

Transarteriell Onkologisk Leverbehandling

Vad är det och hur går det till?



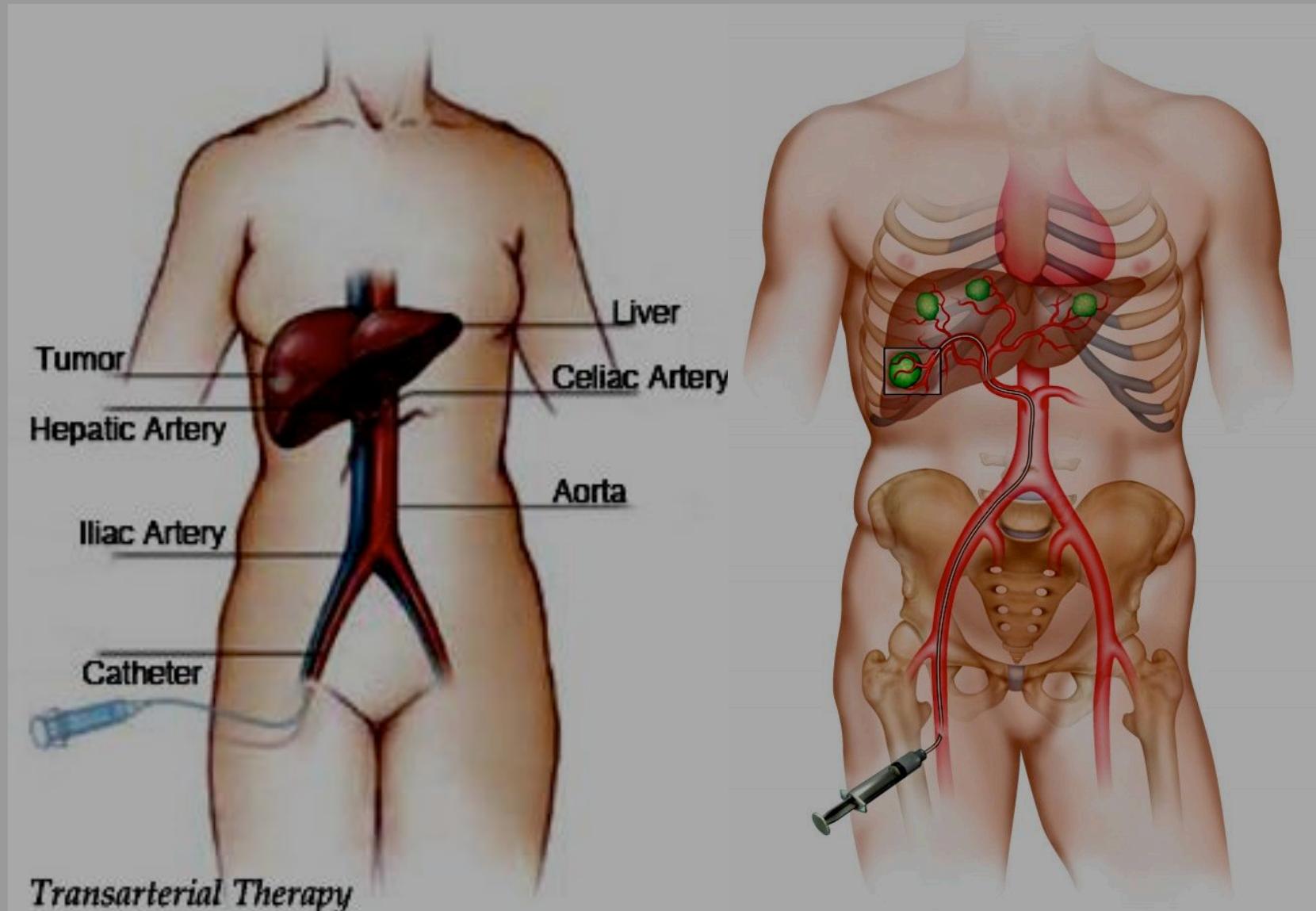
2013-09-06

Charlotte Ebeling Barbier, Överläkare
Intervention, Röntgen, BFC
Akademiska Sjukhuset

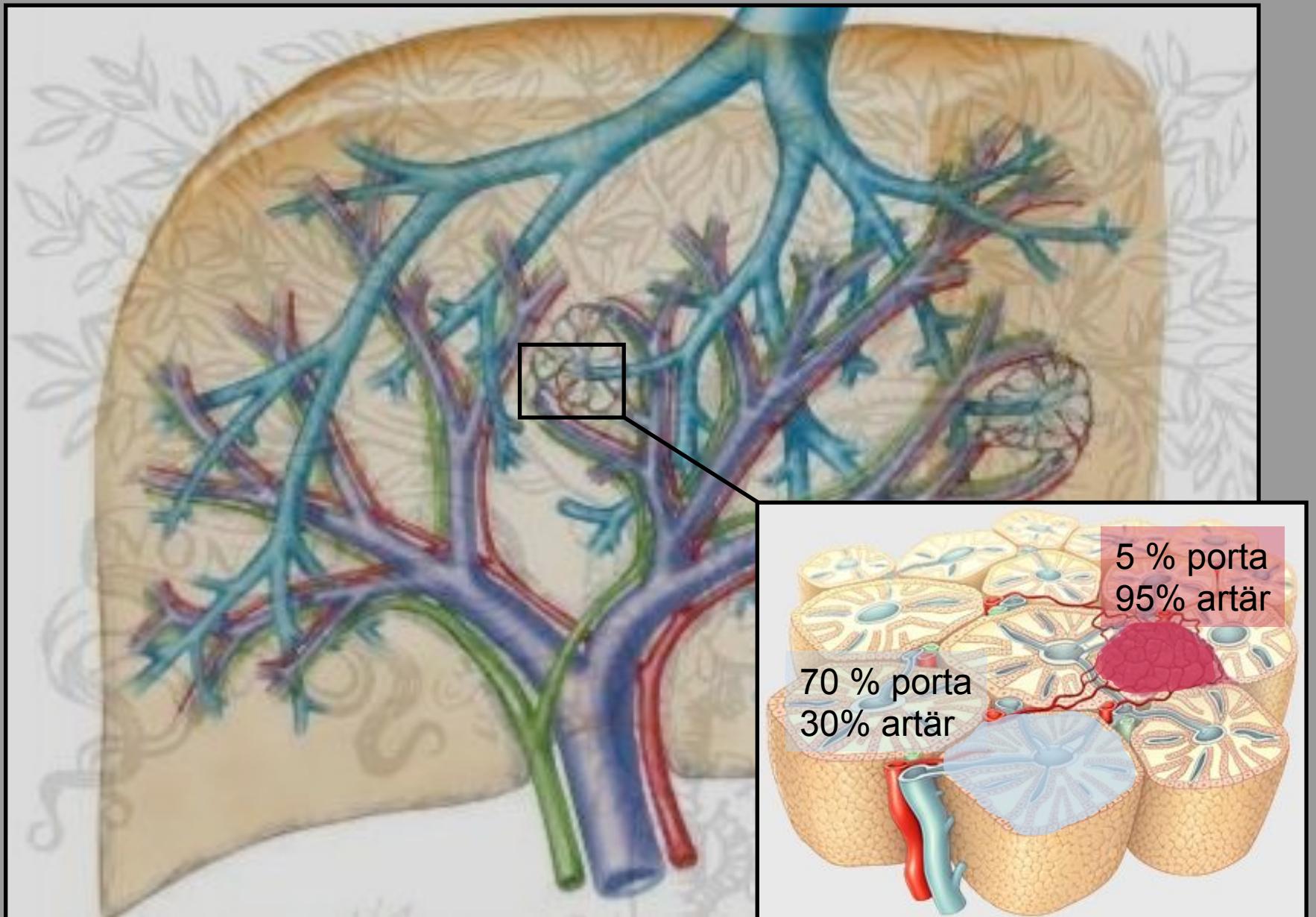


UPPSALA
UNIVERSITET

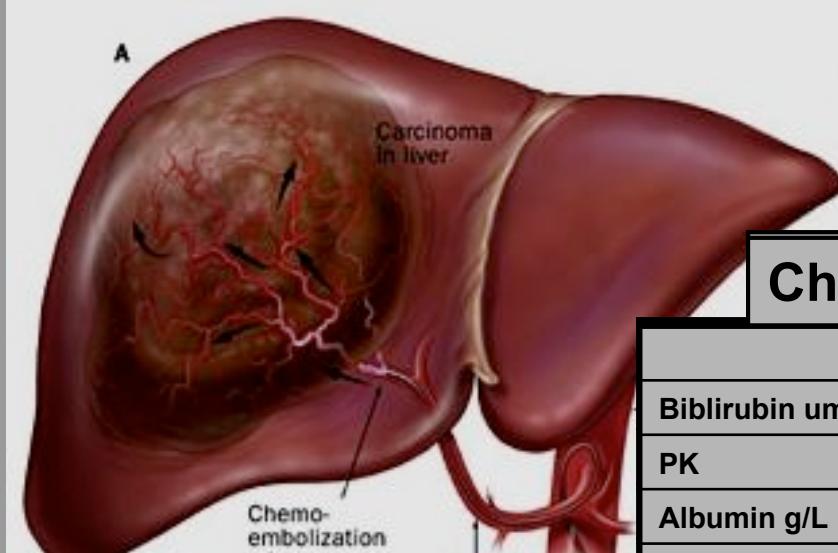
Transarteriell Onkologisk Leverbehandling



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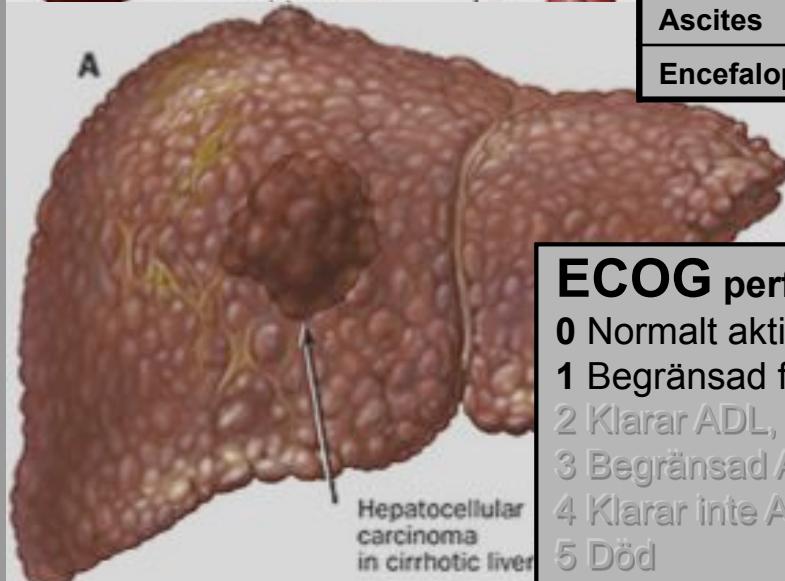
Child Pugh Score

	1 poäng	2 poäng	3 poäng
Bilirubin umol/L	<35	35-51	>51
PK	<1.7	1.7-2.2	>2.2
Albumin g/L	>35	28-35	<28
Ascites	Ingen	Lätt-behandlad	Måttlig/Svår
Encefalopatigrad	Ingen	1-2	3-4

Child A: 5-6 poäng

Child B: 7-9 poäng

Child C: >10 poäng



ECOG performance status:

0 Normalt aktiv o kapabel

1 Begränsad fysisk aktivitet

2 Klarar ADL, uppe 50% av vaken tid

3 Begränsad ADL, säng- eller stolsbunden mer än 50% av vaken tid

4 Klarar inte ADL, helt säng- eller stolsbunden

5 Död

Transarteriell Onkologisk Leverbehandling



Transarteriell Onkologisk Leverbehandling

- Embolisering

TAE (Transarterial Embolization)

Bland embolization



Transarteriell Onkologisk Leverbehandling

- Embolisering

TAE (Transarterial Embolization)

Bland embolization



- Kemoembolisering

TACE (Transarterial ChemoEmbolization)

TAI (Transarterial Infusion)



Transarteriell Onkologisk Leverbehandling

- Embolisering

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Bland embolization



- Kemoembolisering

TACE (Transarterial ChemoEmbolization)

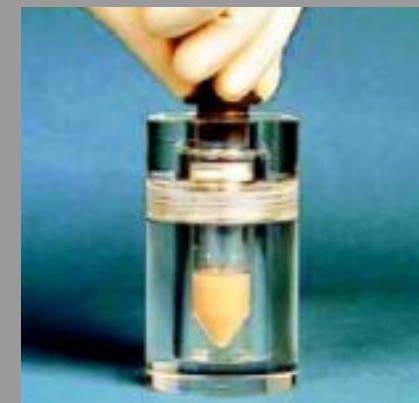
TAI (Transarterial Infusion)



- Radioembolisering

SIRT (Selective Internal RadioTherapy)

TARE (Transarterial RadioEmbolization)



Transarteriell Onkologisk Leverbehandling

- Embolisering

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Bland embolization



- Kemoembolisering

TACE (Transarterial ChemoEmbolization)

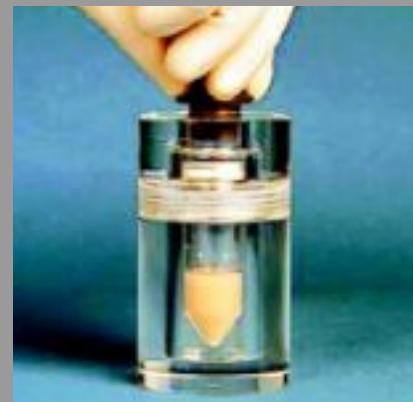
TAI (Transarterial Infusion)

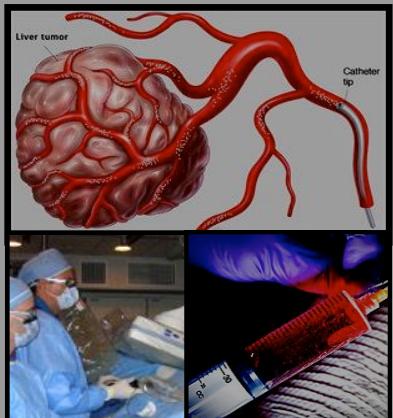


- Radioembolisering

SIRT (Selective Internal RadioTherapy)

TARE (Transarterial RadioEmbolization)

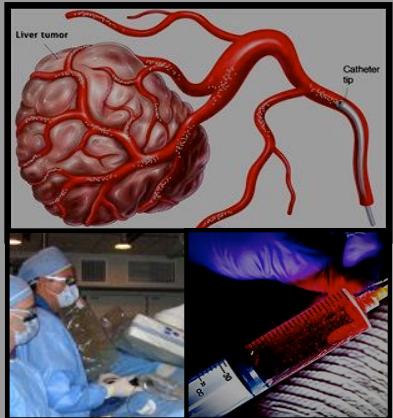




Kemoembolisering

palliativ



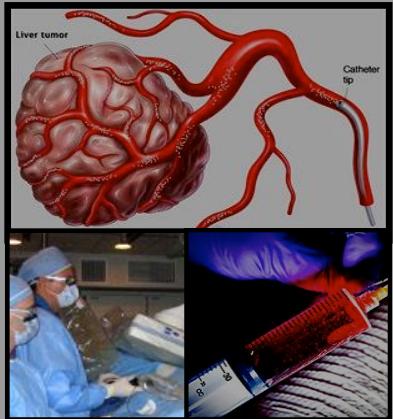


Kemoembolisering

'palliativ'

- Tumör: Inoperabel HCC > 4cm





Kemoembolisering

palliativ

- Tumör: Inoperabel HCC > 4cm
- Cytostatikum:
Doxorubicin
Cisplatin



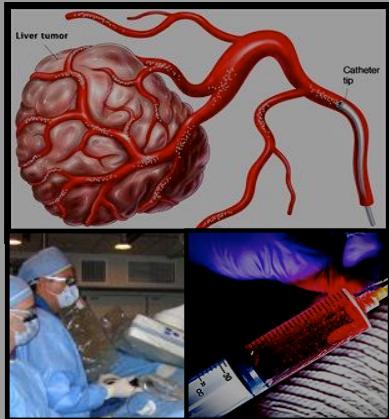


Kemoembolisering

palliativ

- Tumör: Inoperabel HCC > 4cm
- Cytostatikum:
 - Doxorubicin
 - Cisplatin
- Administration:
 - Emulsion med lipiodol
 - Drug Eluting Beads



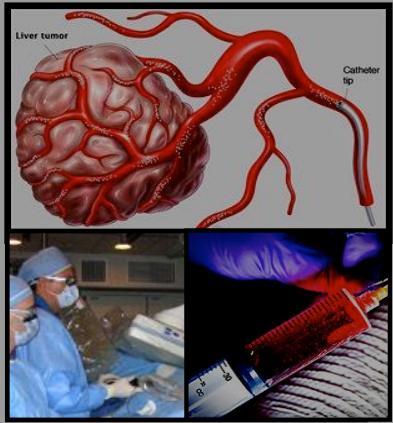


Kemoembolisering

palliativ

- Tumör: Inoperabel HCC > 4cm
- Cytostatikum:
 - Doxorubicin
 - Cisplatin
- Administration:
 - Emulsion med lipiodol
 - Drug Eluting Beads
- Teknik:
 - lob/segment/feeder
 - dos
 - intervall





Kemoembolisering

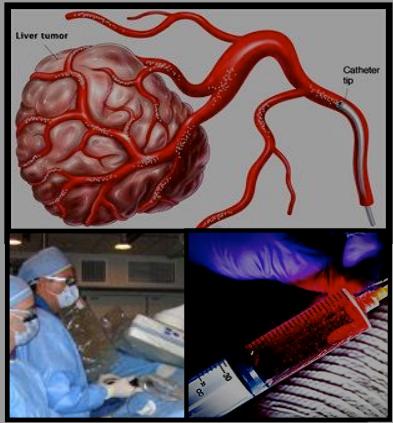
96 interventionella radiologiavd i Tyskland

42% cTACE (lipiodol/doxorubicin)

43.5 % DEB-TACE (doxorubicinbeads)



Niessen et al. Transarterial Chemoembolization – Status Quo in Germany. Fortschr Röntgenstr 2013



Kemoembolising

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99% vill delta i studie av ett standardiserat protokoll



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87 interventionella radiologiavd i Italien

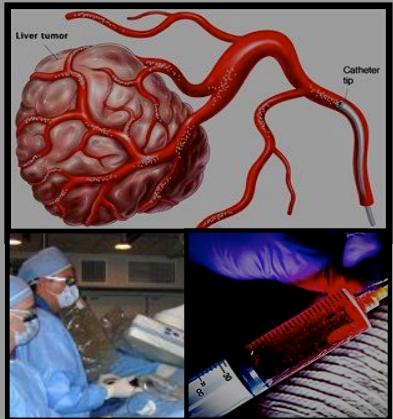
32% cTACE (lipiodol/doxorubicin)

52 %DEB-TACE (doxorubicinbeads)

68% kombinationsterapi

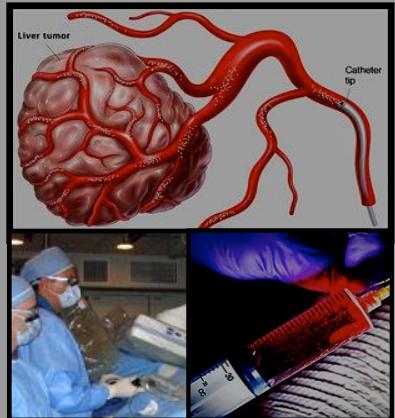
Bargellini et al. Trends in Utilization of Transarterial Treatments for Hepatocellular Carcinoma: Results of a Survey by the Italian Society of Interventional Radiology. Cardiovasc Intervent Radiol 2013





Kemoembolisering

cTACE vs DEB-TACE

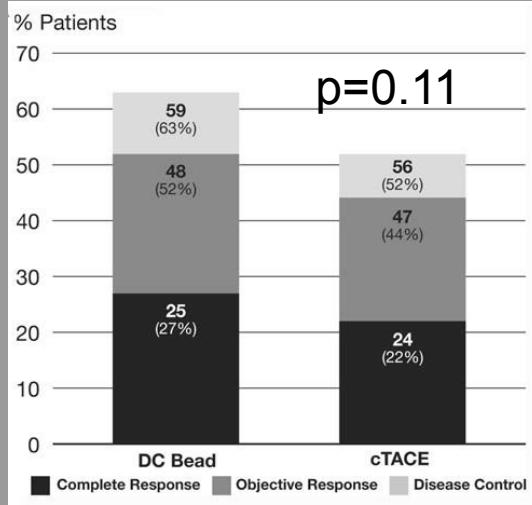


Kemoembolising

cTACE vs DEB-TACE

- Objective Response (=CR+PR) rate 51.6% DEB-TACE vs 43.5% cTACE ($p=0.11$)

Lammer 2010 Cardiovasc Intervent Radiol

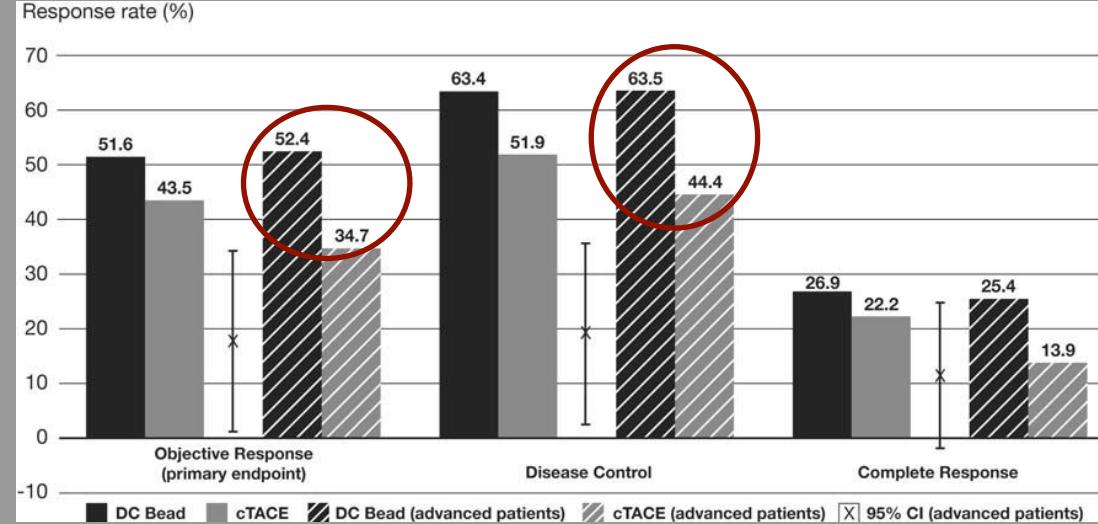
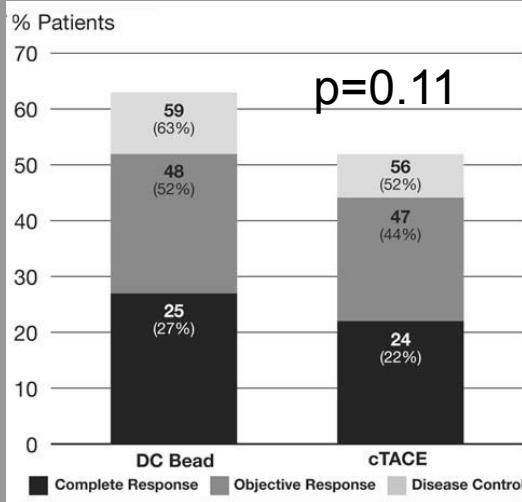




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- Objective Response (=CR+PR) rate 51.6% DEB-TACE vs 43.5% cTACE ($p=0.11$)
av de 67% som hade mer avancerad sjd (Child B, ECOG 1, bilobär sjd el återfall)
var OR och disease control högre för de beh m beads ($p=0.038$ resp $p=0.026$)
Lammer 2010 Cardiovasc Intervent Radiol

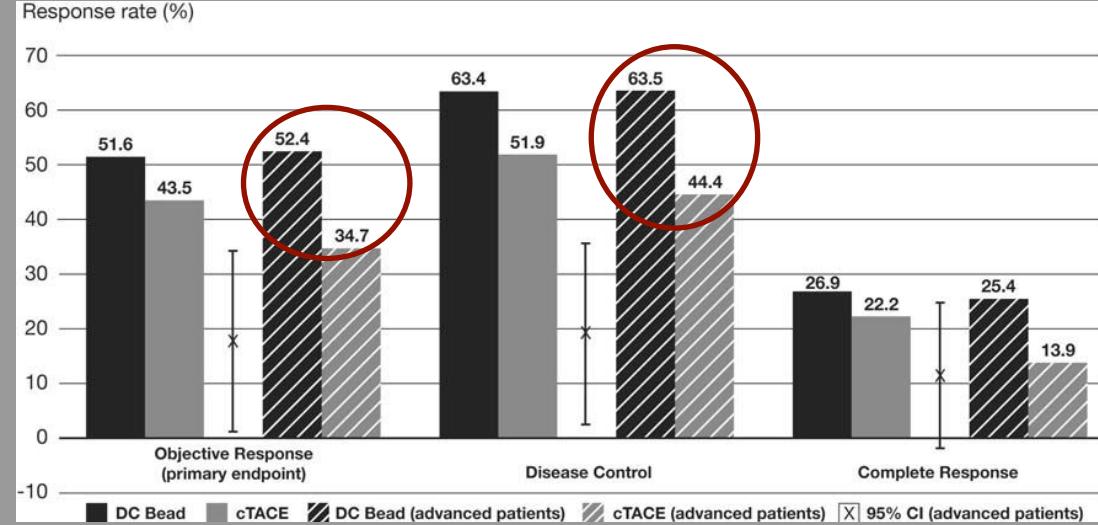
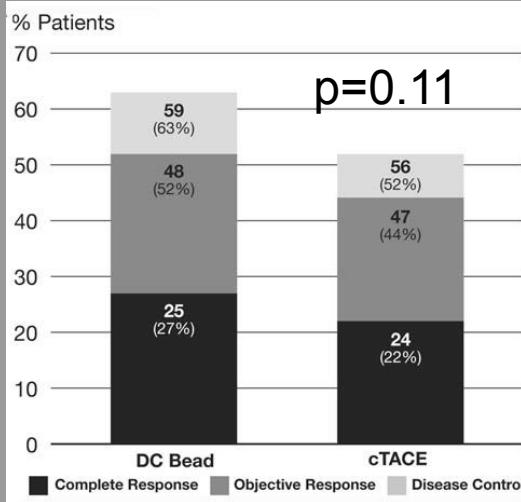




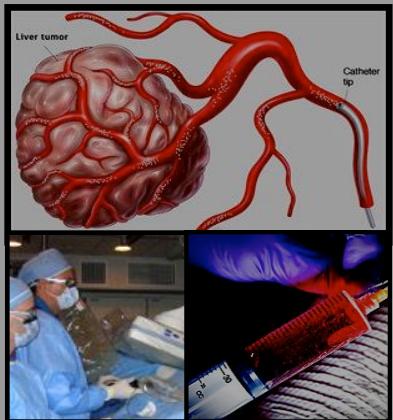
Kemoembolisinger

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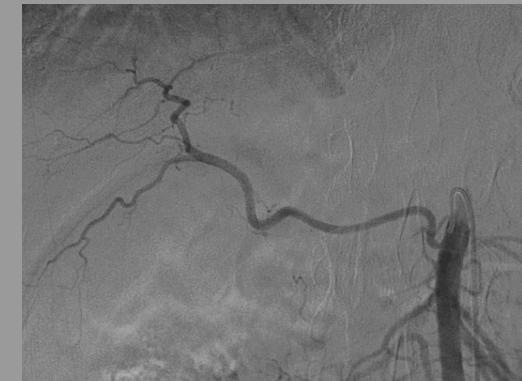
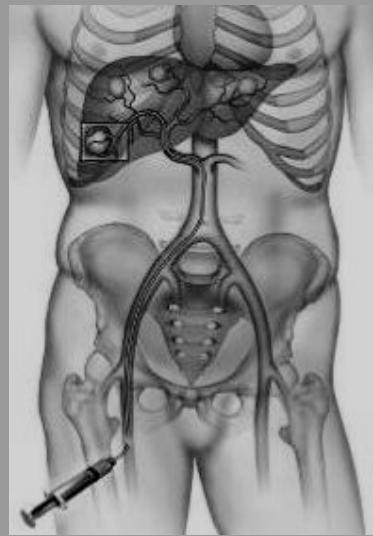
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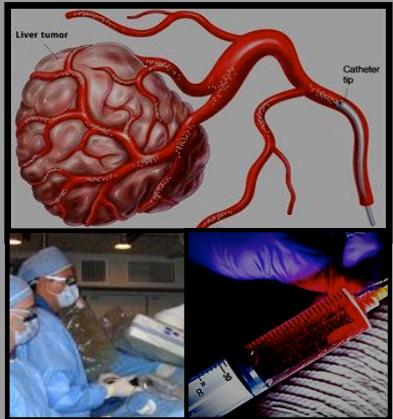


- DEB-TACE ökad överlevnad (651+/-76 dgr) jmf cTACE m cisplatin (414+/-43 dgr)
Wiggermann 2011 Med Sci Monit



Kemoembolising: procedur

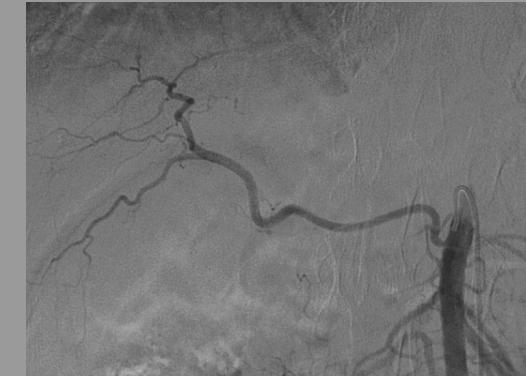
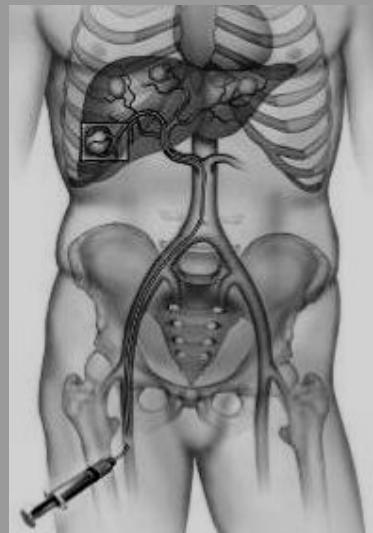


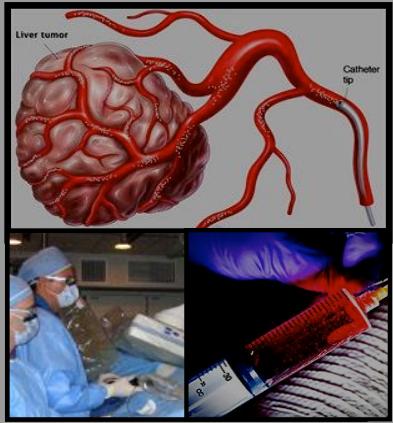


Kemoembolisering: procedur

1. Kartläggning:

- Punktion AFC
- Kärlanatomin:
 - trucus celiakus
 - SMA
 - risk för spill
- Detektera AV-fistlar
- Kontrollera att porta är öppen





Kemoembolisering: procedur

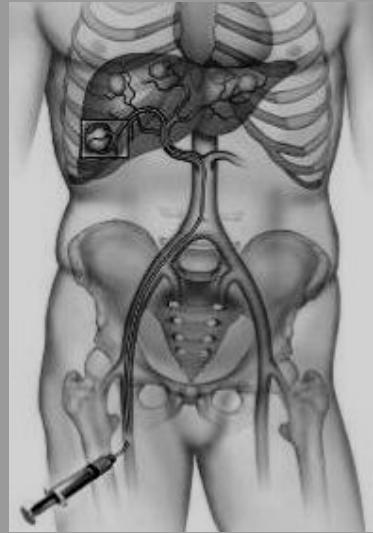
2. Katetrising:

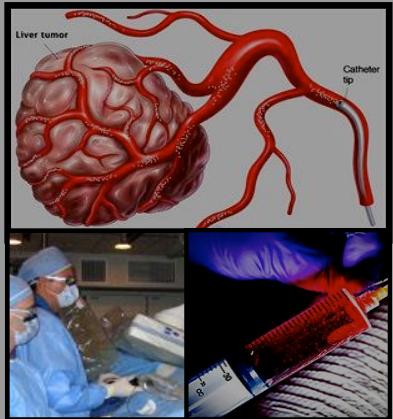
- Katetrising av aktuellt kärl
hela loben
specifika feeders

- Materialval

.035
.018

- Undvika spasm

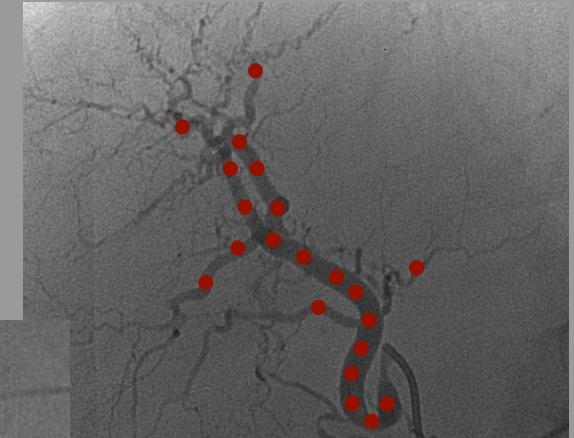
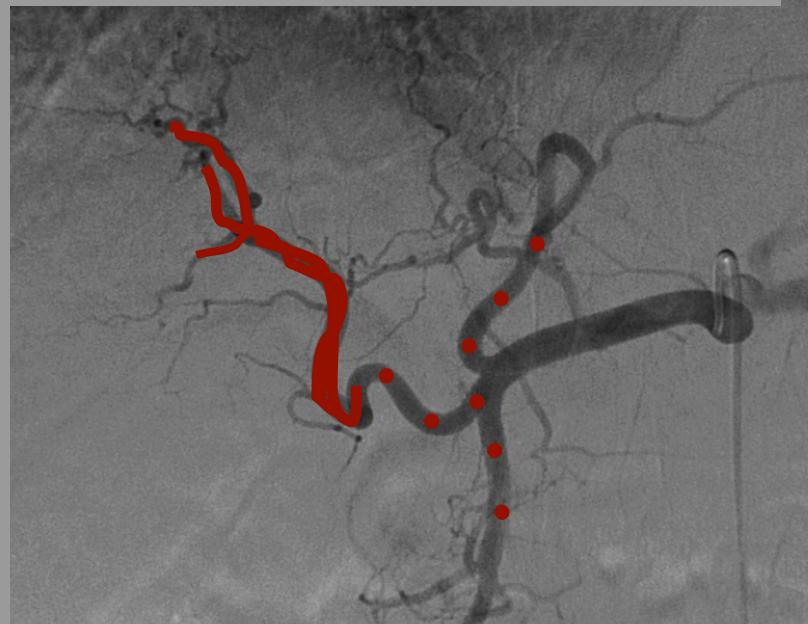
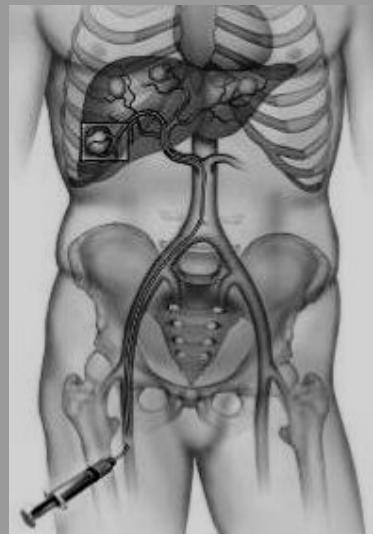


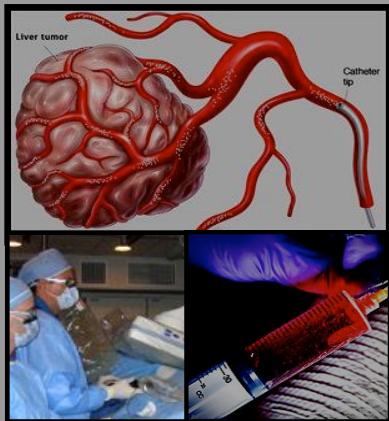


Kemoembolisering: procedur

3. Behandling:

- Infusion/embolisering under genomlysning
- Till stas
- Stopp innan backflöde

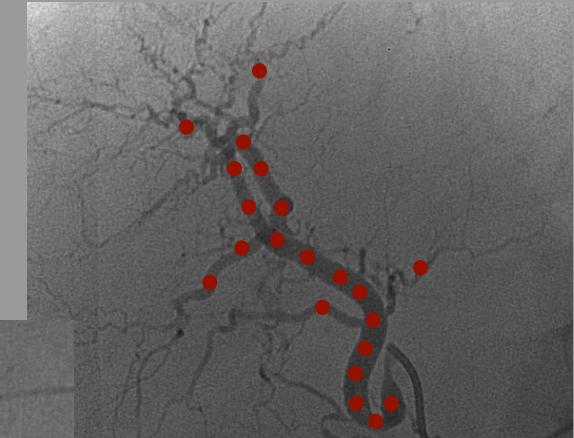
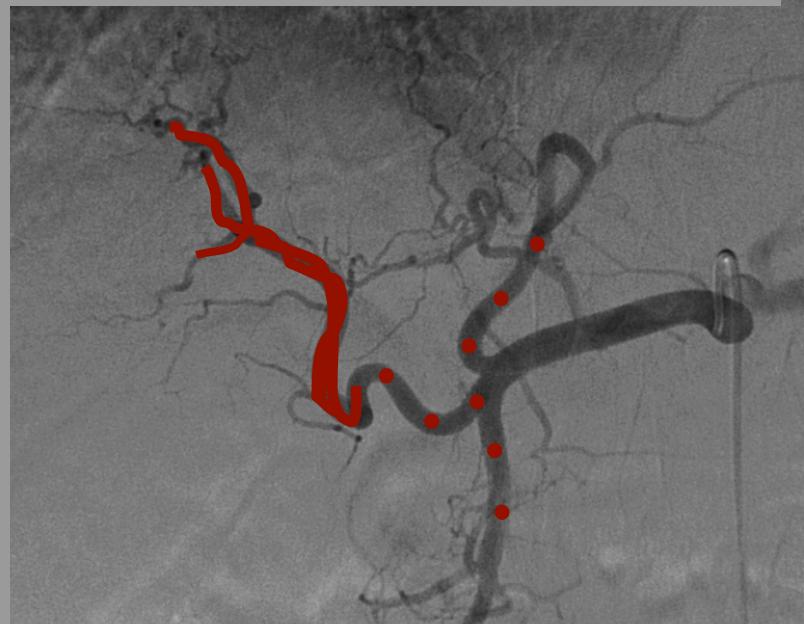
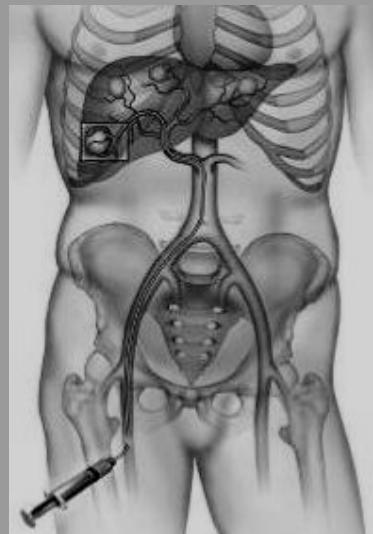




Kemoembolisering: procedur

3. Behandling:

- Infusion/embolisering under genomlysning
- Till stas
- Stopp innan backflöde



3. Avslutning:

- Bild
- Hemostas

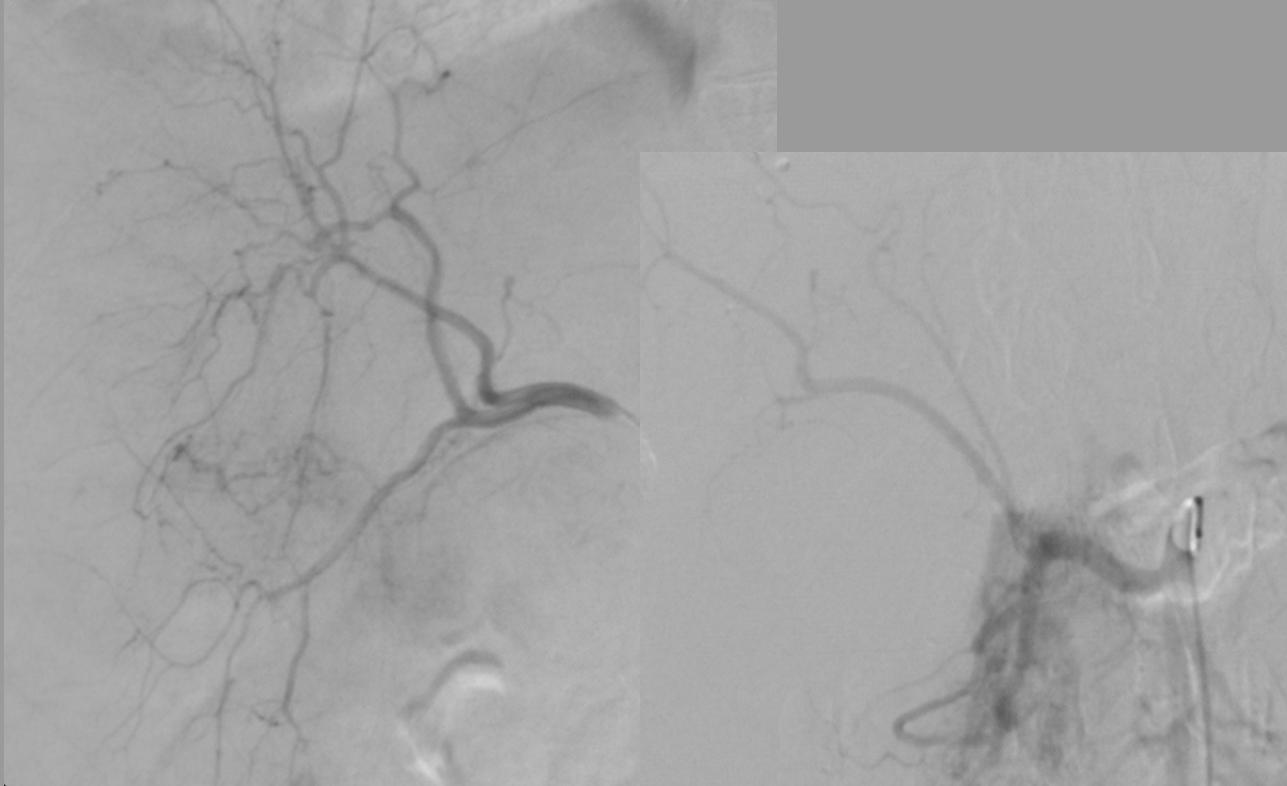
Kemoembolising Adriamycin-Lipiodol

53-årig man
kronisk hepatit C
levercirros
HCC



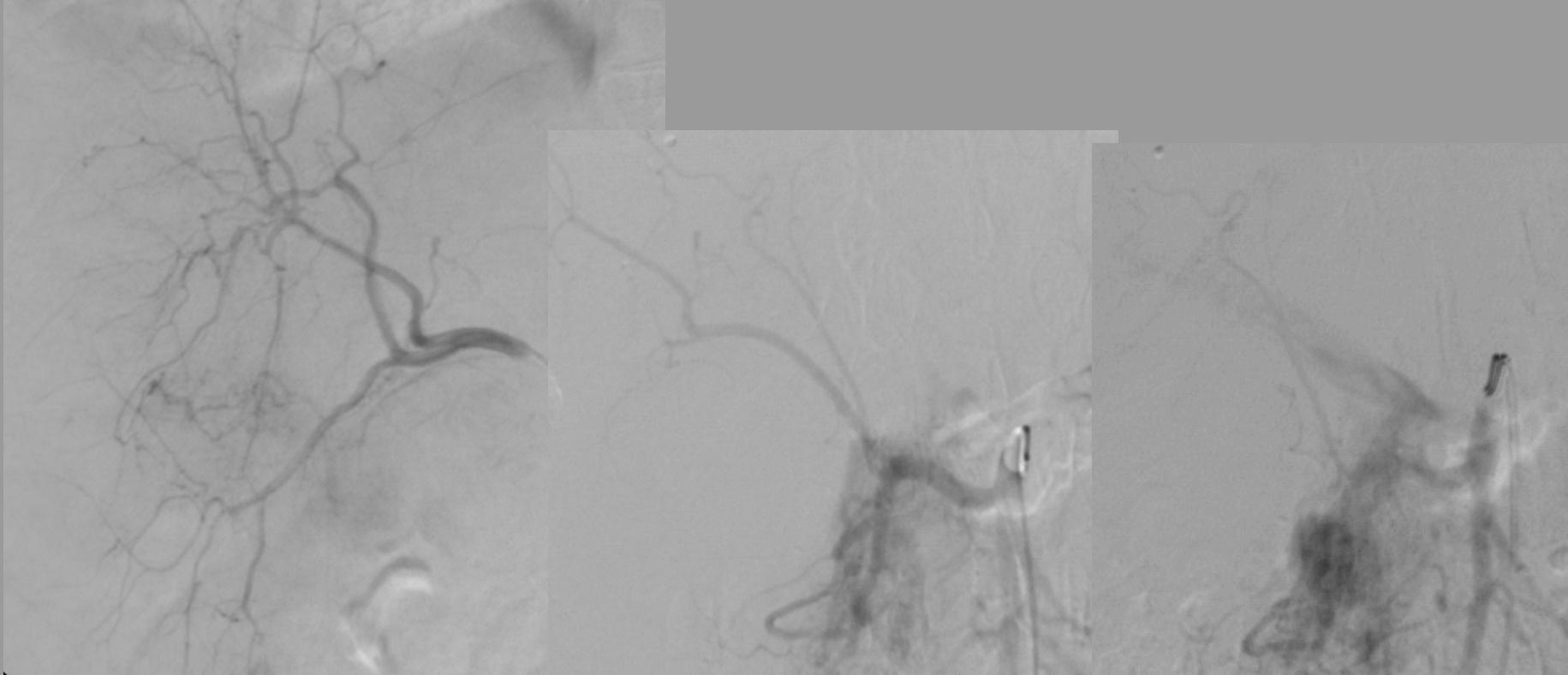
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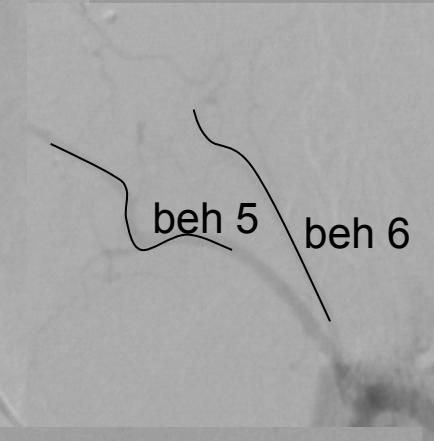
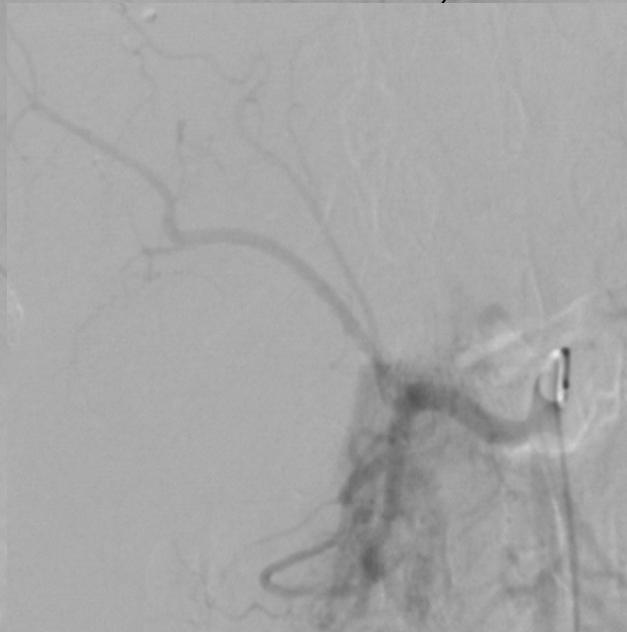
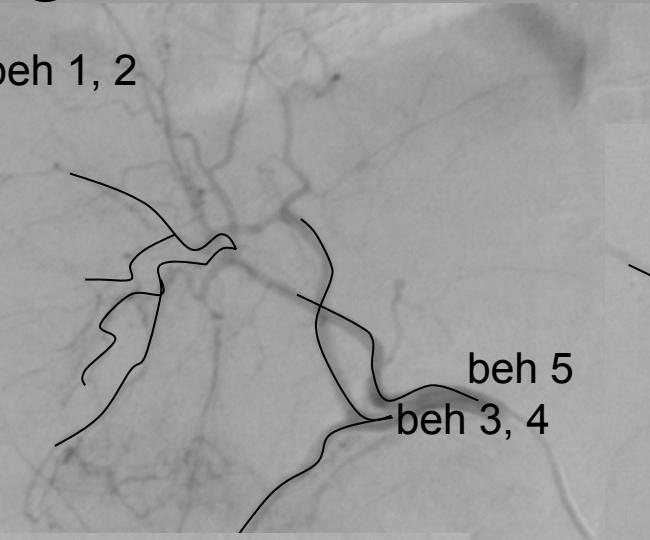


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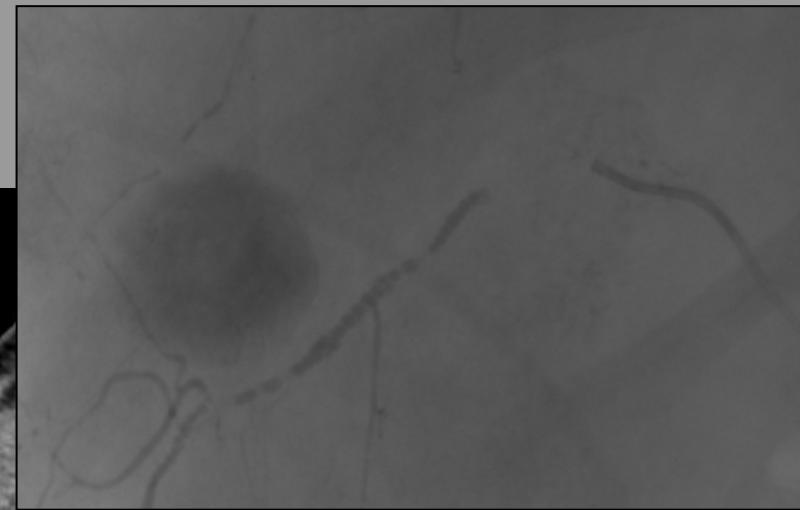
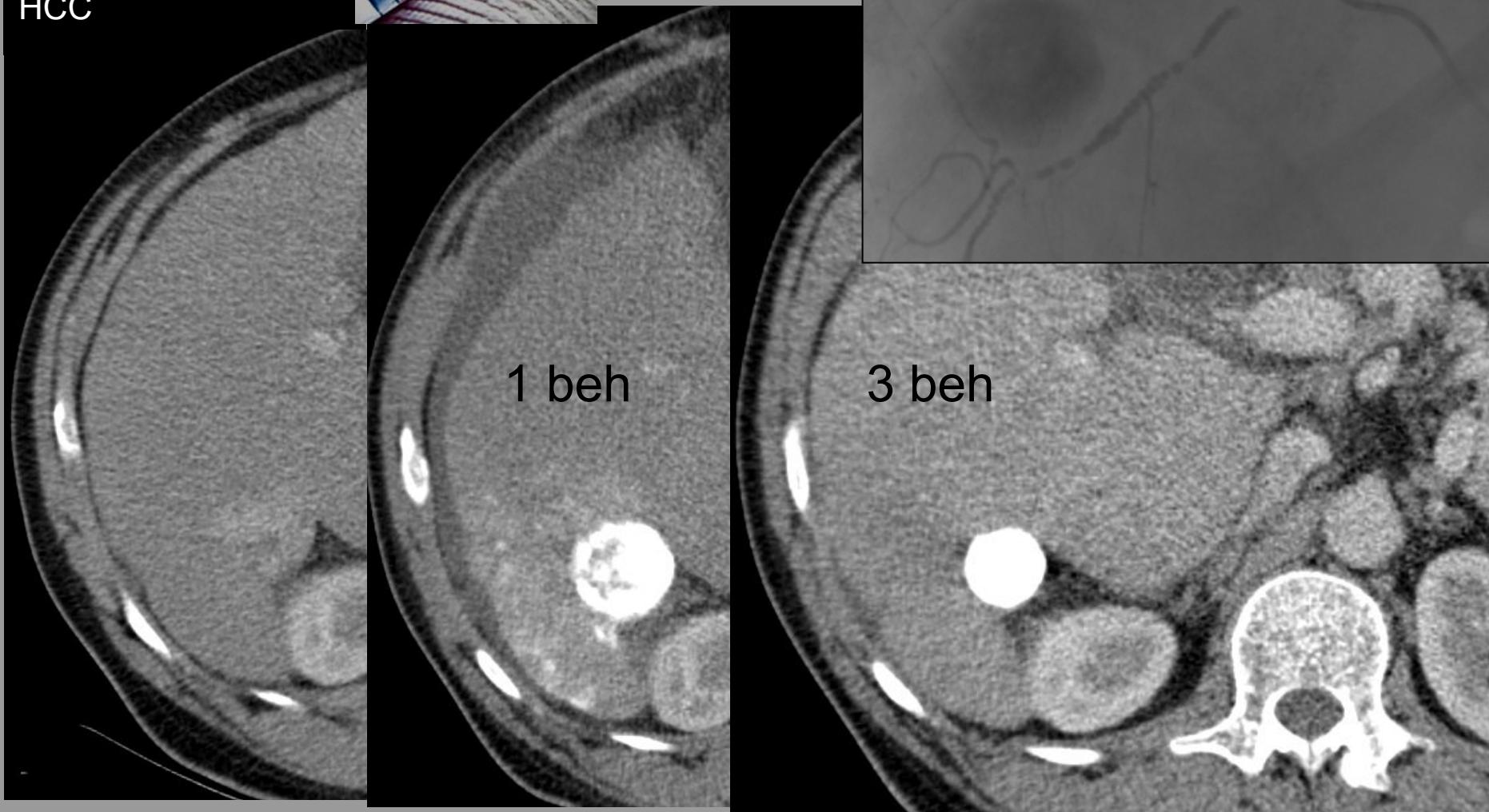


beh 1, 2



Kemoembolising Adriamycin-Lipiodol

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levercirros
HCC





Kemoembolisering

•Portavenstrombos

(meta-analys 8 RCT, 1601 pat):

- förb 6 mån o 1 års överlevn
jmf konserv beh
- effektivt både segmentell o
huvudstam
- <2% akut leversvikt
- 0-6% död
- temporär leversvikit o post
emboliseringssyndrom
behandlingsbart



Xue et al. Transarterial chemoembolization for hepatocellular carcinoma with portal vein tumor thrombus: a meta-analysis. 2013 BMC Gastroenterology 33



Kemoembolisering

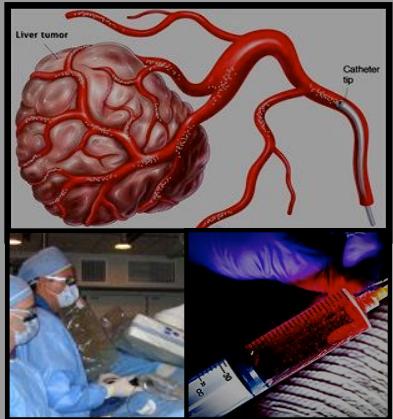
- TIPS

10 TIPS, 23 ej TIPS

- TACE mindre effektivt (CR 30 vs 74%; överlevnad bättre utan TIPS p=0.01)
- Levertransplantation lika vanligt
Time to tumor progression samma



Kuo et al. Efficacy of TACE in TIPS Patients: Comparison of Treatment Response to Chemoembolization for HCC...2013 Cardiovasc Intervent Radiol



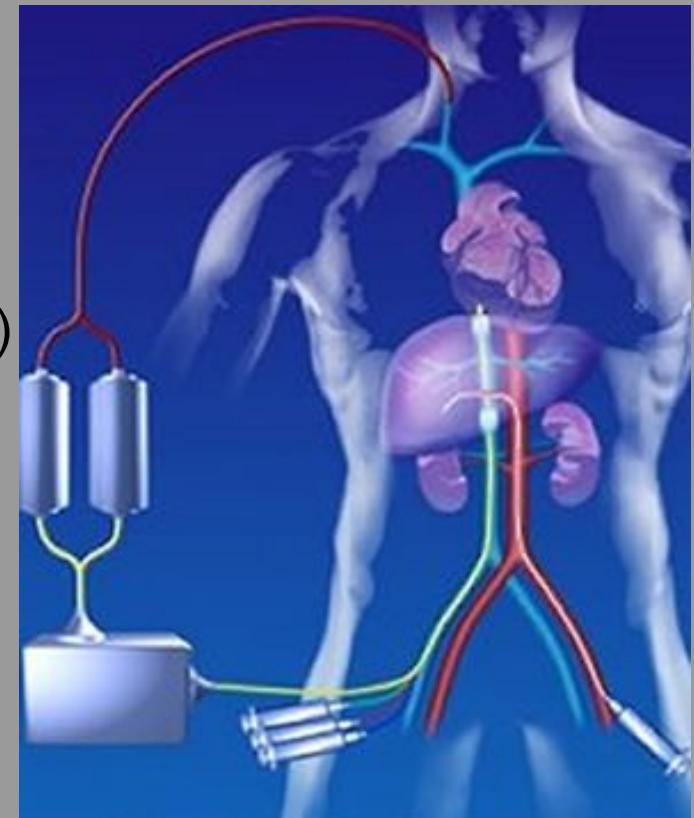
Andra kemoemboliseringar

- Irinotecan beads
 - colorectalmet (mCRC)



Andra kemoembolisingar

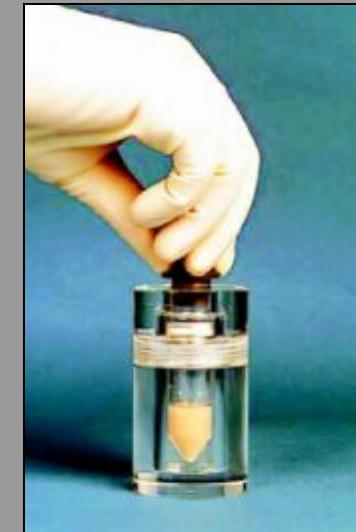
- Irinotecan beads
 - colorectalmet (mCRC)
- PHP (percutaneous hepatic perfusion)
melphalan (Delcath)
 - HCC
 - mNET
 - mAdenocarcinom
 - mMelanom

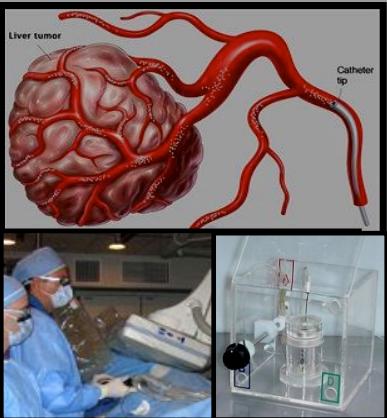




Radioembolising

- Tumör:
 - Primära inoperabla: HCC
 - Metastaser inoperabla:
 - Neuroendokrin
 - Colorectal
 - Annat, ex bröst





Radioembolisering

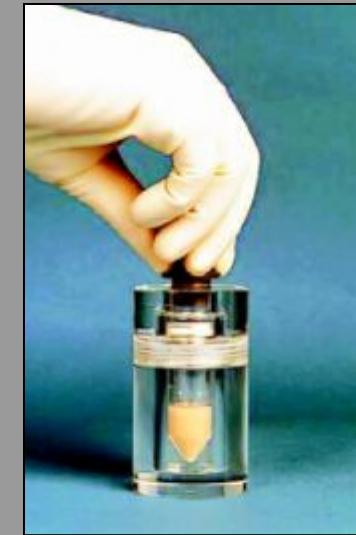
- Tumör:
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 - Metastaser inoperabla:
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 - Annat, ex bröst
- Yttrium-90:
 - Resinmicrosfärer (SIRTEX)
 - Glasmicrosfärer (Therasphere)

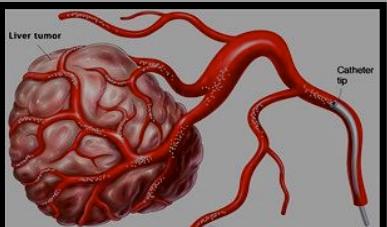




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 Neuroendokrin
 Colorectal
 Annat, ex bröst
- Yttrium-90:
 - Resinmicrosfärer (SIRTEX)
 - Glasmicrosfärer (Therasphere)
- Multidiciplinärt:
 - Kliniker
 - Radiolog
 - Nukleärmedicinare
 - Fysiker





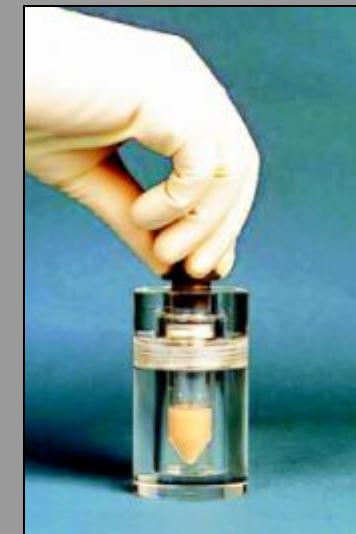
Radioembolisering

Effektivitet:

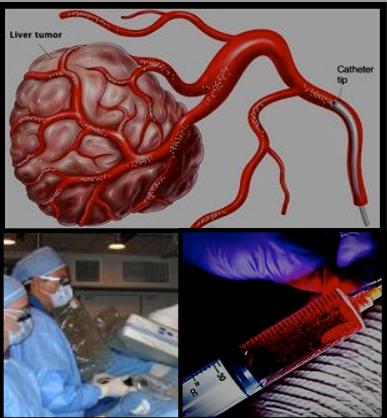
339 pat (224 mCRC, 115 andra met)

Låg grad komplikationer – mestadels medicinskt beh-bar (ex. ulcer)

Overall survival 11.9 mån, 12.7 mån



Bester et al. Radioembolisation with Yttrium-90 microspheres: An effective treatment modality for unresectable liver metastases. 2012 J Med Img Rad Onc



Radioembolisering

Toxicitet:

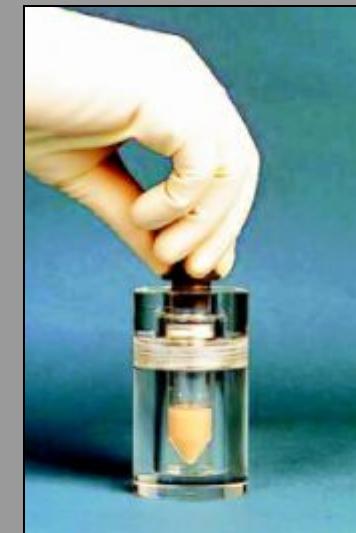
59 pat (30 mCRC, 6 mNET, 23 andra met)

Klinisk toxicitet = postemboliseringssyndrom

38% lab-mässig toxicitet

Låg risk för svåra komplikationer

Smits et al. Clinical and Laboratory Toxicity after Intra-Arterial Radioembolization with ^{90}Y -microspheres for Unresectable Liver Metastases. 2013 PLoS One





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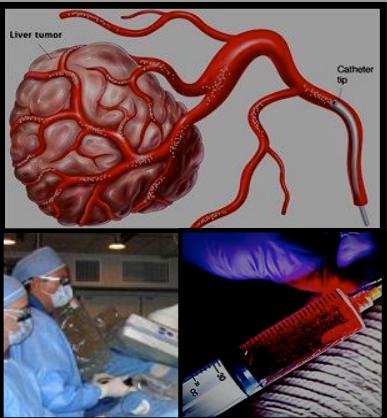
Smits et al. Clinical and Laboratory Toxicity after Intra-Arterial Radioembolization with ^{90}Y -microspheres for Unresectable Liver Metastases. 2013 PLoS One

31 pat m tidigare extern strålbeh
stråldos $>30\text{Gy}$ = levertoxicitet

RadioEmbolization Induces Liver Disease (REILD) – 2 döda (91.8 Gy; 149 Gy)

Lam et al. Safety of ^{90}Y Radioembolization in Patients Who Have Undergone Previous External Beam Radiation Therapy. 2013 Clin Invest Gastointest Cancer





Radioembolising

Pågående studier:

SIRFLOX



FOXFIRE

SIR-step



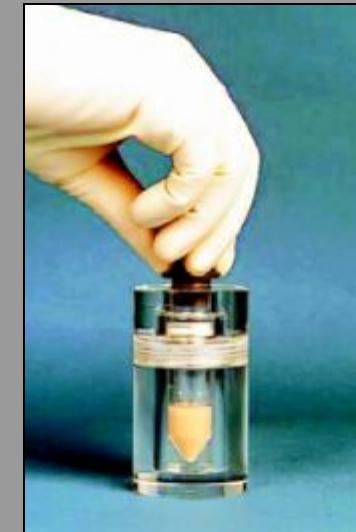
SIR-KRAS



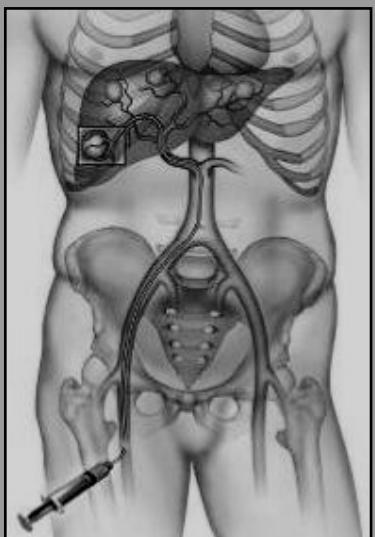
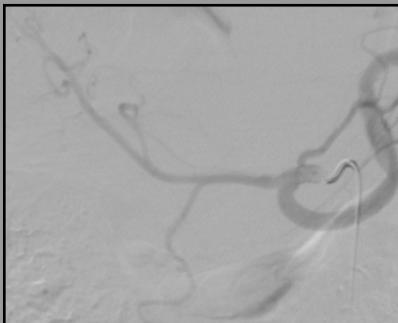
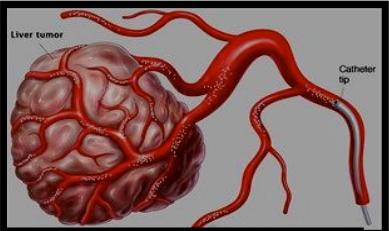
Radioembolising

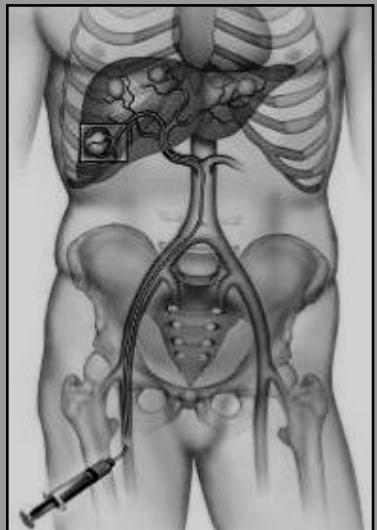
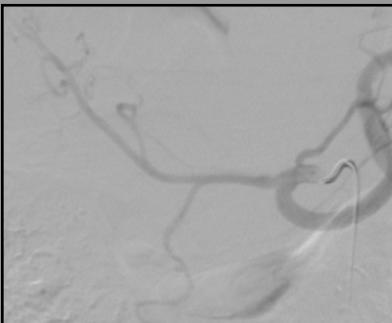
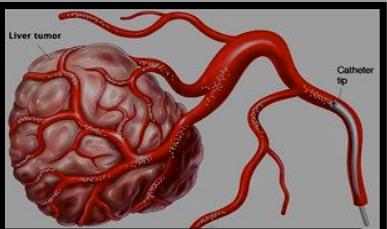
Kontraindikationer:

- Dålig leverfunktion
- Stor tumörbörd
- Portatrombos
- Tidigare strålbehandling
- Tidigare beh som påverkar angiogenes
- Extrahepatisk tumörspridning



Radioembolising: procedur





Radioembolising: procedur

1. Diagnostik (Röntgen):

- Kartläggning

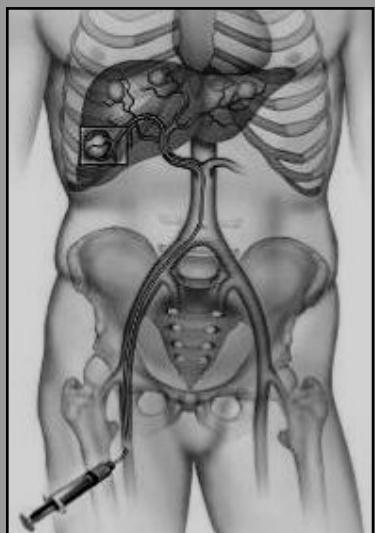
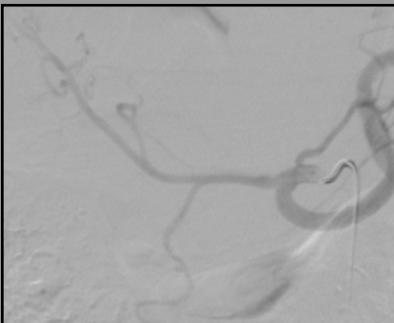
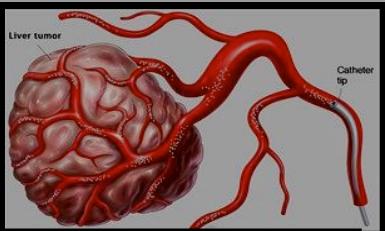
Punktion AFC

Kärlanatomin: trucus coeliakus, SMA

Risk för spill

Detektera AV-fistlar

Kontrollera att porta är öppen



Radioembolising: procedur

1. Diagnostik (Röntgen):

- Kartläggning

- Punktion AFC

- Kärlanatomin: trucus coeliakus, SMA

- Risk för spill

- Detektera AV-fistlar

- Kontrollera att porta är öppen

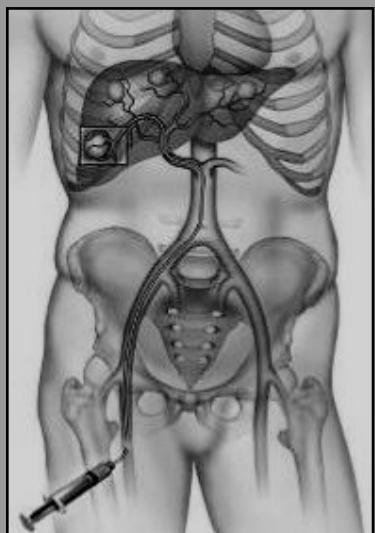
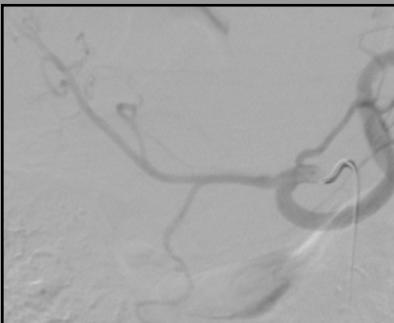
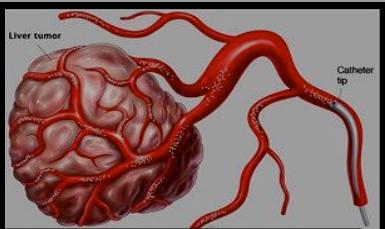
- Katetrering

- En lob i taget

- Materialval .018

- Evt coila GDA, a gastrica sin, a cystica

- Undvika spasm



Radioembolising: procedur

1. Diagnostik (Röntgen):

- Kartläggning

- Punktion AFC

- Kärlanatomin: trucus coeliakus, SMA

- Risk för spill

- Dektera AV-fistlar

- Kontrollera att porta är öppen

- Katetrering

- En lob i taget

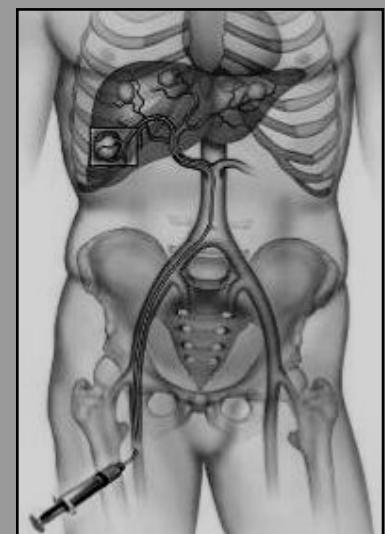
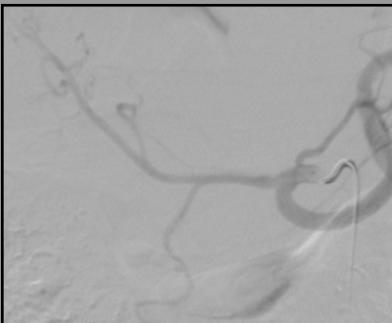
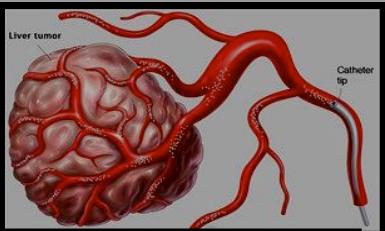
- Materialval .018

- Evt coila GDA, a gastrica sin, a cystica

- Undvika spasm

- Infusion

- Technetium (LyoMAA)



Radioembolising: procedur

1. Diagnostik (Röntgen):

- Kartläggning

Punktion AFC

Kärlanatomin: trucus coeliakus, SMA

Risk för spill

Detektera AV-fistlar

Kontrollera att porta är öppen

- Katetrering

En lob i taget

Materialval .018

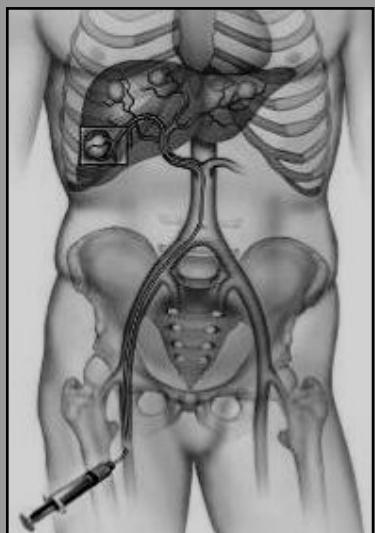
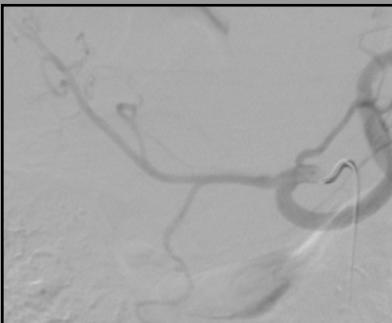
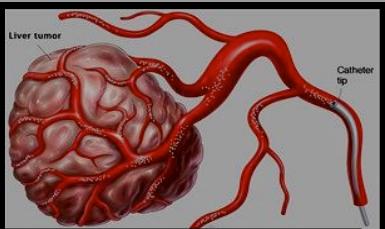
Ev coila GDA, a gastrica sin, a cystica

Undvika spasm

- Infusion
- Avsluta

Technetium (LyoMAA)

Hemostas



Radioembolisering: procedur

1. Diagnostik (Röntgen):

- Kartläggning

Punktion AFC

Kärlanatomin: trucus coeliakus, SMA

Risk för spill

Detektera AV-fistlar

Kontrollera att porta är öppen

- Katetrising

En lob i taget

Materialval .018

Ev coila GDA, a gastrica sin, a cystica

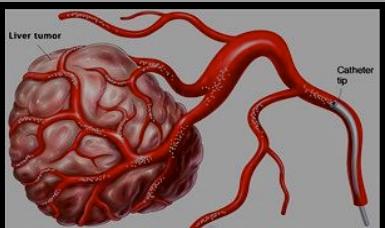
Undvika spasm

- Infusion
- Avsluta
- SPECT

Technetium (LyoMAA)

Hemostas

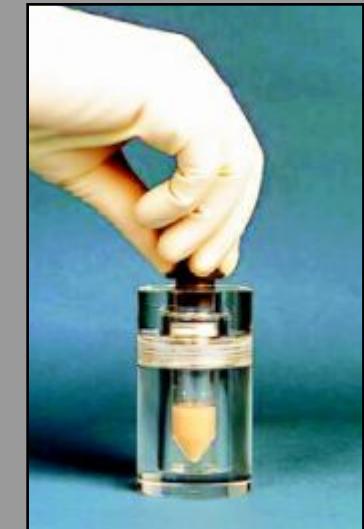
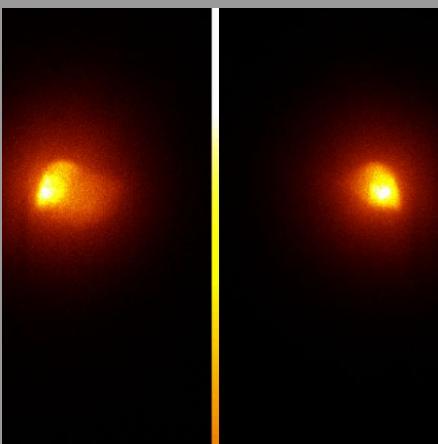
Bedöma fördelning, shuntar

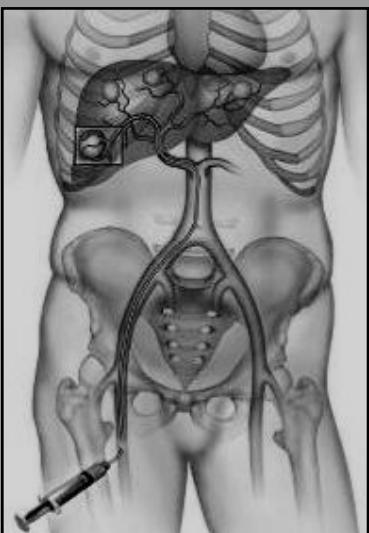
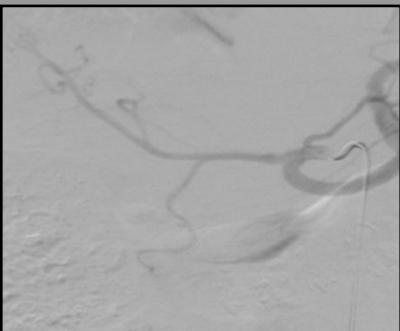
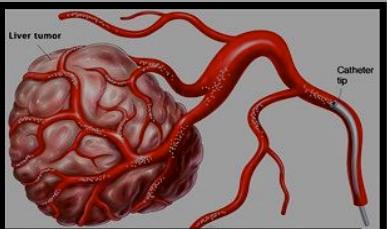


Radioembolising: procedur

2. Planering (Nuklearmedicin):

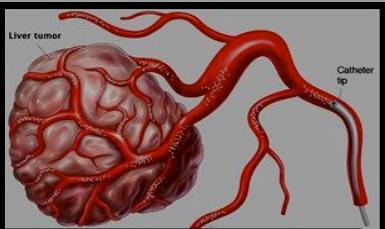
- Bedömning av lungshunt mm (SPECT)
- Beräkning av dos
- Beställning av preparat





Radioembolising: procedur

3. Behandling (Röntgen):



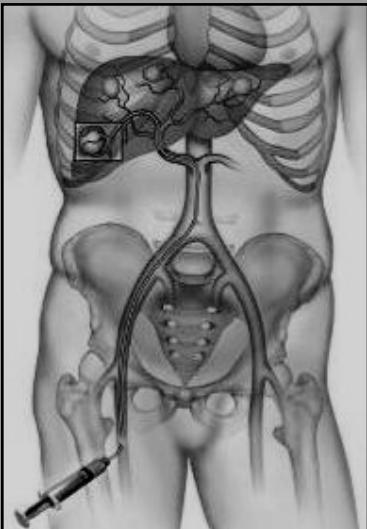
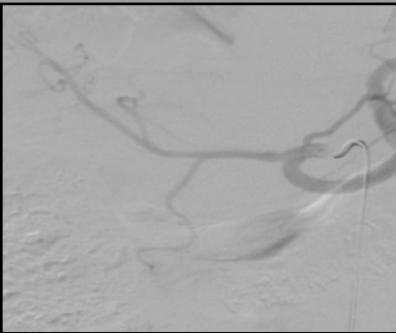
Radioembolising: procedur

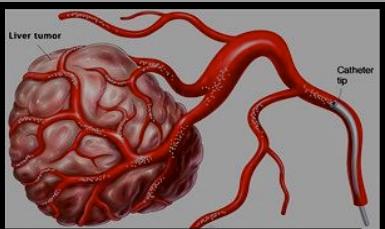
3. Behandling (Röntgen):

- Kartläggning

Punktion AFC

Kontrollera att porta är öppen





Radioembolising: procedur

3. Behandling (Röntgen):

- Kartläggning

Punktion AFC

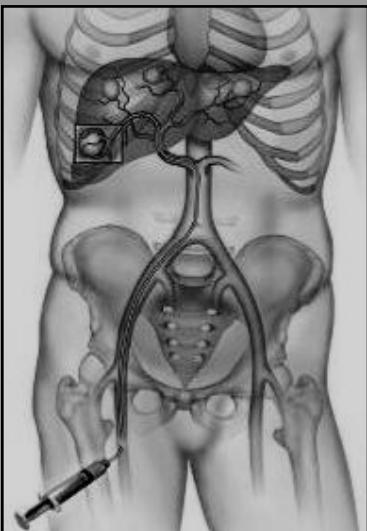
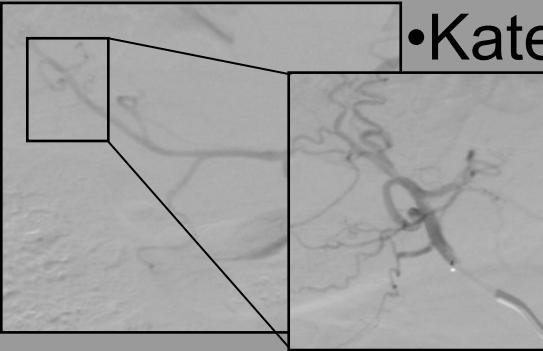
Kontrollera att porta är öppen

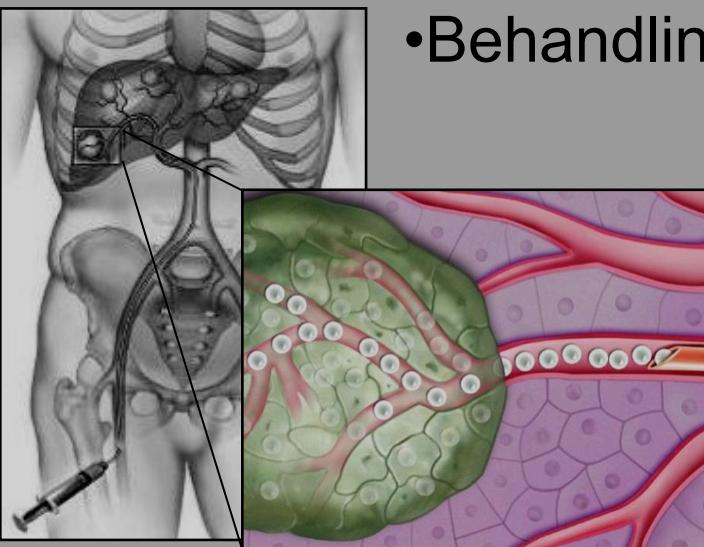
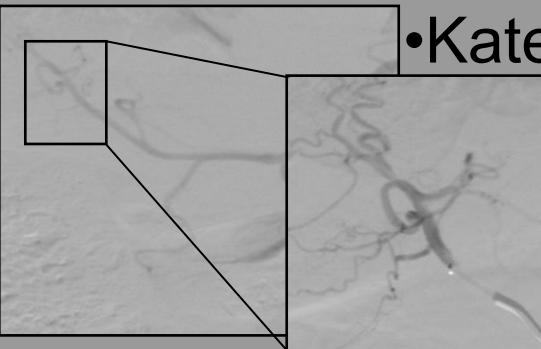
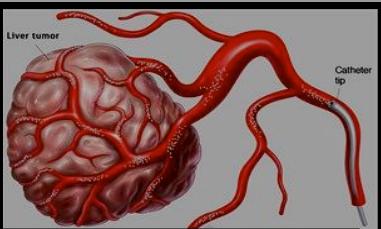
- Katetrering

Identiskt emboliseringsläge

Materialval .018

Undvika spasm





Radioembolising: procedur

3. Behandling (Röntgen):

- Kartläggning

Punktion AFC

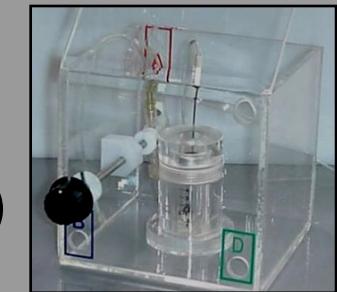
Kontrollera att porta är öppen

- Katetrering

Identiskt emboliseringsläge

Materialval .018

Undvika spasm

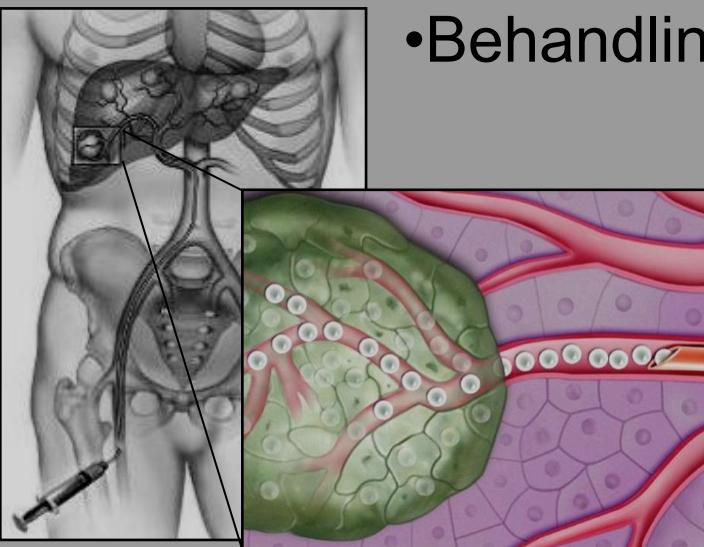
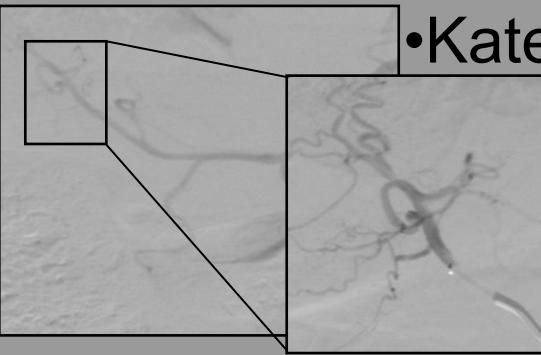
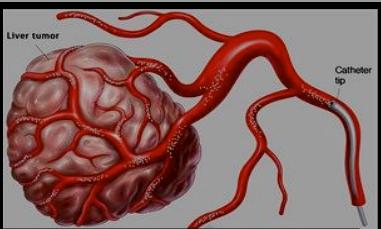


- Behandling

Yttrium-90-sfärer(Sirtex)

sterilt vatten

kontrollera flöde - Stopp innan backflöde



Radioembolising: procedur

3. Behandling (Röntgen):

- Kartläggning

Punktion AFC

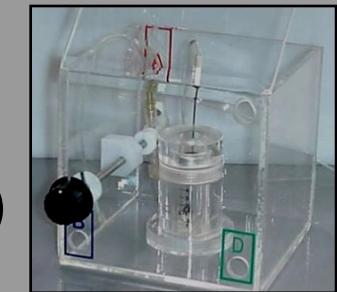
Kontrollera att porta är öppen

- Katetrering

Identiskt emboliseringsläge

Materialval .018

Undvika spasm



- Behandling

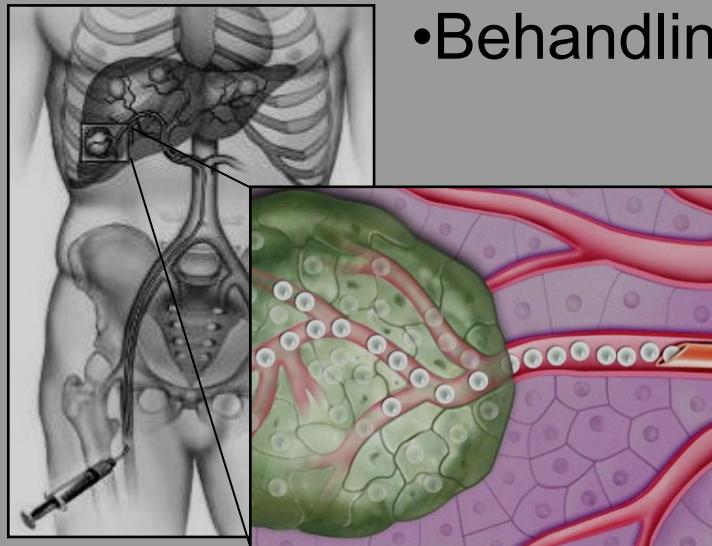
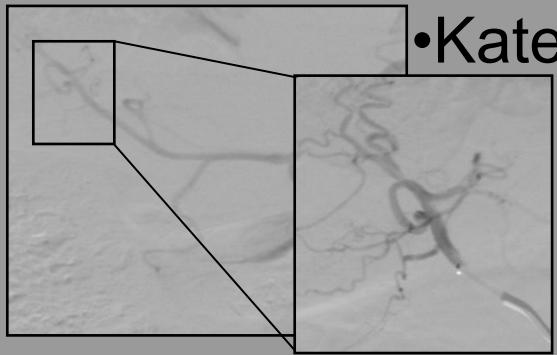
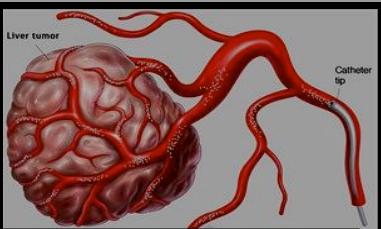
Yttrium-90-sfäärer(Sirtex)

sterilt vatten

kontrollera flöde - Stopp innan backflöde

- Avsluta

Hemostas



Radioembolising: procedur

3. Behandling (Röntgen):

- Kartläggning

Punktion AFC

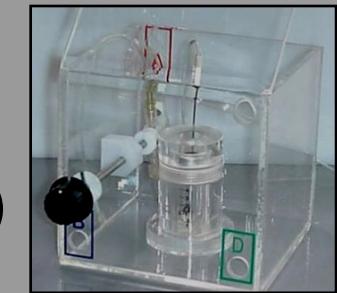
Kontrollera att porta är öppen

- Katetrering

Identiskt emboliseringsläge

Materialval .018

Undvika spasm



- Behandling

Yttrium-90-sfäärer(Sirtex)

sterilt vatten

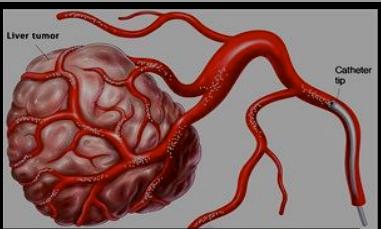
kontrollera flöde - Stopp innan backflöde

- Avsluta

Hemostas

- Fysiker

Mäta strålning



Radioembolising: procedur

3. Behandling (Röntgen):

- Kartläggning

Punktion AFC

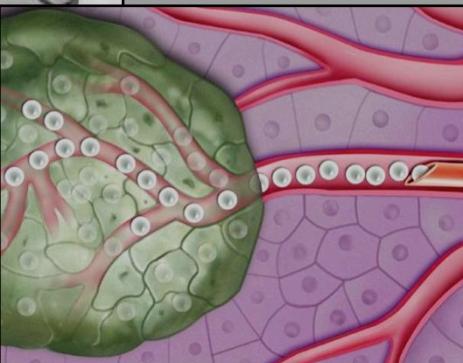
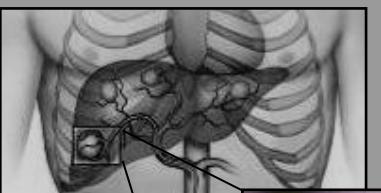
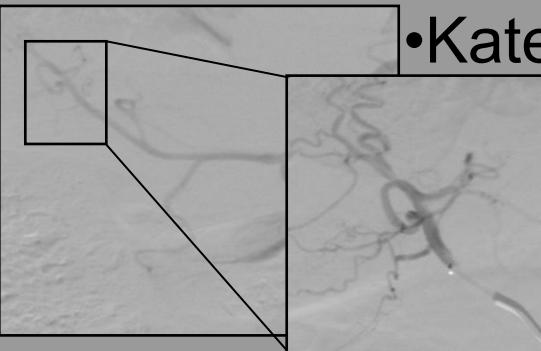
Kontrollera att porta är öppen

- Katetrering

Identiskt emboliseringsläge

Materialval .018

Undvika spasm

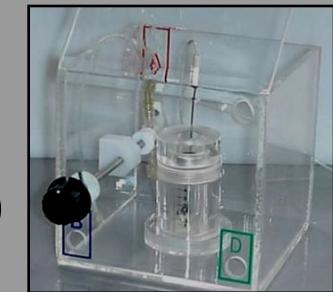


- Behandling

Yttrium-90-sfärer(Sirtex)

sterilt vatten

kontrollera flöde - Stopp innan backflöde

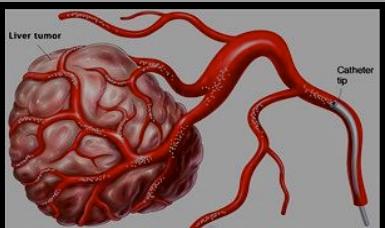


- Avsluta
- Fysiker
- SPECT

Hemostas

Mäta strålning

Bedöma fördelning

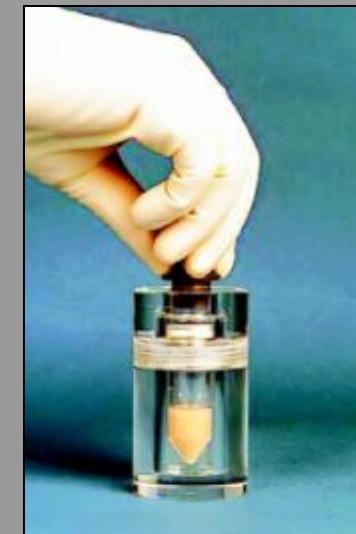


Radioembolising

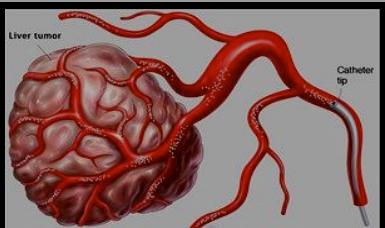
Värdera/bedöma:

- Distribution

SPECT/CT
PET/CT
PET/MR*



* Wissmeyer et al. ⁹⁰Y Time-of-flight PET/MR on a hybrid scanner following liver radioembolisation (SIRT). 2011 Eur J Nucl Med Mol Img



Radioembolising

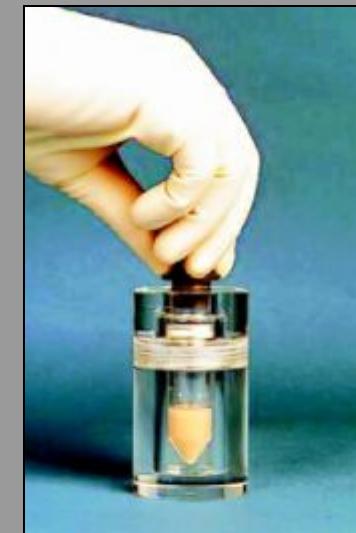
Värdera/bedöma:

- Distribution

SPECT/CT
PET/CT
PET/MR*

- Effekt

tumörstorlek/viabel tumör
PET



* Wissmeyer et al. ⁹⁰Y Time-of-flight PET/MR on a hybrid scanner following liver radioembolisation (SIRT). 2011 Eur J Nucl Med Mol Img

70-årig kvinna



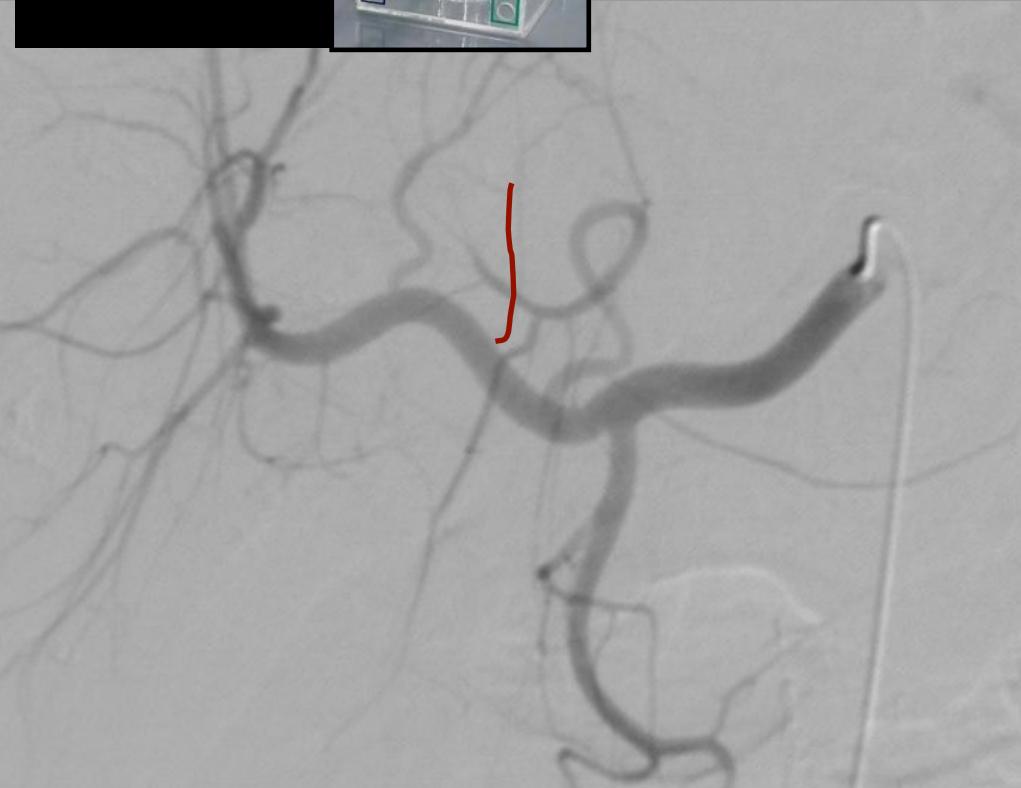
Radioembolisering



70-årig kvinna



Radioembolisering



70-årig kvinna



Radioembolisering



70-årig kvinna



Radioembolisering



70-årig kvinna



Radioembolisering



Transarteriell Onkologisk Leverbehandling

Vad är det och hur går det till?

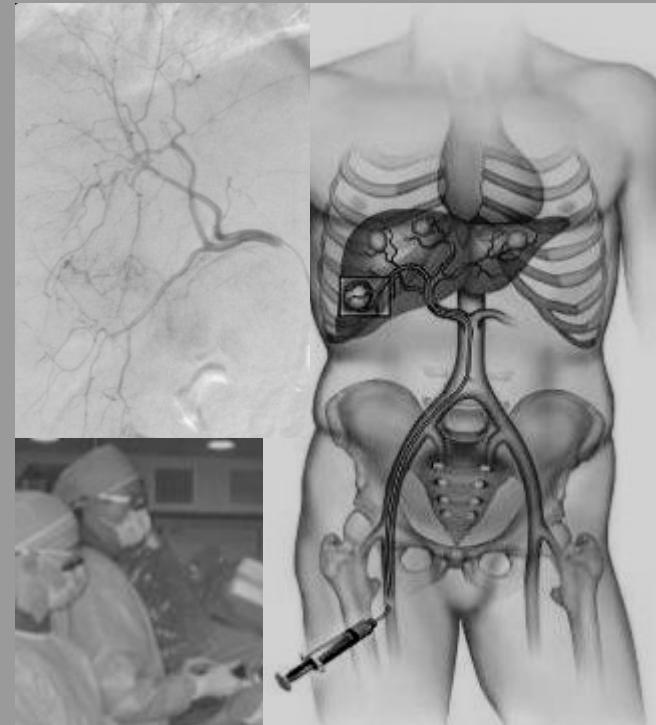
- Palliativ

- Effektiv

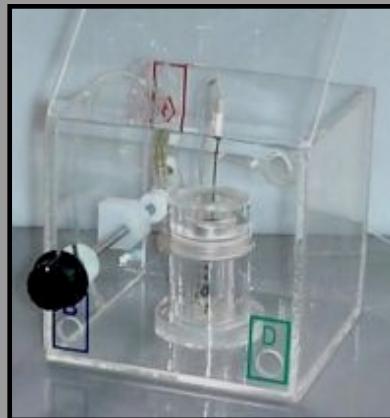
- TACE  HCC varierande teknik

- SIRT  levermetastaser

- Multidiciplinärt samarbete



Transarteriell Onkologisk Leverbehandling



Liver radiotherapy with **SIR-Spheres® microspheres** **vs. ischaemia with TACE?**

Chairs: **Ignacio Bilbao**

Clínica Universidad de Navarra, Pamplona (Spain)

Jens Ricke

Universitätsklinikum Magdeburg (Germany)

13:00 Introduction and welcome

Chairs

13:05 SIR-Spheres vs. TACE in HCC

David Liu

University of British Columbia, Vancouver (Canada)

13:20 SIR-Spheres vs. TACE in mCRC

Bernhard Gebauer

Charité, Berlin (Germany)

13:35 SIR-Spheres vs. TACE in mNET

Andrew S. Kennedy

Sarah Cannon Research Institute, Nashville (USA)

13:50 Panel discussion

Transarteriell Onkologisk Leverbehandling

8.30 – 9.00 **Vad är det och hur går det till?**

Charlotte Ebeling Barbier, Interventionell Radiologi, BFC, Akademiska sjukhuset, Uppsala

9.00 – 9.10 **Vem har glädje av kemoembolisering?** TACE vid hepatocellulärcancer - indikationer och resultat

Agneta Norén, Leverkirurgi, Kirurgkliniken, Akademiska Sjukhuset, Uppsala

9.10 – 9.20 **Doxorubicin i emulsion eller bead?**

Per Stål, Hepatologi, Gastrocentrum, Karolinska Universitetssjukhuset Huddinge

9.20 – 9.30 **Radioembolisering - Vem, hur och varför?**

Frans Duraj, Leverkirurgi, Kirurgkliniken, Akademiska Sjukhuset, Uppsala

9.30 – 9.40 **Vem tolererar radioembolisering?**

Ulrike Garske-Román, Nukleärmedicin, BFC, Akademiska Sjukhuset, Uppsala

9.40 – 9-50 **Vem har glädje av radioembolisering?**

Dan Granberg, Endokrinonkologi, Medicinkliniken, Akademiska Sjukhuset, Uppsala

9.50 – 10.00 **Paneldiskussion/Frågestund**