Hepatocellular Carcinoma: Treatment Options

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Treatment Options for HCC

- Hepatic Resection
- Liver Transplantation
- Percutaneous Therapy
- Transarterial Chemo-Embolisation
- Chemotherapy

Treatment Option depends on

- Tumor Size
- Staging:
  - Metastasis/ No Metastsis
- Grading:
  - Differentiated/ Undifferentiated
- Performance Status (PST)

Performance Status Scale (PST)

0	Fully active, able to carry on all usual activities without restriction and without the aid of analgesics
1	Restricted in strenuous activity but ambulatory and able to carry out light work or pursue a sedentary occupation. This group also contains patients who are fully active, as in grade 0, but only with the aid of analgesics
2	Ambulatory and capable of all self-care but unable to work. Up and about more than 50% of waking hours
3	Capable of only limited self-care, confined to bed or chair more than 50% of waking hours
4	Completely disabled, unable to carry out any self-care and confined totally to bed or chair

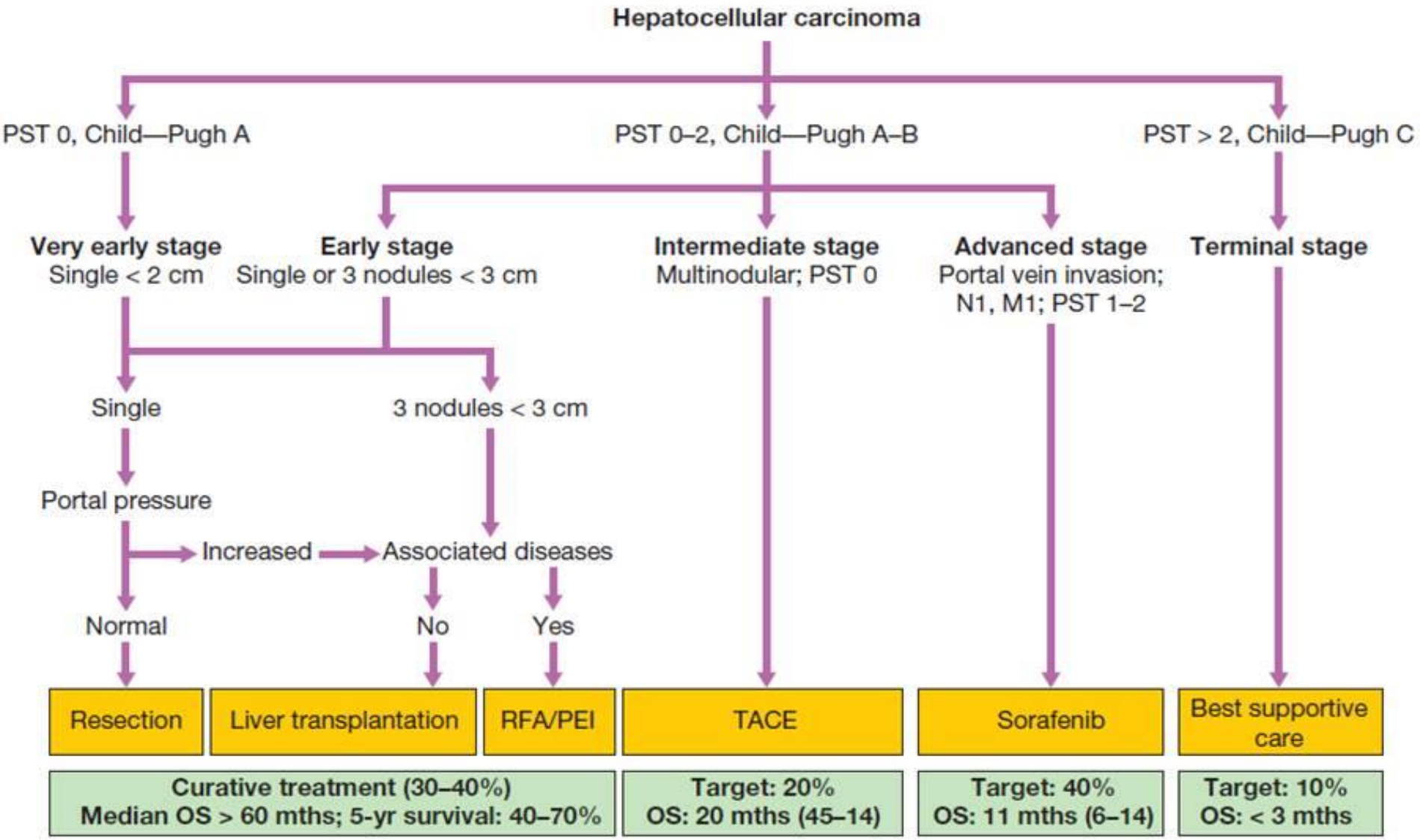
Child-Pugh Score

Score	1	2	3
Encephalopathy	None	Mild	Marked
Bilirubin (μmol/L)*			
PBC/sclerosing cholangitis	< 68	68–170	> 170
Other causes of cirrhosis	< 34	34–50	> 50
Albumin (g/L)	> 35	28–35	< 28
PT (seconds prolonged)	< 4	4–6	> 6
Ascites	None	Mild	Marked
Add the individual scores: < 7 = Child's A, 7–9 = Child's B, > 9 = Child's C			

Milan Criteria

- Single tumor ≤ 5 cm, or
- 2-3 tumors, none exceeding 3 cm, and
- No vascular invasion and/or extrahepatic spread.

Algorithm for HCC Treatment



Hepatic Resection

- 10-15% are suitable for surgical resection
- Treatment of choice for **Non-Cirrhotic** patients
- Few patients with Cirrhosis are suitable if **small tumor** and **good liver function**
- 5-year survival rate 50%

Hepatic Resection (Cont..)

- Best Prognosis
- Resection in Cirrhotic patients carry high morbidity and mortality
- Disease recurrence rate:
  - 50% at 5 years
  - >15% in non-cirrhotic patients
  - > 40% in cirrhotic patients
  - Overall 50-60%
  - Due to a second de Novo tumor, or
  - Recurrence of the original tumor

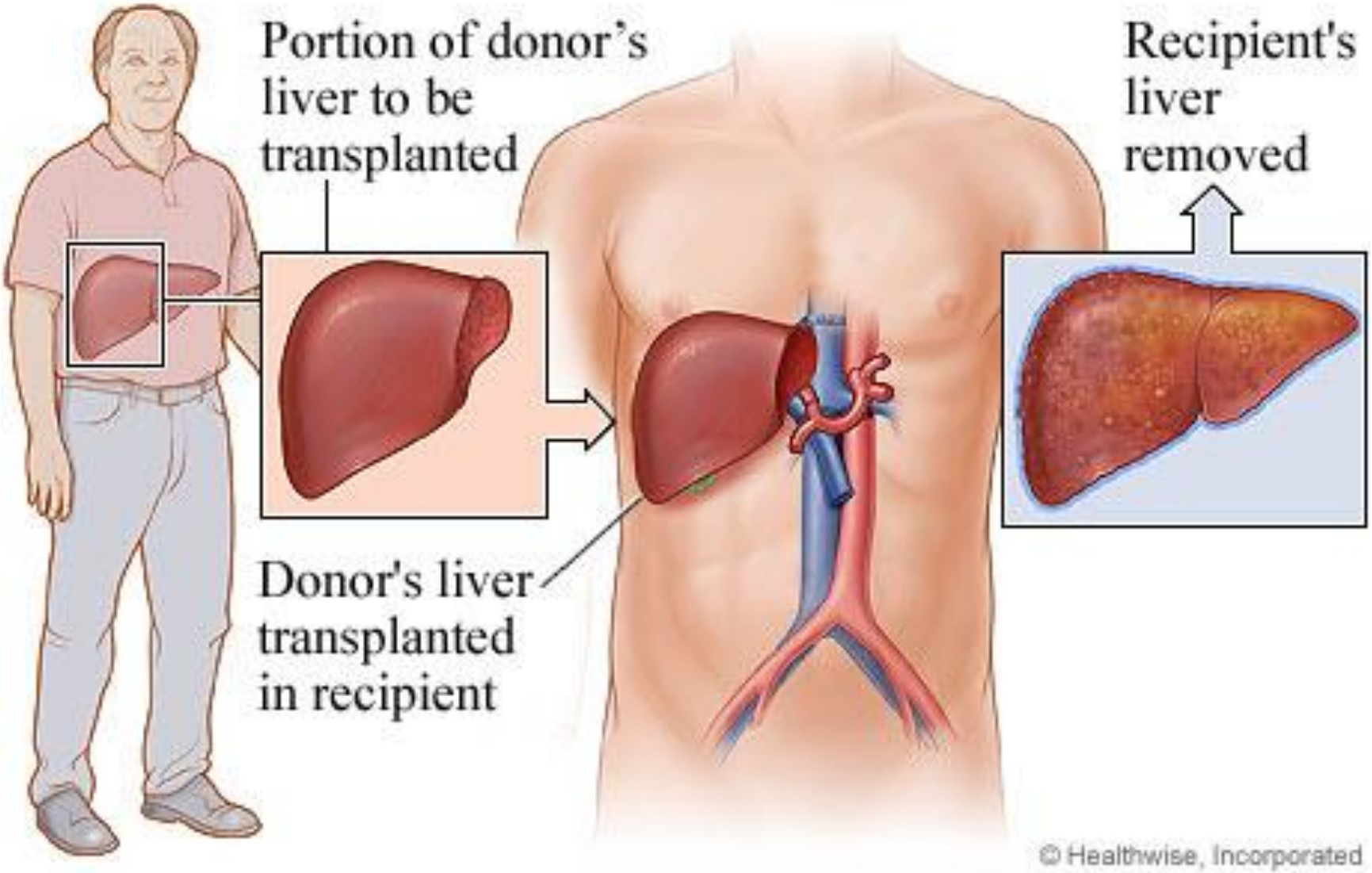
Liver Transplantation

- Benefit of **curing** underlying Cirrhosis
- Risk of reactivation of residual or metastatic disease present
- Exclusion of extrahepatic and vascular invading disease
- 5 year survival is 75% for patients with simple tumor <5 cm in size or two-three tumors < 3 cm (Milan criteria)

Transplantation (cont..)

- Hepatitis C may recur in the transplanted liver and can result in recurrent cirrhosis
- Curative approach for patients with advanced HCC without extrahepatic metastasis
- Liver tumor metastasized decrease the chance of survival.

Liver Transplantation



Interventional Radiology

- TACE (Transcatheter Arterial Chemo-Embolisation)
- RFA (Radiofrequency Ablation)
- SIRT (Selective Internal Radiation Therapy)
- Intra-arterial Iodine-131 Lipiodol administration
- PEI (Percutaneous Ethanol Injection)
- Combined PEI & TACE
- PVE (Portal Vein Embolisation)

TACE (Transcatheter Arterial Chemoembolisation)

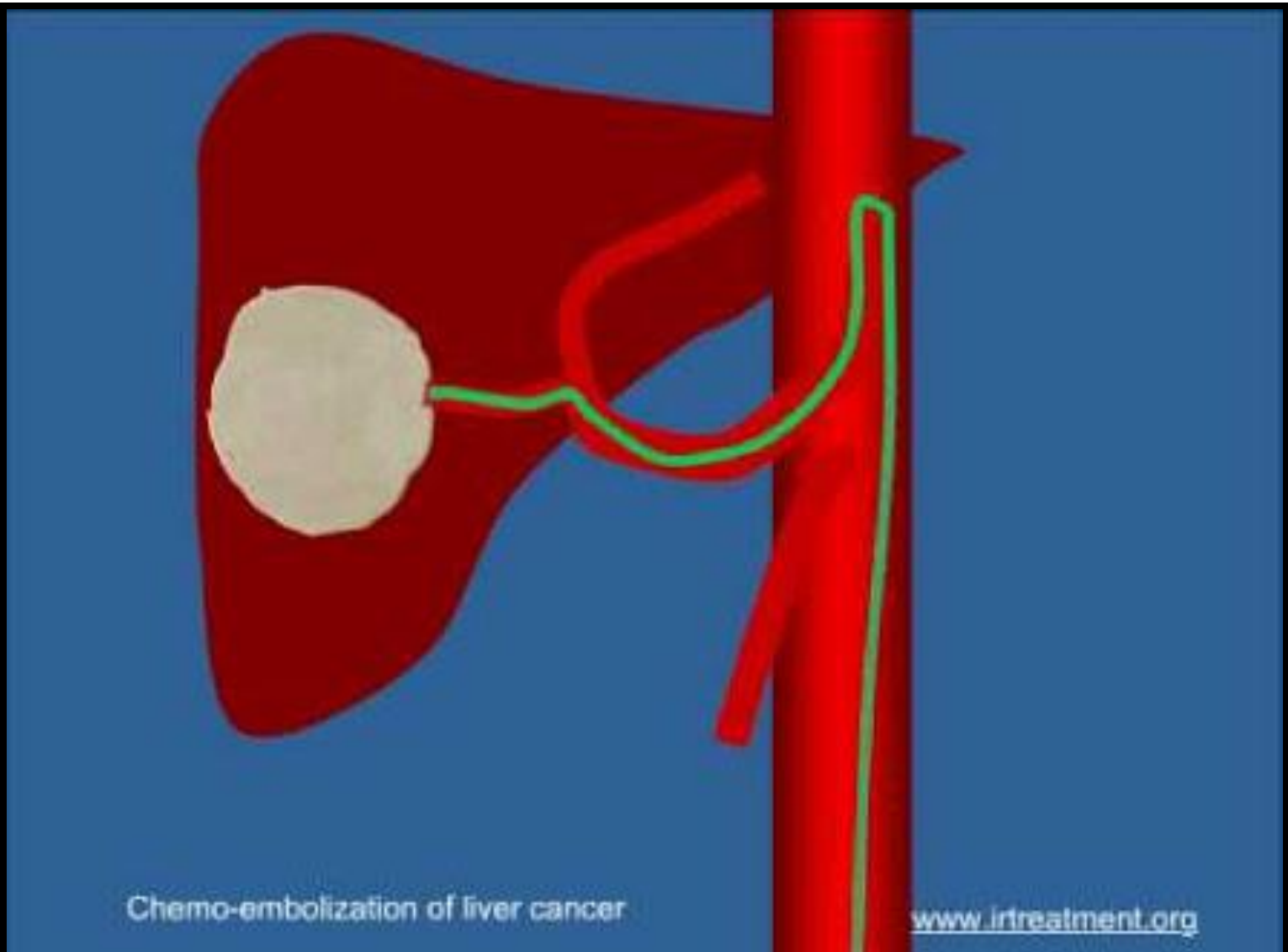
- Unresectable tumors
- Temporary treatment while waiting for liver transplantation
- Cisplatin+ Lipiodol+ Gelfoam increase survival
- Downstages HCC

TACE (cont..)

- Not suitable, if:
  - Large tumors (> 8cm)
  - Portal Vein Thrombosis
  - Tumor with portosystemic shunt
  - Poor liver function

- Response rate:
  - Chemoembolisation with-
    - Doxorubicin: 30%
    - Doxorubicin with Gelfoam: 70%

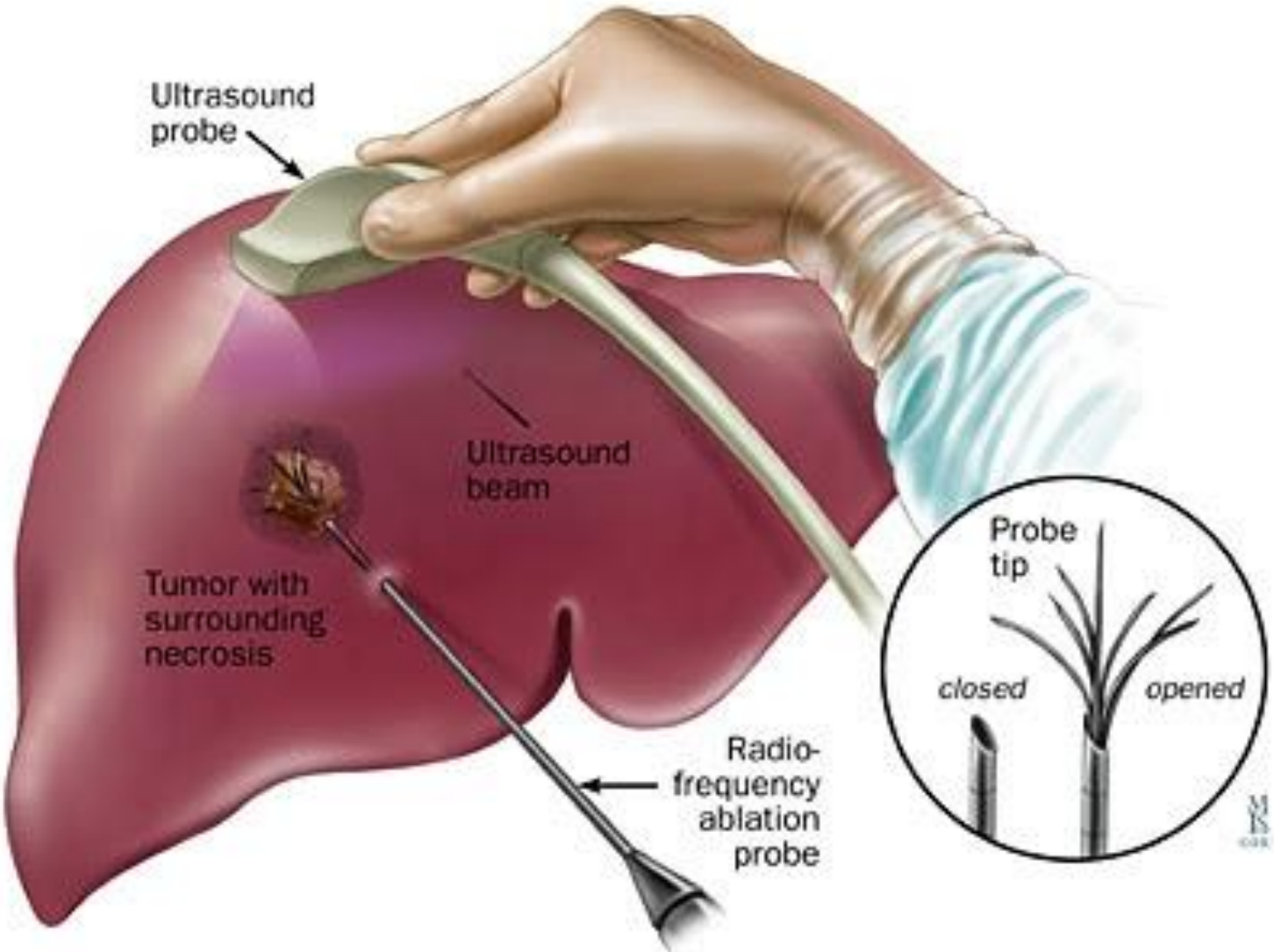
TACE



RFA (Radiofrequency Ablation)

- Suitable for small tumors (<5 cm)
- Best outcome in patients with a solitary tumor less than 4 cm
- Can be repeated multiple times

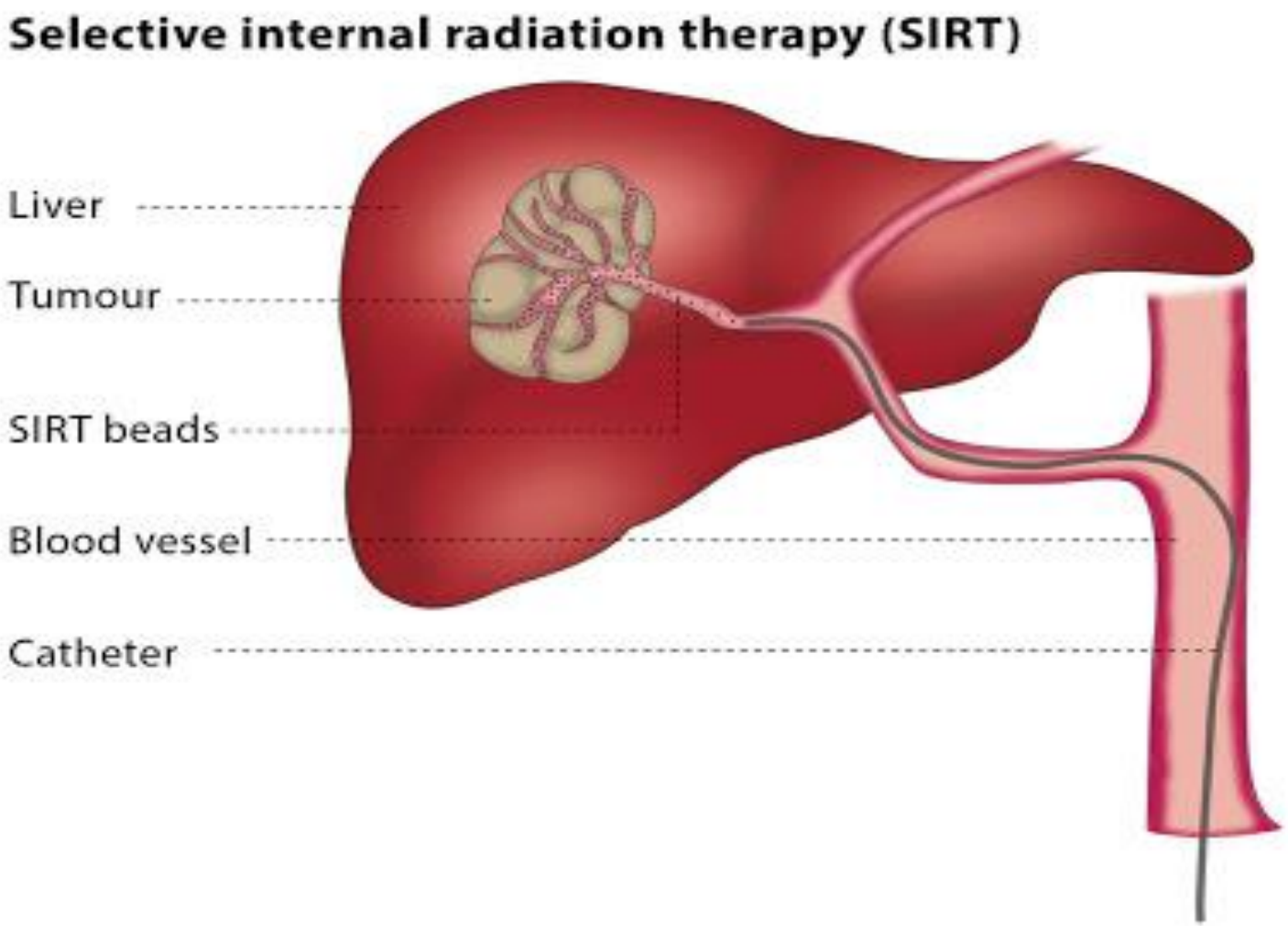
RFA


Ultrasound probe
Ultrasound beam
Tumor with surrounding necrosis
Radio-frequency ablation probe
Probe tip
closed
opened

SIRT (Selective Internal Radiation Therapy)

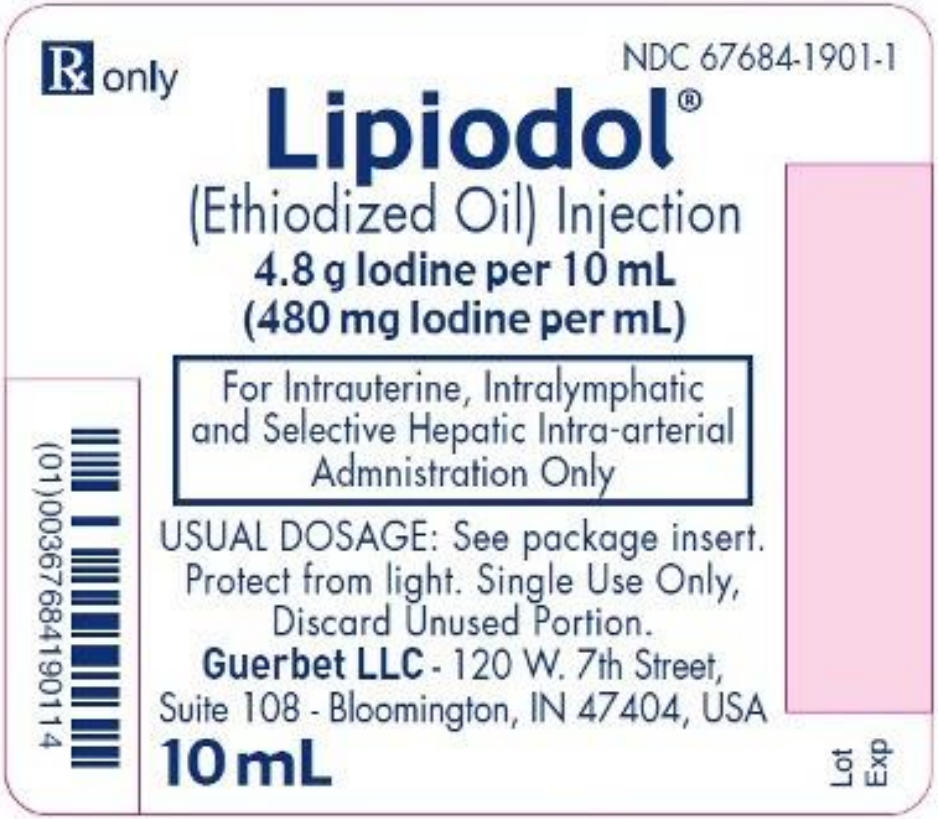
- Yttrium-90 is used
- Causing tumor vascular ischemia
- Radiation dose directly to the lesion
- Increased survival

SIRT

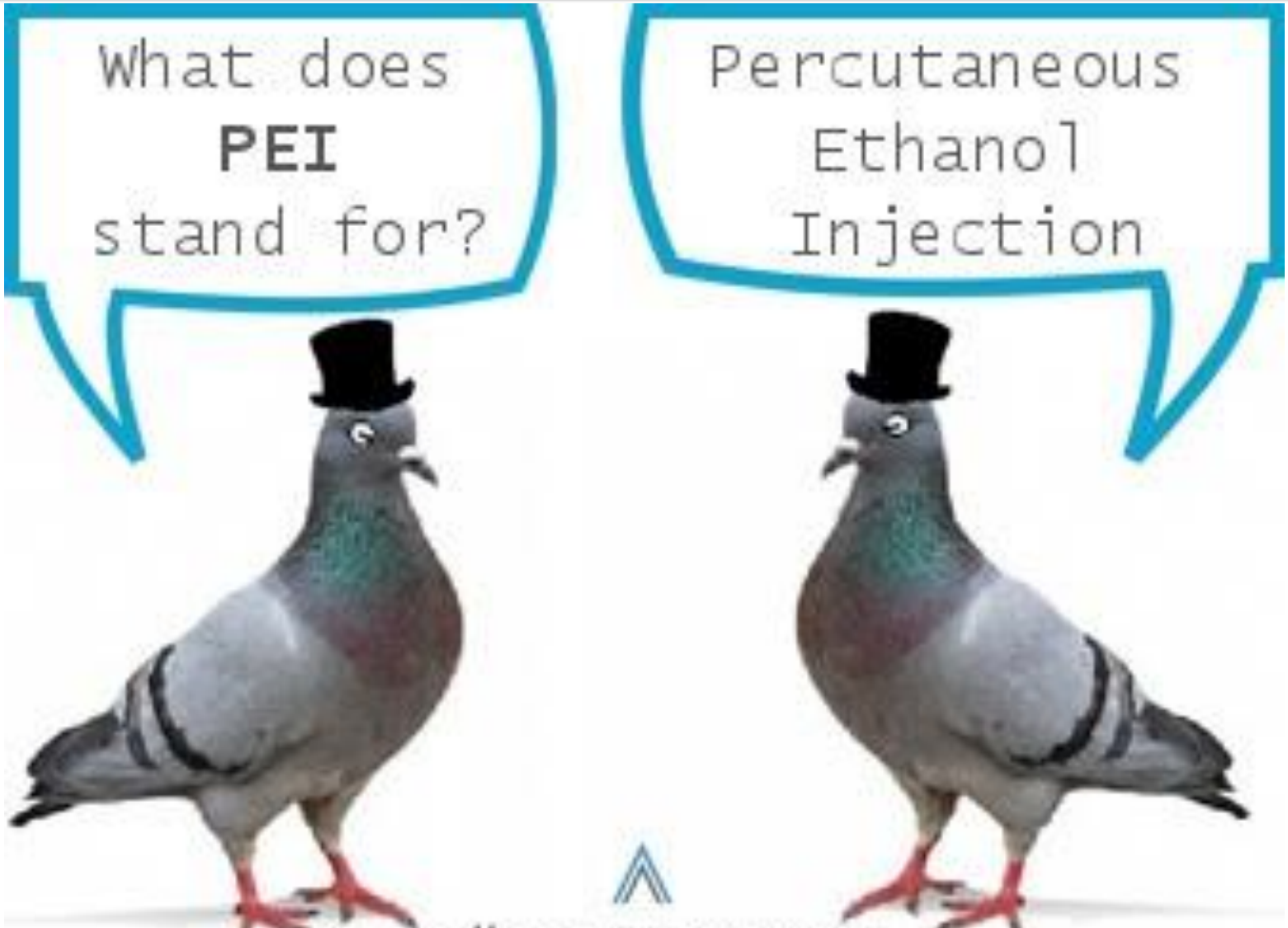

Selective internal radiation therapy (SIRT)
Liver
Tumour
SIRT beads
Blood vessel
Catheter

Intra-arterial Iodine-131 Lipiodol administration

- Unresectable patients
- Portal vein thrombosis
- Adjuvant therapy for resected patients



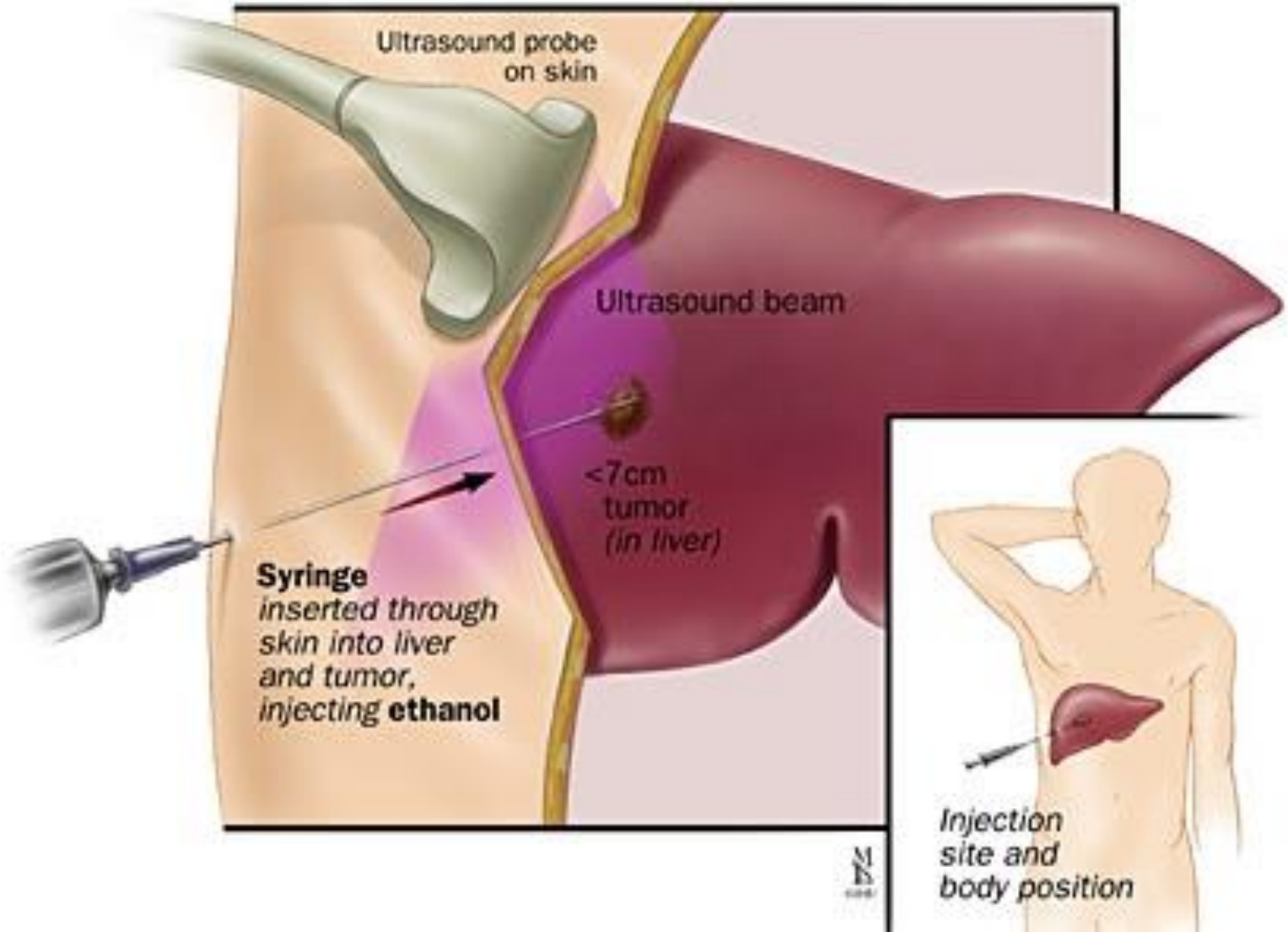
PEI



Percutaneous Ethanol Injection

- Well tolerated
- High Response Rate in small (< 3 cm), solitary tumor
- Recurrence rate similar to those for post resection

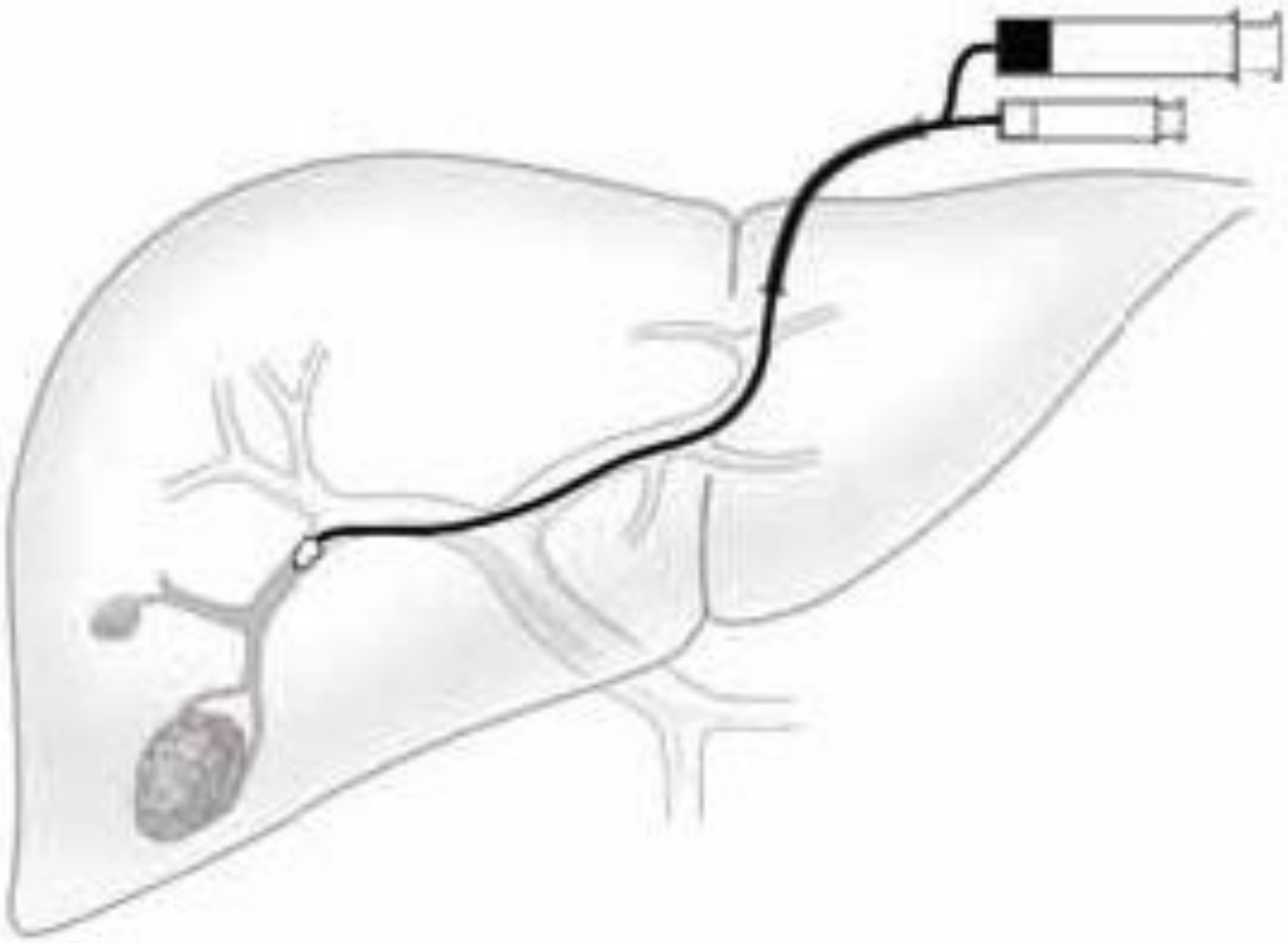
PEI


Ultrasound probe
on skin
Ultrasound beam
<7cm
tumor
(in liver)
Syringe
inserted through
skin into liver
and tumor,
injecting ethanol
Injection
site and
body position

Portal Vein Embolisation

- Using a Percutaneous Transhepatic approach
- Embolise the portal vein supplying the side of the liver with the tumor
- Compensatory hypertrophy of the surviving lobe can qualify the patient for resection
- Serves as a bridge to transplantation

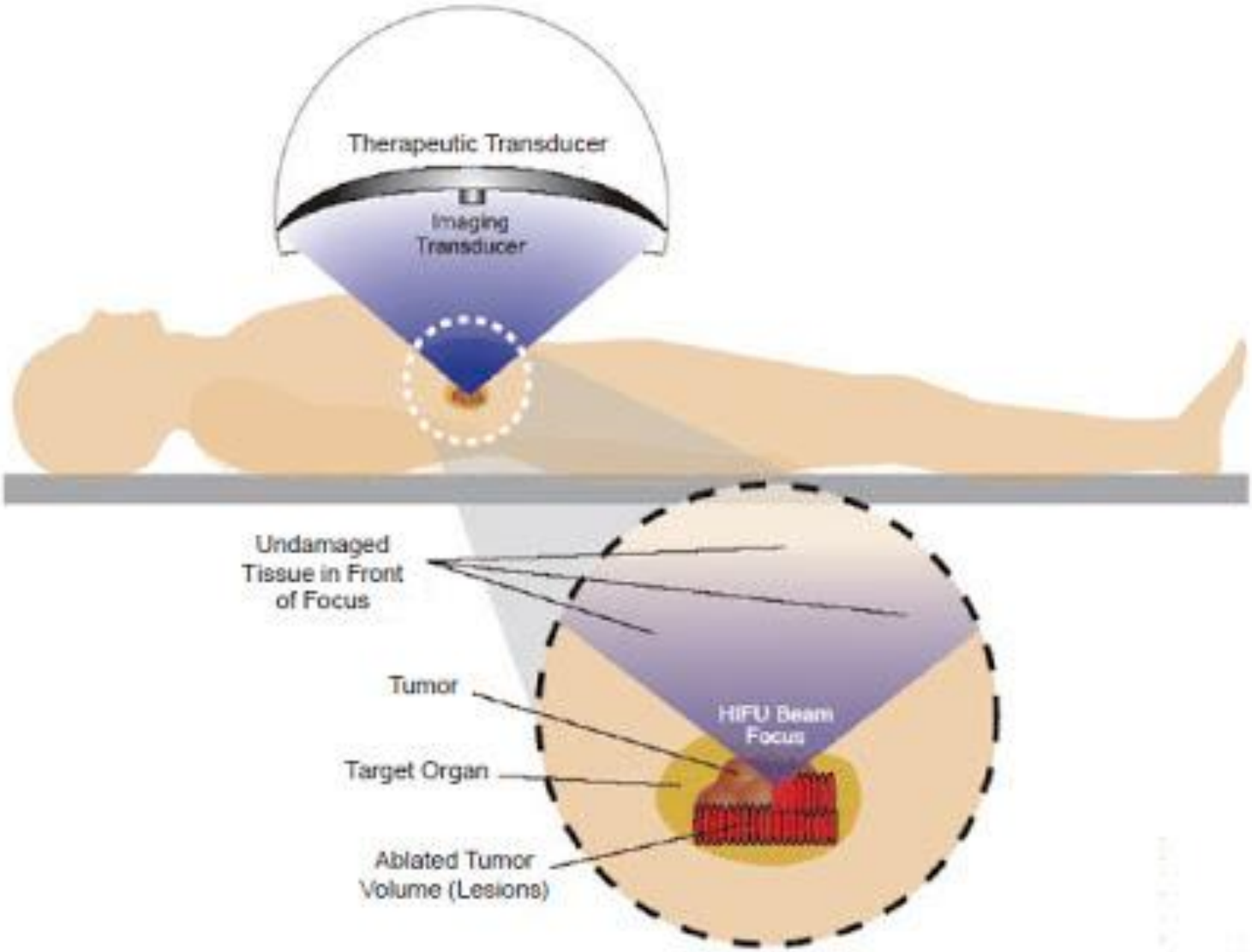
PVE



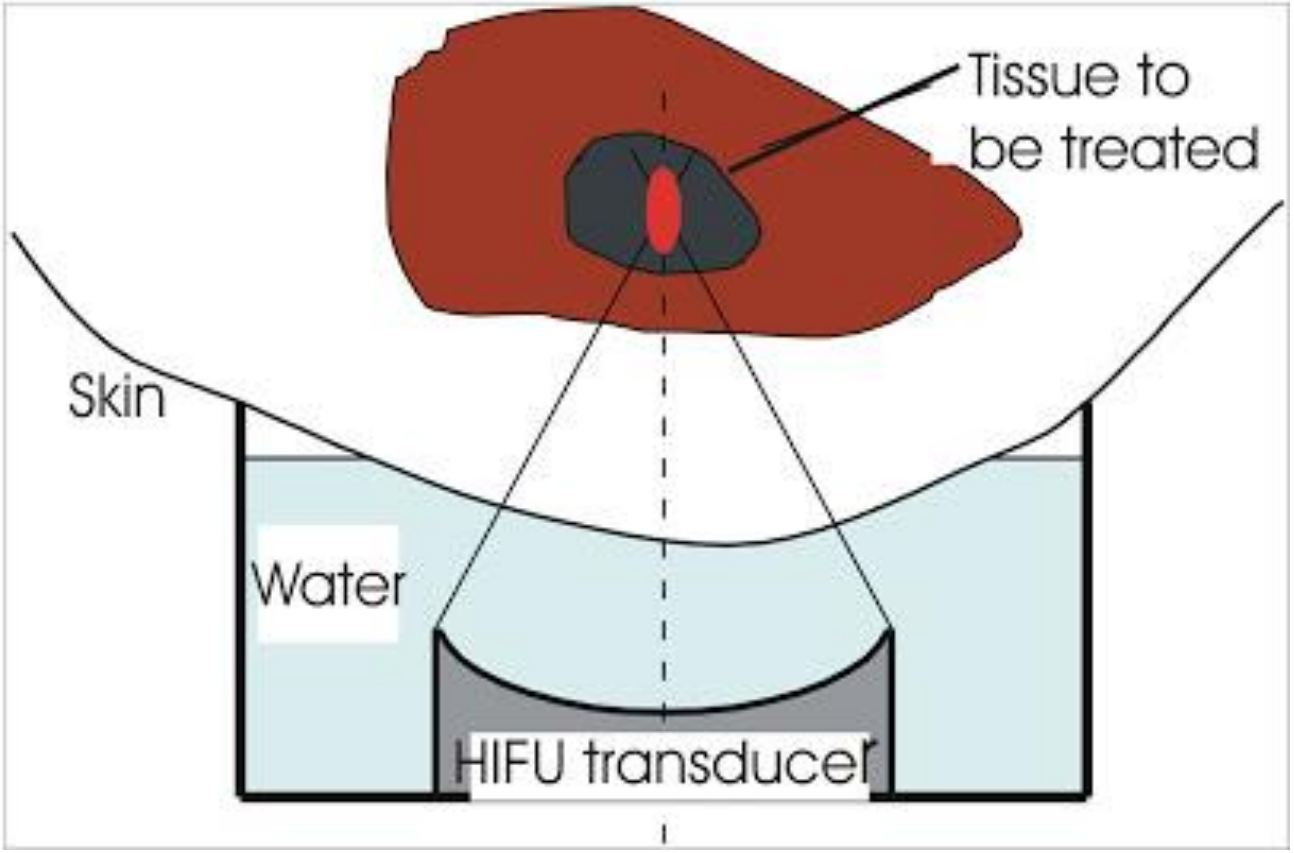
HIFU (High Intensity Focused Ultrasound)

- New technique
- More powerful to treat the tumors

HIFU (cont…)


Therapeutic Transducer
Imaging Transducer
Undamaged Tissue in Front of Focus
Tumor
Target Organ
Ablated Tumor Volume (Lesions)
HIFU Beam Focus

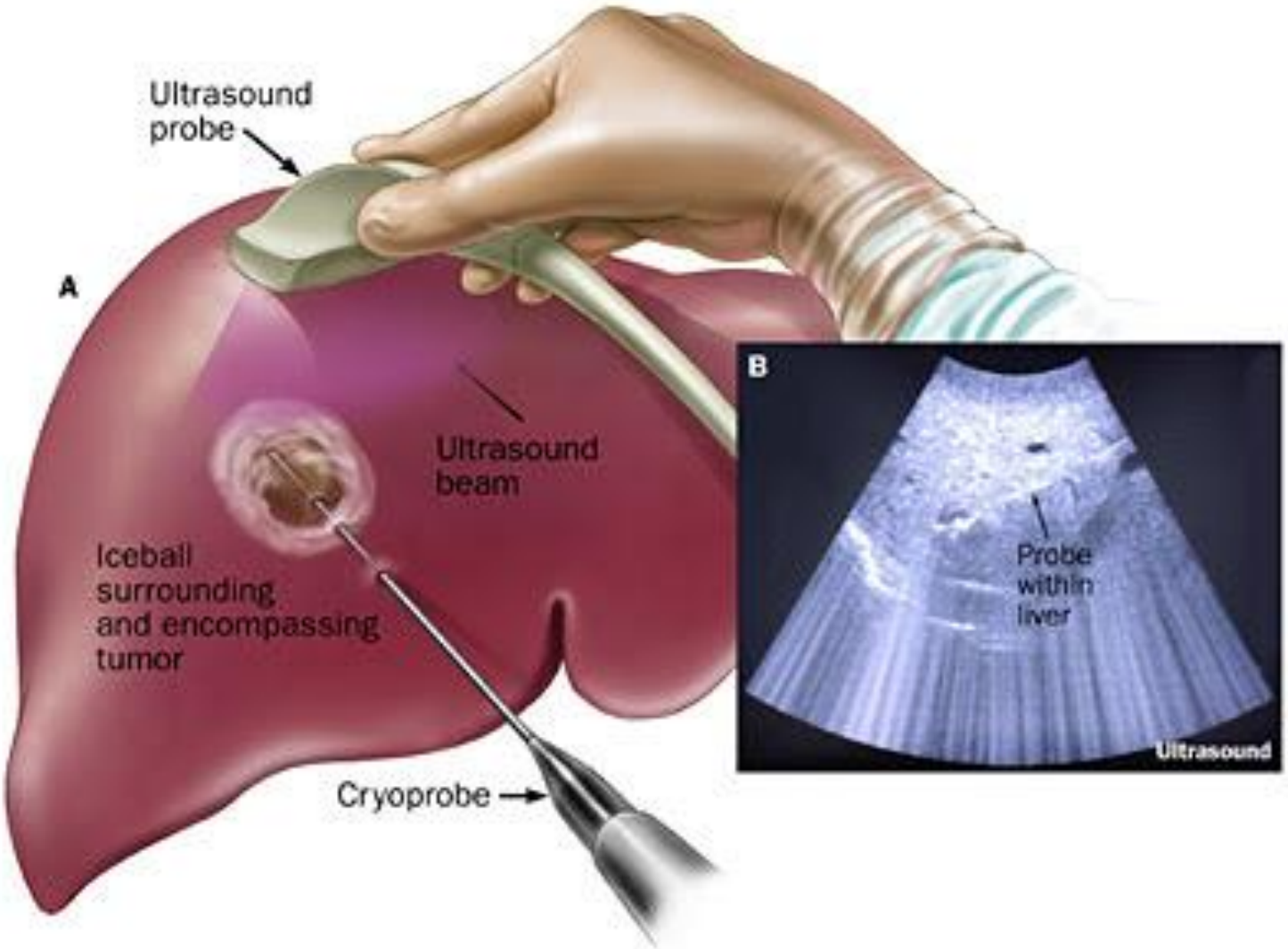
HIFU (cont…)



Cryosurgery

- Destroys tumors in a variety of sites:
  - Brain
  - Breast
  - Kidney
  - Prostrate
  - Liver
- Liquid nitrogen used in -190˚C for 15 minutes
- Occasionally needs to repeat.

Cryosurgery



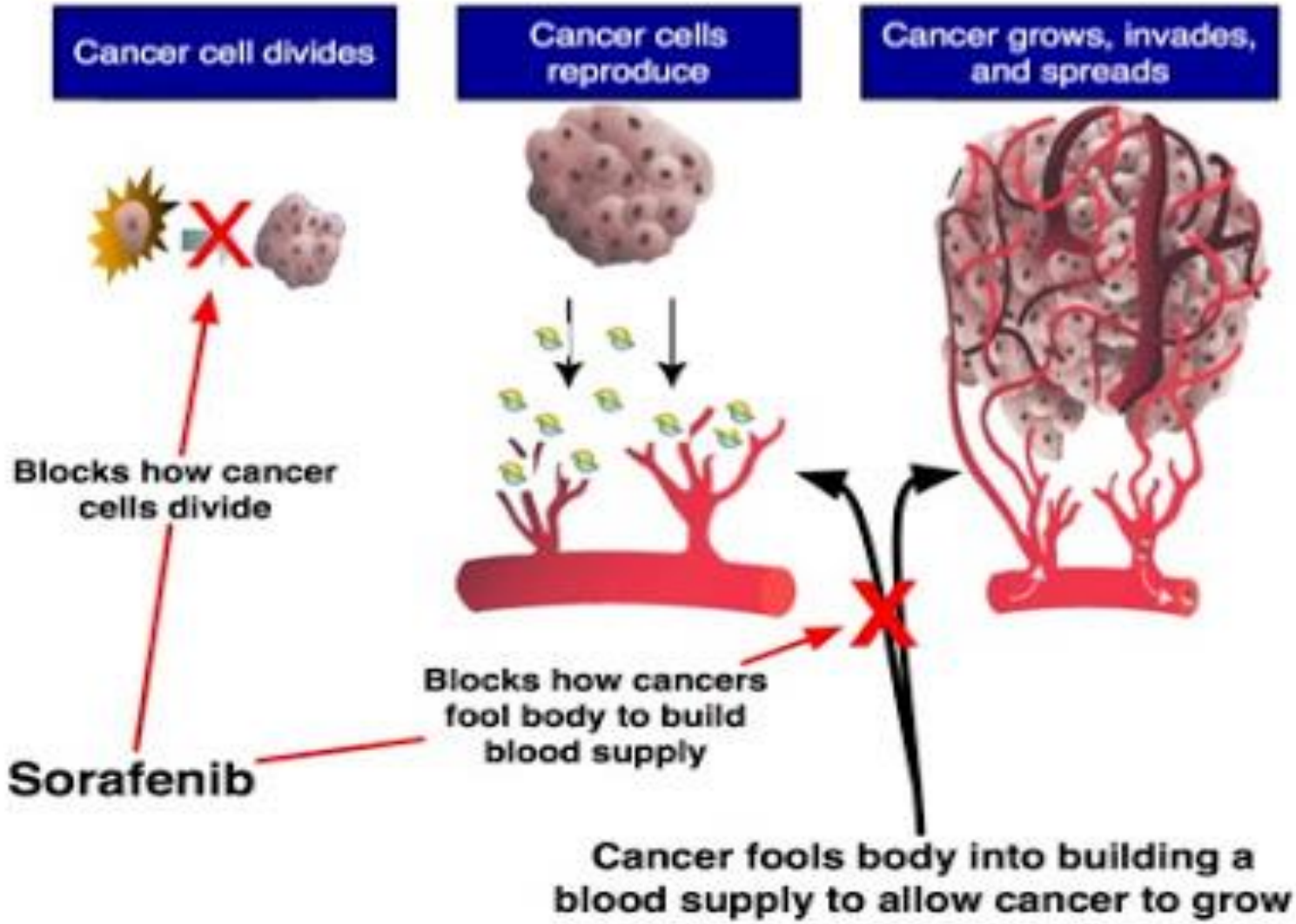
Complications

- Post Embolisation Syndrome
- Liver Failure
- Hepatic Dysfunction
- Gastric Ulceration
- Radiation Pneumonitis
- Abscess Formation
- Subcapsular Hematoma

Medical Management

- Sorafenib (a receptor tyrosine kinase inhibitor)
- Inhibits tumor cell proliferation and tumor angiogenesis
- Increases the rate of apoptosis
- Beneficial therapeutic effects
- Median overall survival increases
- Indicates an improvement in survival from **7.9 to 10.7 months** in cirrhotic patients

Mechanism of Sorafenib



Prevention

- Prevention of Hepatitis B & C infection
- Childhood vaccination against Hepatitis B
- Avoidance of Alcohol consumption
- Multikinase inhibitors-first systemic therapy to prolong survival

Prognosis

- Outcome poor
- Surgery can be done in 10-20%
- Untreated life span 3-6 months
- Survival more than 6 months occasionally
- Sorafenib can prolong survival
- High grade tumor- poor prognosis
- Low grade tumor- may go untreated for many years

Thank You