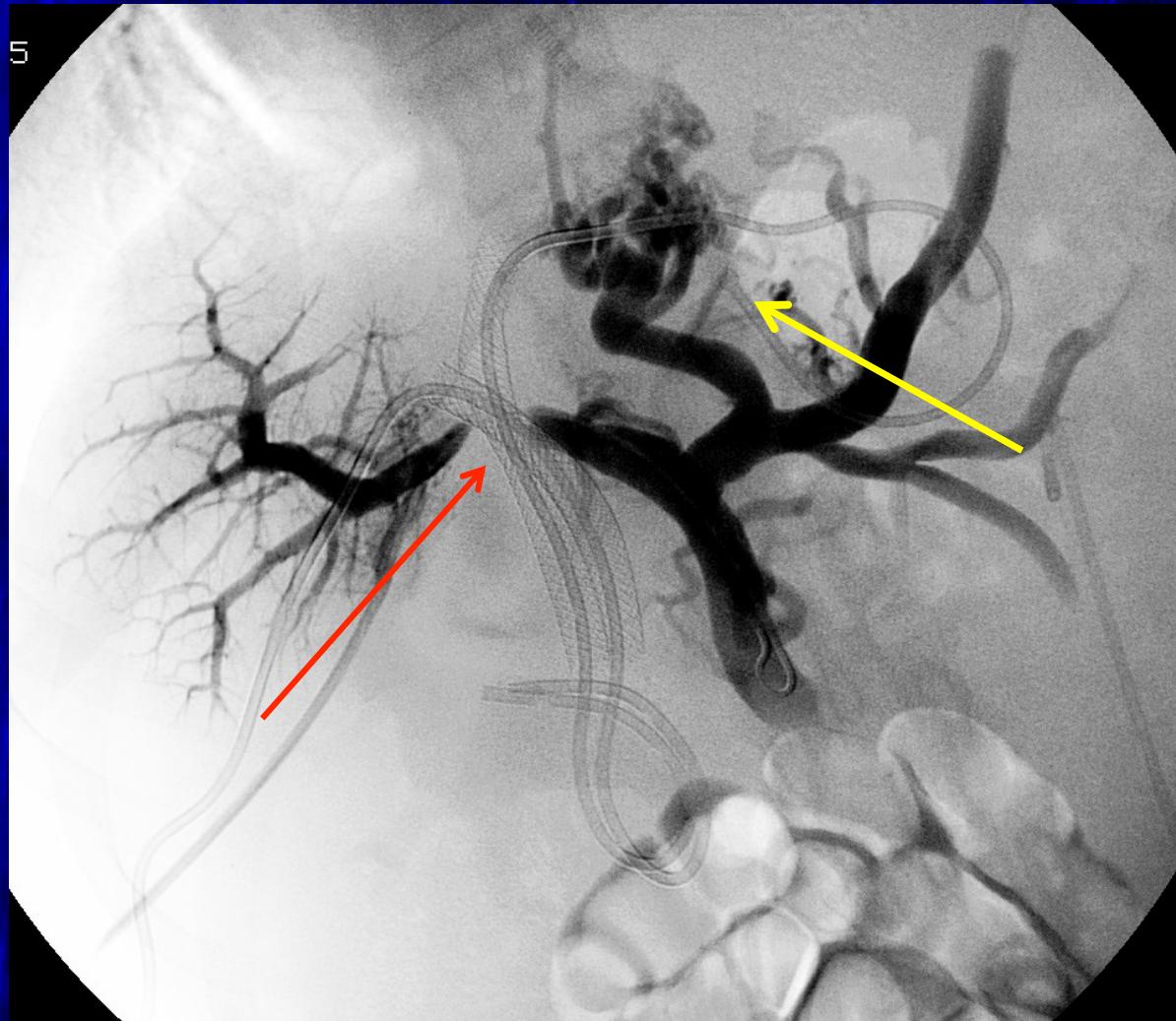


# After stent-graft

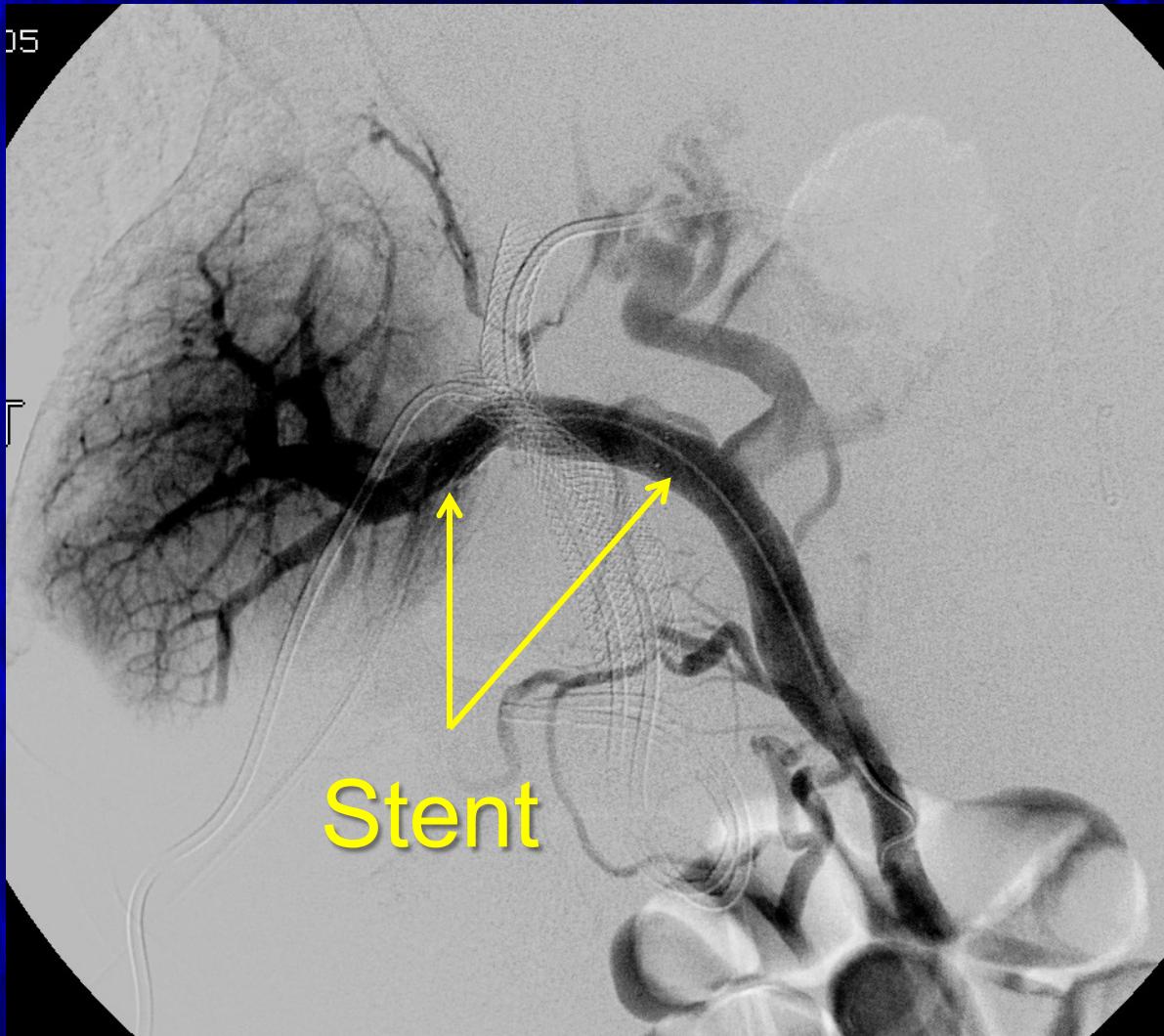
Mariann



# Iatrogen porta ocklusion vid malignitet



# Iatrogen porta ocklusion vid malignitet



Interventional radiological management of prehepatic obstruction of the splanchnic venous system. *Semiz-Oysu A, Keussen I, Cwikiel W.*  
*Cardiovasc Intervent Radiol. 2007;30:688-95*

Clinical usefulness of portal venous stent in hepatobiliary pancreatic cancers. *Zhou ZQ et al.*  
*ANZ J Surg. 2013 Feb 20 [Epub ahead of print].*

# Preoperativ embolisering

Relation of the portal blood flow to the liver maintenance: a demonstration of liver atrophy conditional on compensation.  
*Rous P, Larimore LD. J Exp Med 1920;31:609-632*

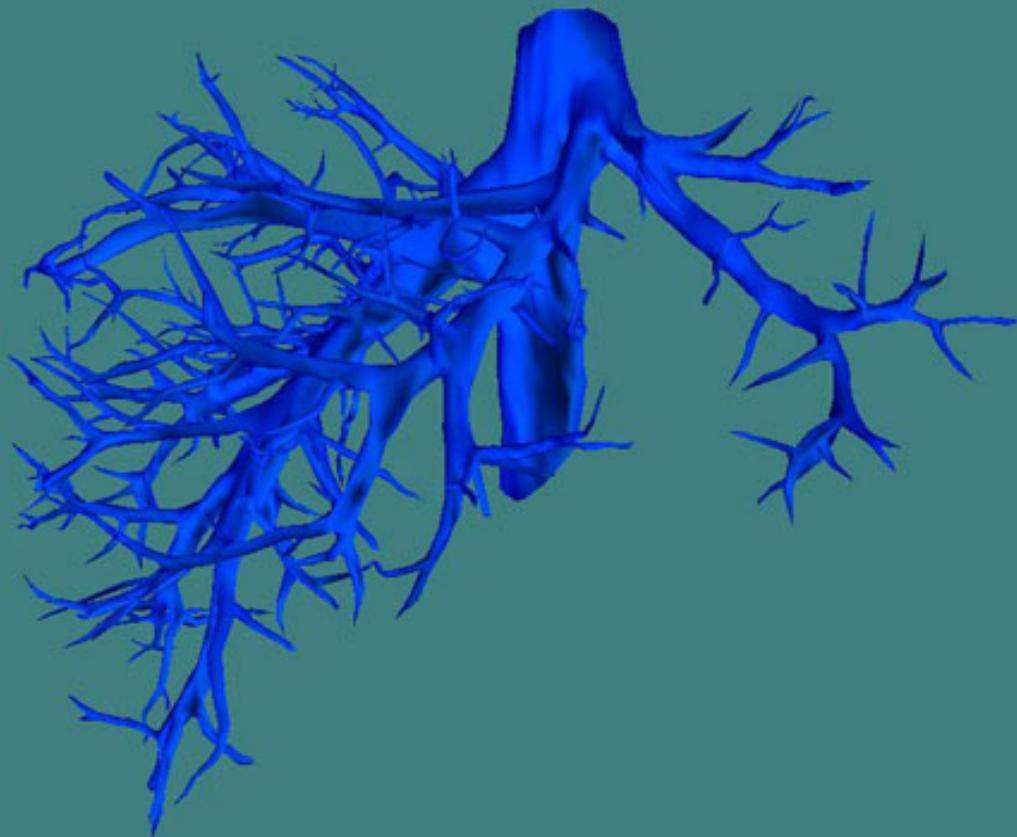
Athropy of the liver after occlusion of the bile ducts or portal vein and compensatory hyperthropy of the unoccluded portion and its clinical importance. *Bax HR, et al. Gastroenterology 1956;31:131-155*

# Kompensatorisk volymsökning av en leverlob

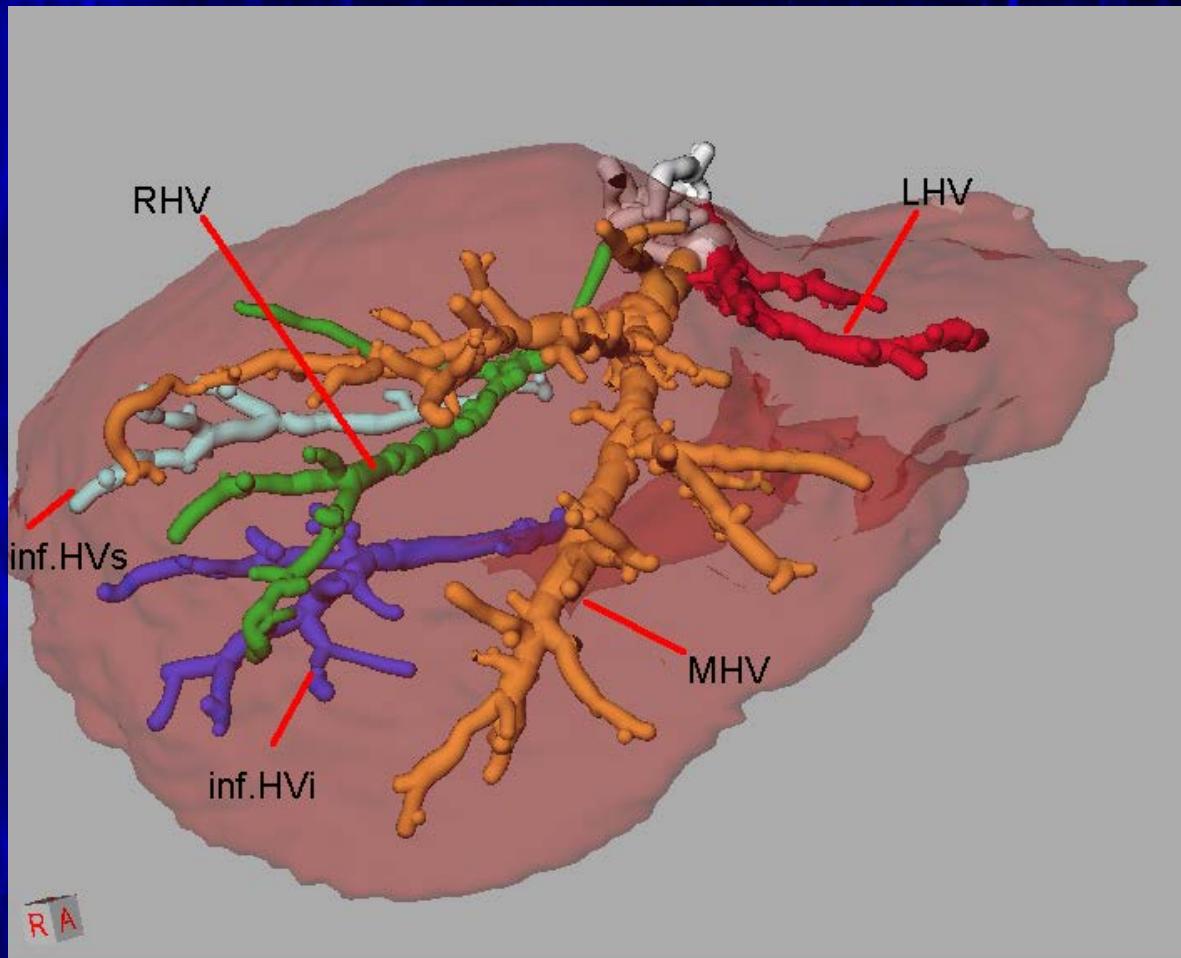
- efter partiell leverresektion
- efter partiell ocklusion av vena porta
  - tumörinväxt
  - skada
  - kirurgisk ligering
  - interventionell embolisering
- (avstängda gallvägar, arteria hepatica)

# Venös leveranatomy

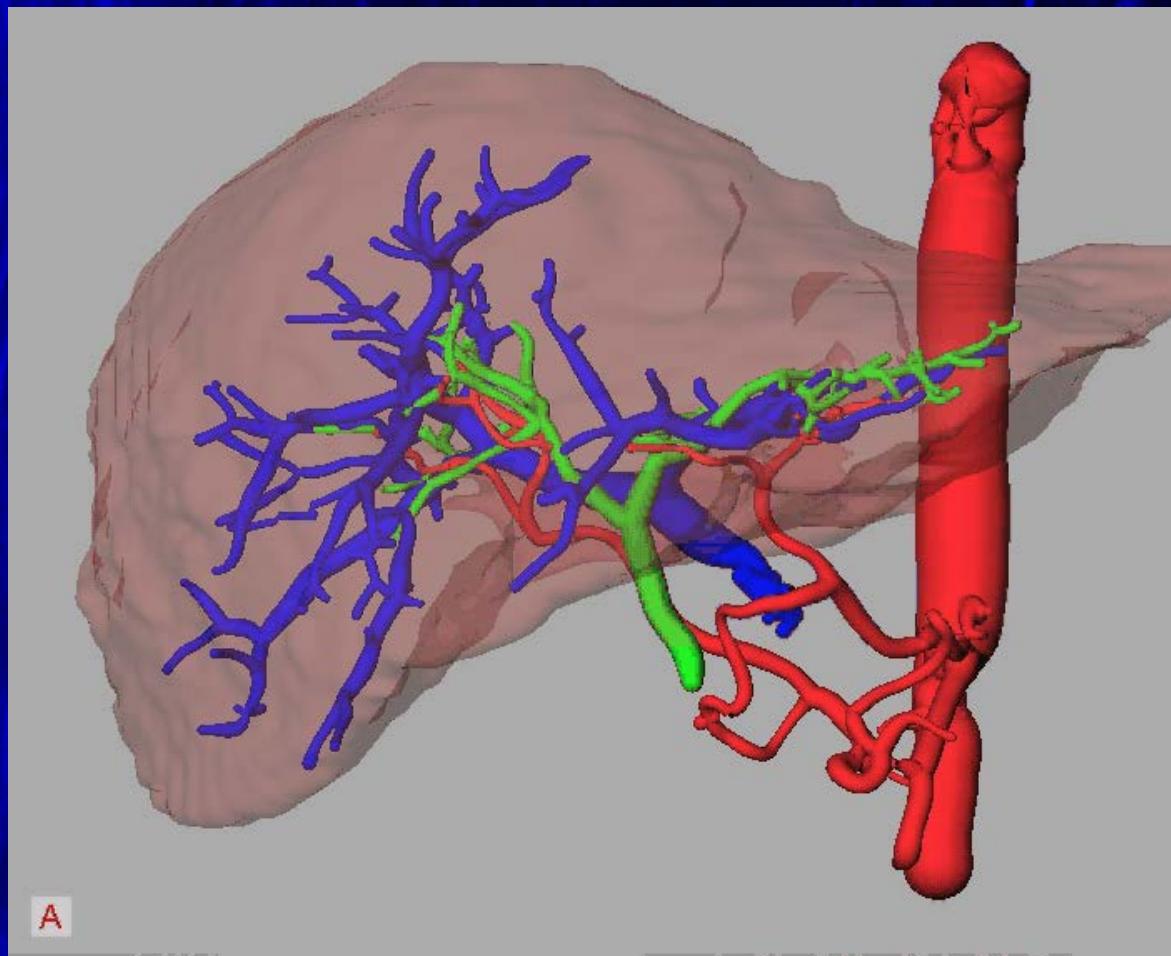
Lever  
vener



# Venös leveranatomi



# Vaskular leveranatomi



# Partiell leverresektion möjligt om:

- en lever lob är fri från metastaser/tumör
- volym av FRL (*future remaining liver*)  
 $>25\% (>40\% \text{ vid lever cirrhos})$

# Preoperativ induktion av hypertrofi av ett leversegment

- vena porta embolisering
- kirurgisk vena porta ligatur
- arteriell lever embolisering (?)
- (infusion av HGF i v porta ??)

# Preoperativ vena porta embolisering

## Kontraindikationer

- spridning utanför lever
- koagulopati
- portal hypertension
- ingen säker access

# Preoperativ vena porta embolisering

Förväntad långsam hypertrofi

- cirrhos
- diabetes
- efter extensiv cytostatika behandling

# Beräkning av lever volym

- TLV = Total Lever Volym
- TU = Tumör
- FRL = Future Remaining Liver
- FRL > 25% TLV (or TLV – TU)
- FRL > 40% TLV i cirrhos

## ***Volumes of Vascular Territories***

### **Portal Venous**

Territory	Volume (in ml)	(relative) (% of total)
II	89	( 6.9%)
III	92	( 7.1%)
IVa	111	( 8.6%)
IVb	71	( 5.5%)
V	149	( 11.5%)
VI	142	( 11.0%)
VII	261	( 20.1%)
VIII	379	( 29.3%)
Total	1294	(100.0%)

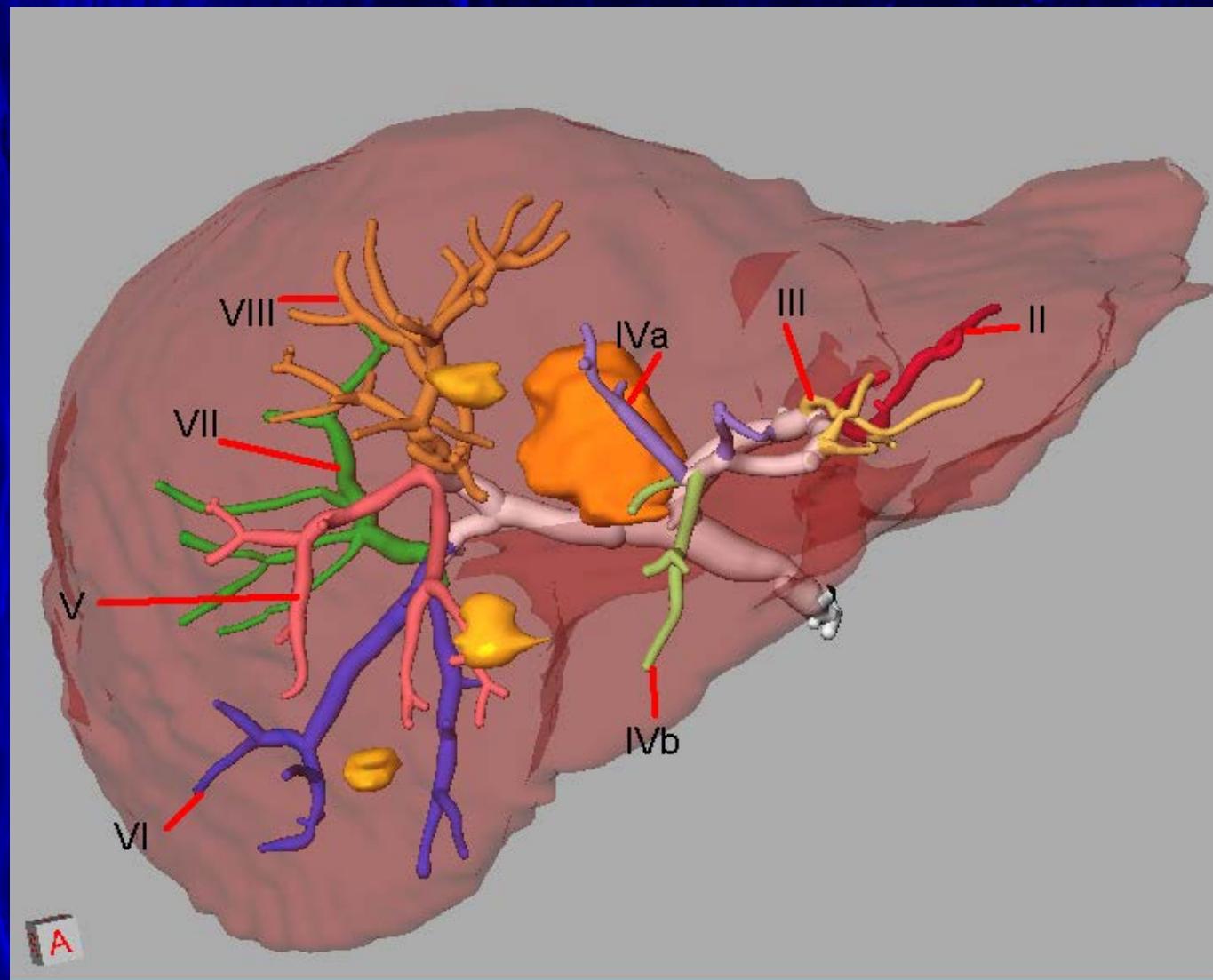
***Risk Analysis for large central metastasis with 0 mm (red), 2 mm (yellow), and 5 mm (green) safety margins***

### **HV at Risk\_Ter.TM1**

Safety Margin	cum.Volume (in ml)	relative) (% of total)
0 mm	347	( 26.8%)
2 mm	669	( 51.7%)
5 mm	726	( 56.1%)
safe	568	( 43.9%)
Total	1294	(100.0%)

# Innan preoperativ portaembolisering

- CT /MR/ USG
  - resektabilitet
  - volymer
  - anatomi
  - öppna artärer & vene
  - tu position
  - tu inväxt



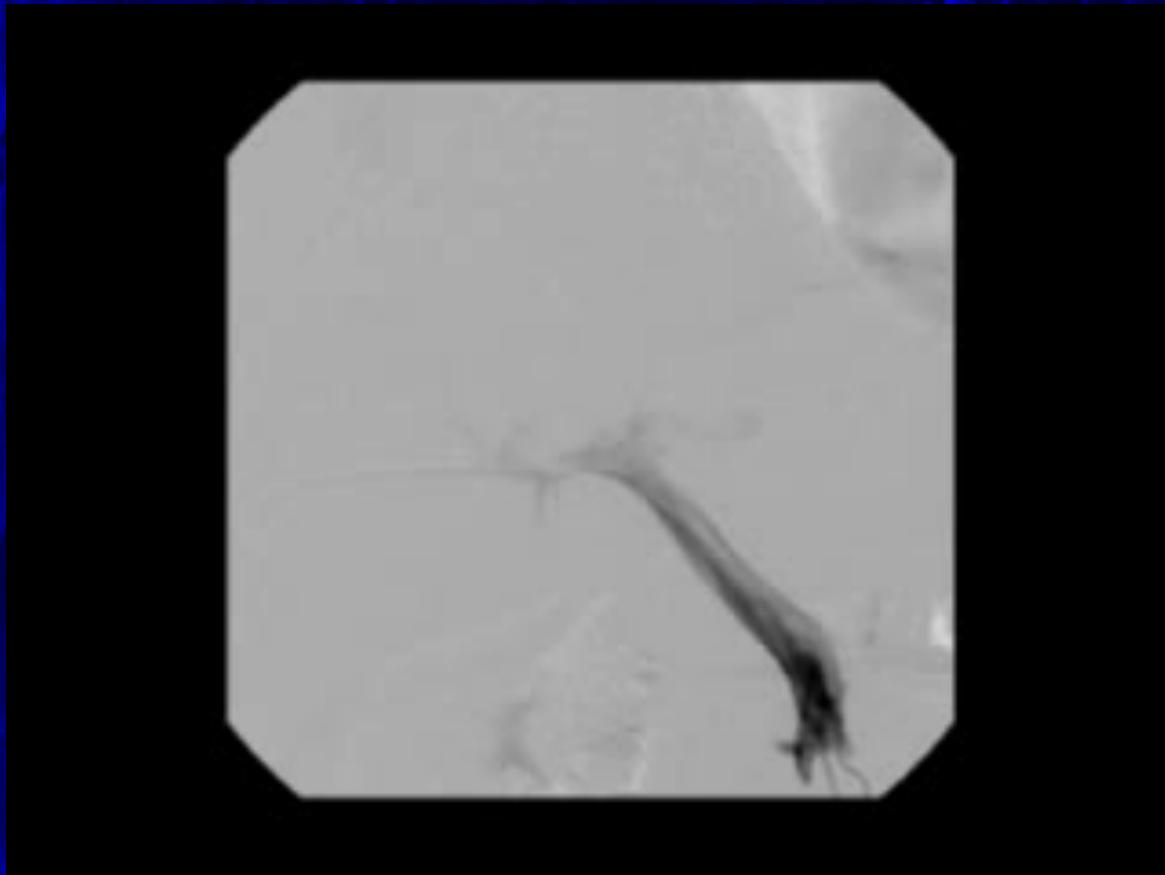
# Innan preoperativ porta embolisering

- lab tester (lever, blod, koagulation, Krea)
- antibiotika
- general anestesi

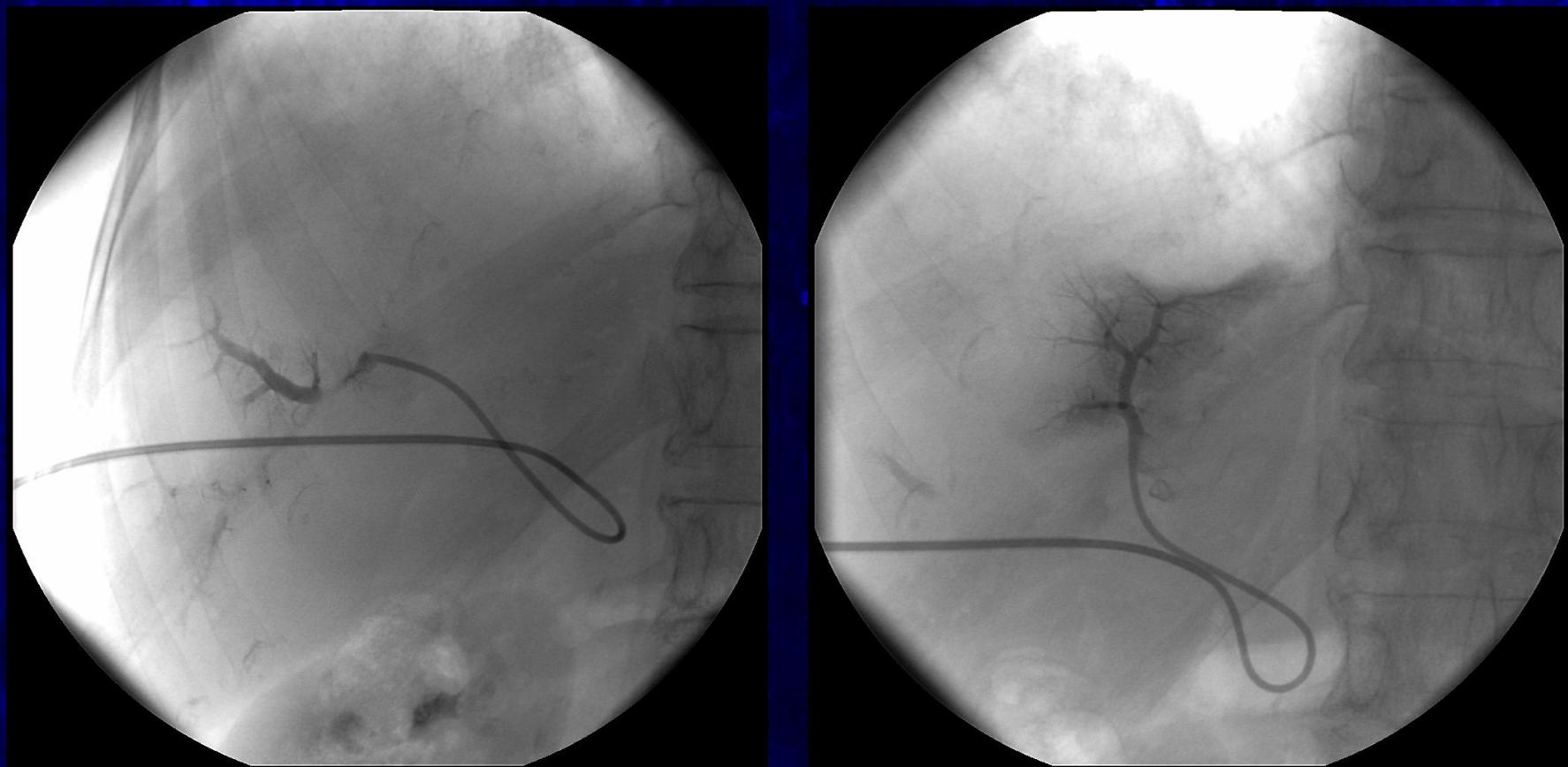
# Preoperativ vena porta embolisering

- percutan Hö (Vä) leverlob access
- partiklar/microsfärer
- spongostan
- etanol
- Histoacryl+lipiodol
- +/-occlusionsballonger

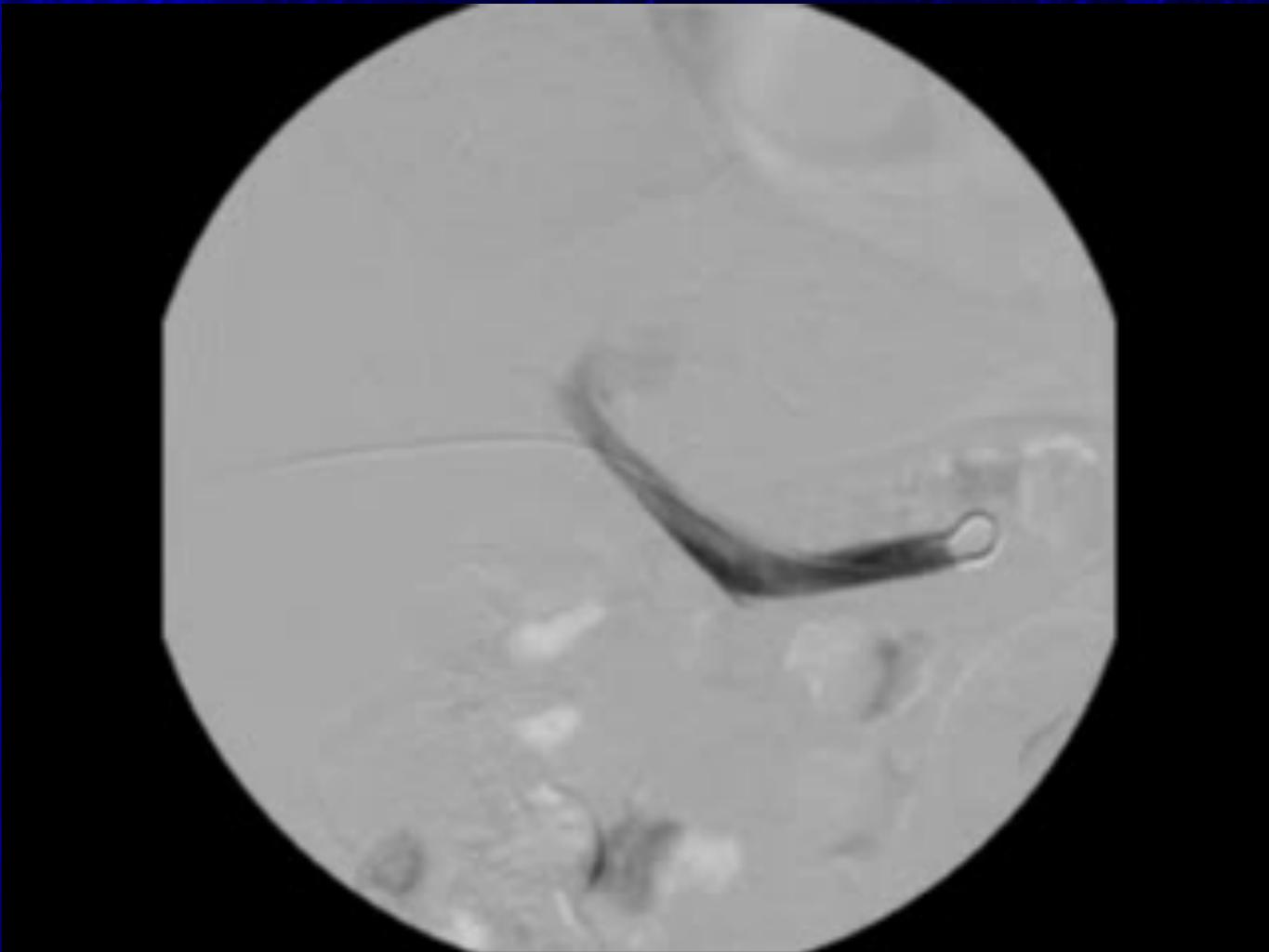
# Preoperativ vena porta embolisering



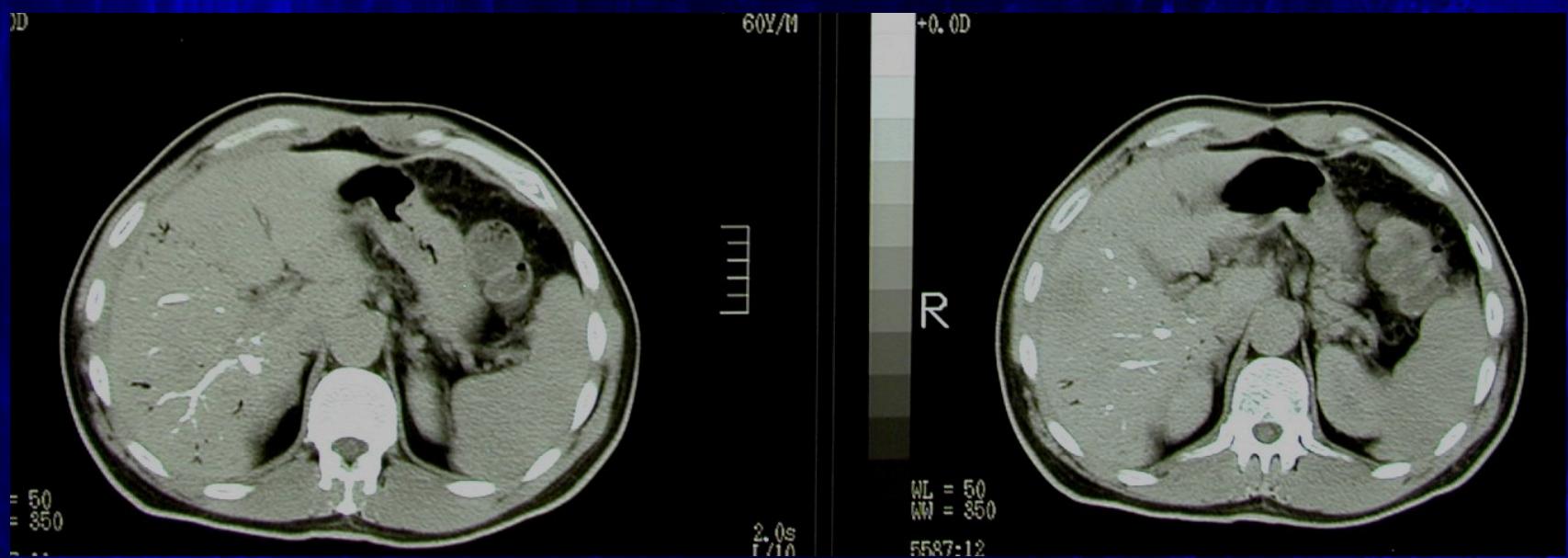
# Preoperativ vena porta embolisering



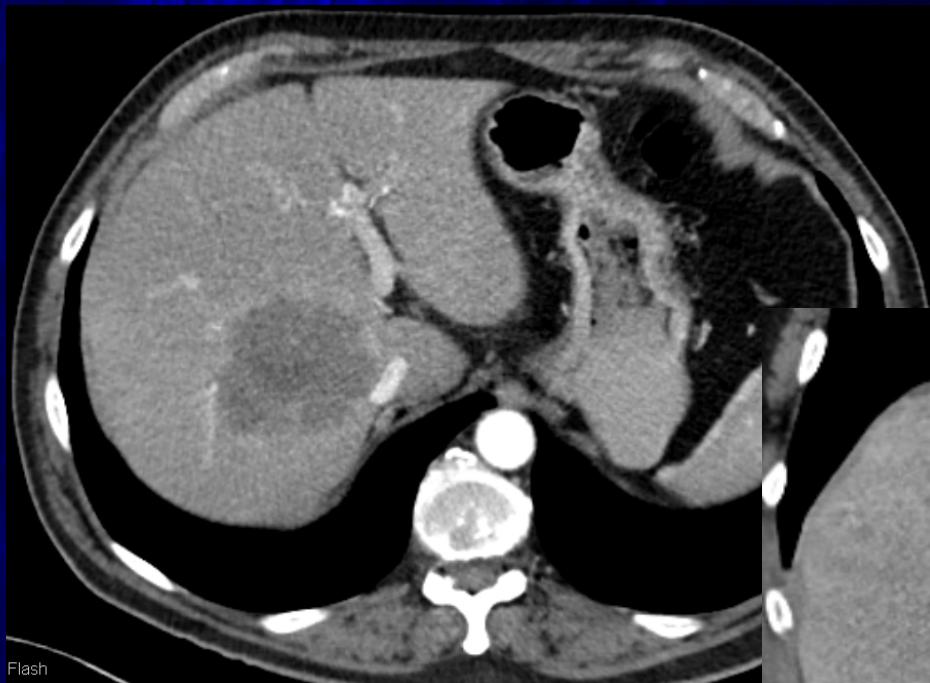
Efter vena porta embolisering



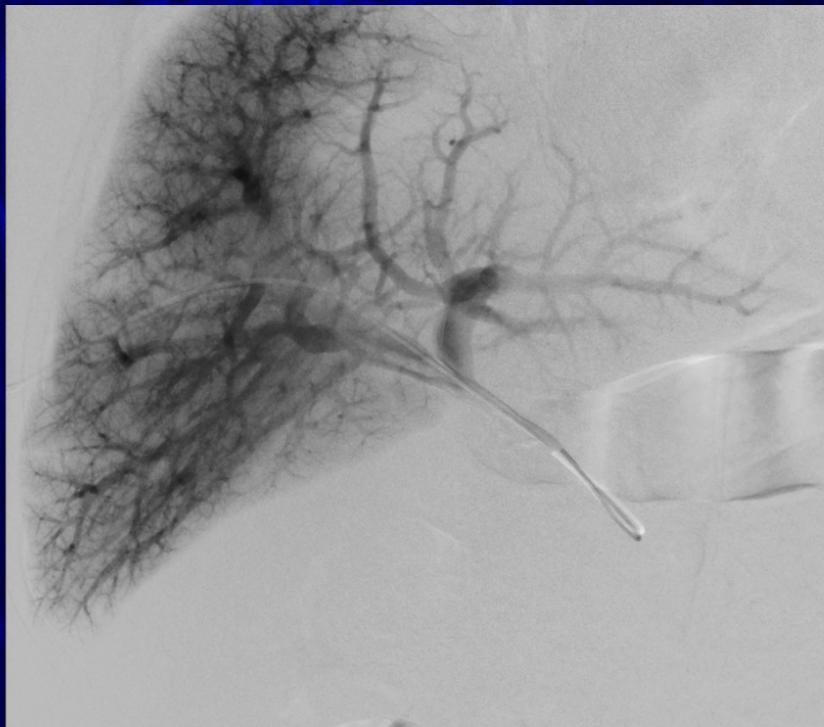
# Efter vena porta embolisering



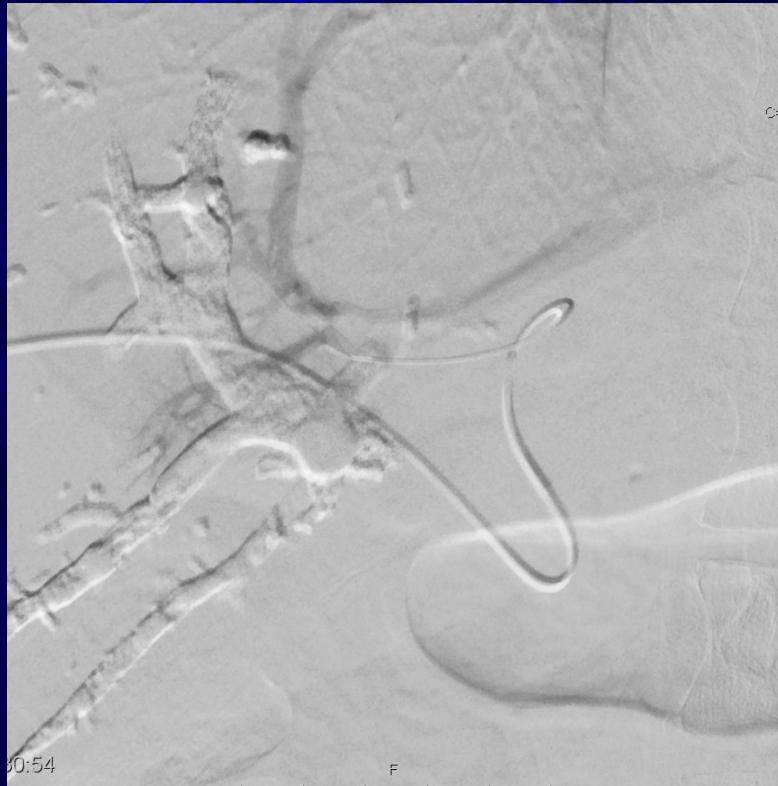
# Preoperativ vena porta embolisering



# Vena porta embolisering med histoacryl+lipiodol



# Efter vena porta embolisering



# Effekt av preoperativ vena porta embolisering



3 v efter embo



3 m etter kirurgi

# Preoperativ vena porta embolisering

“Portal vein embolization enables safe and potentially curative extended hepatectomy in a subset of patients who would otherwise be marginal candidates for resection based on a small liver remnant size.”

(MD Andersson Cancer Center;Huston)

*Extended hepatectomy in patients with hepatobiliary malignancies with and without preoperative portal vein embolization. Abdalla EK et al. Arch Surg. 2002;137:675-80*

# Preoperativ vena porta embolisering

## Fördelar

- minskar lever dysfunction
- " encefalopatia
- " ascites
- lägre bilirubin
- kortare sjukhusvård

*Preoperative portal vein embolization for extended hepatectomy. Hemming AW et al. Ann Surg. 2003;237:686-1*

# Preoperativ vena porta embolisering

- tekniskt success i 17/17 patienter
- FRL volym ökade 28% under 2-3 veckor
- inga komplikationer

*Use of Double-Occlusion Balloon Catheter: Preoperative Portal Vein Embolization for Induction of Future Remnant Liver Hypertrophy. Kim MJ et al. Cardiovasc Intervent Radiol. 2003;23.*

# Preoperativ vena porta embolizing

- 26 patienter med FRL < 25% of TLV
- två embolisering komplikationer (hindrade inte resektion)
- ingen postembolisering syndrom
- Medel FRL ökade 41.1 %
- ingen lever insufficiens efter resektion

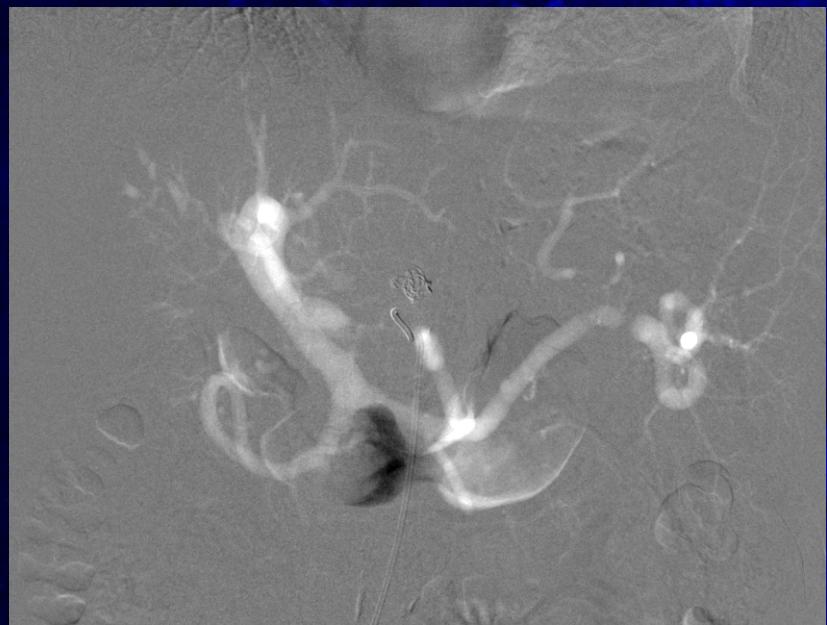
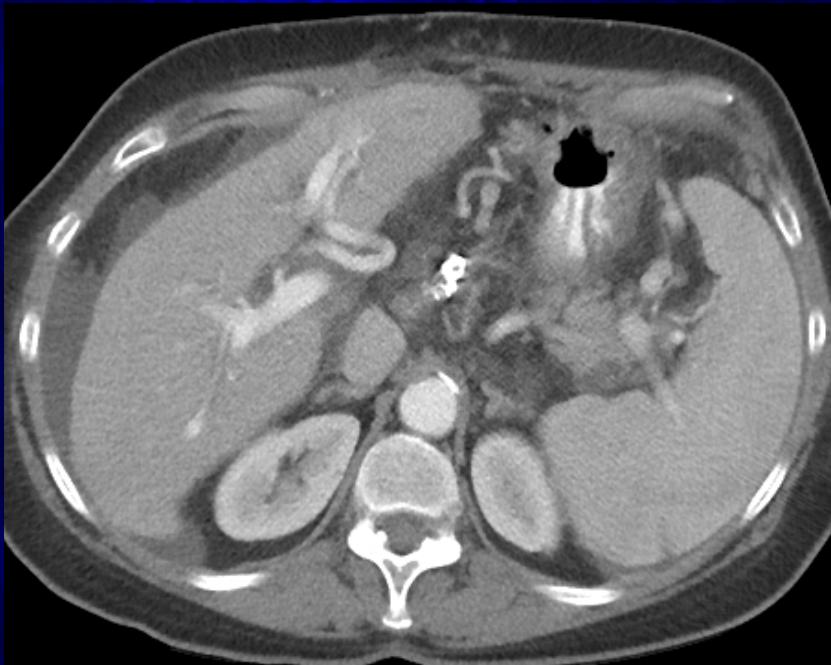
*Portal Vein Embolization with PVA particles and coils in preparation for major liver resection for hepatobiliary malignancy: safety and effectiveness –study in 26 patients. Madoff DC et al. Radiology 2003;227:251-260.*

# Preoperativ vena porta embolisering

## Möjliga komplikationer

- blödning
- hematom
- vena porta trombos
- snabbare tumör växt (?)

# Stängning av patologiska shuntar



# Stängning av patologiska shuntar



# Portala interventioner vid malignitet

- har god palliativ effekt
- förlänger överlevnad
- underlättar/ökar möjligheter av kirurgi

Thank you!

