Complex Liver Transplant Surgery: Techniques for Difficult Hurdles

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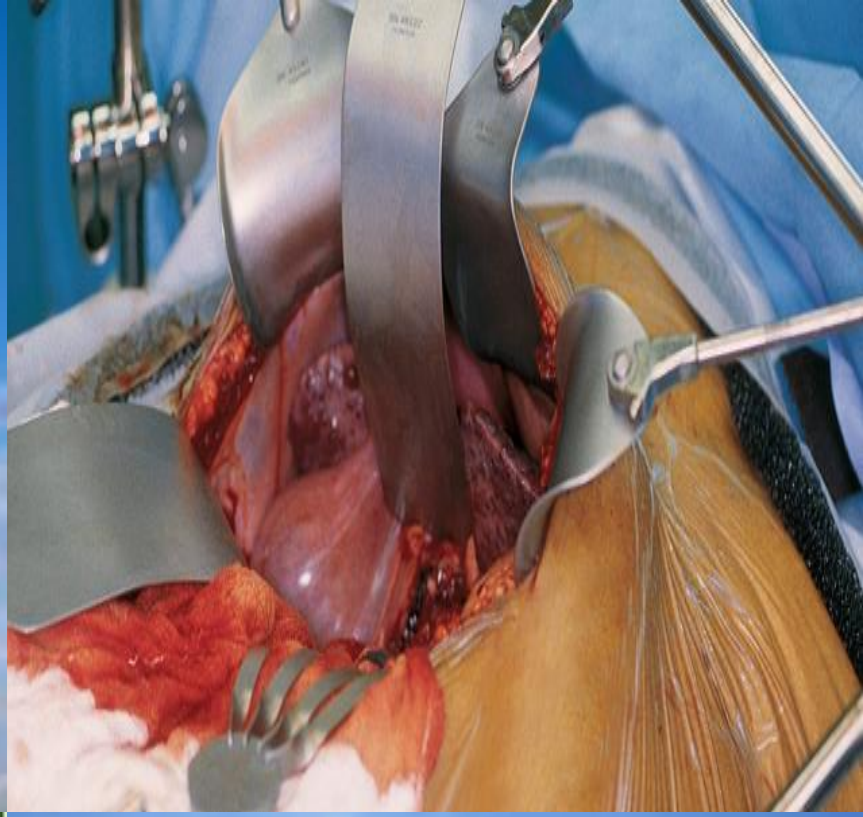
Complex or Extreme?

- Arterial reconstruction
  - Intra
  - Post
- Splanc
  - Pre t
  - Intra
- Venou
  - Wha
- Budd
  - Alwa

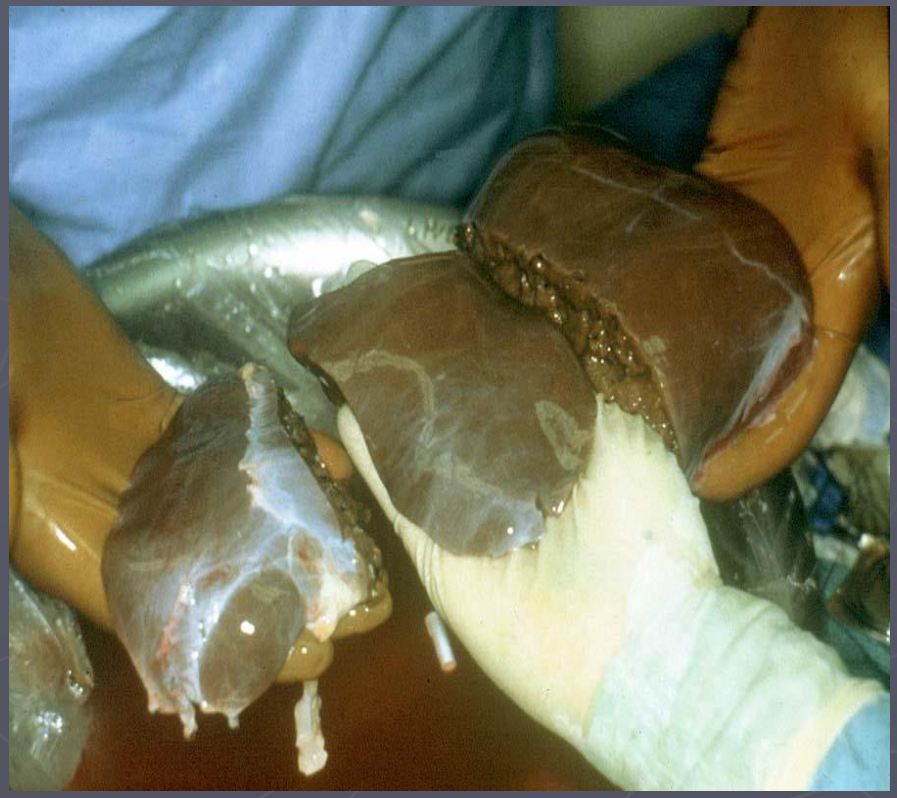

Right Way
Wrong Way




DANGER
WRONG WAY
TURN BACK

Arterial Problems

- Complex reconstruction on backtable
- Unsuitable recipient artery
- Post-transplant challenges
  - HAT
  - Pseudo aneurisms

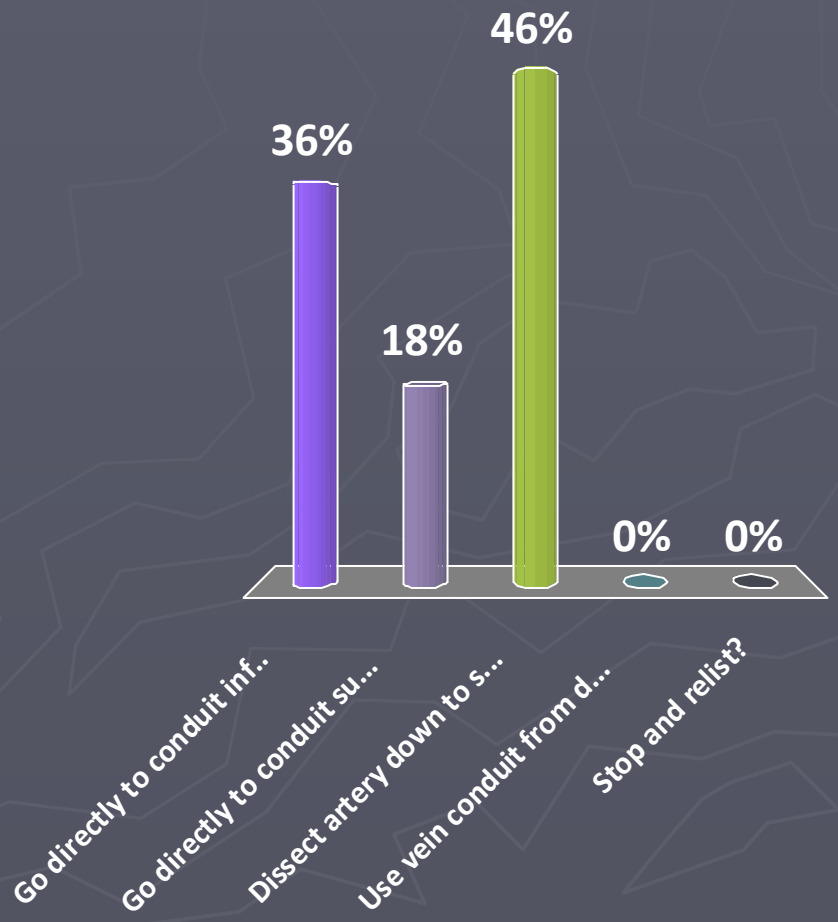


62 yo male Laennec's/Hep C with small HCC. Donor 63 yo CVA, 10% macro, outside team removing, arrives with 4 hours CIT

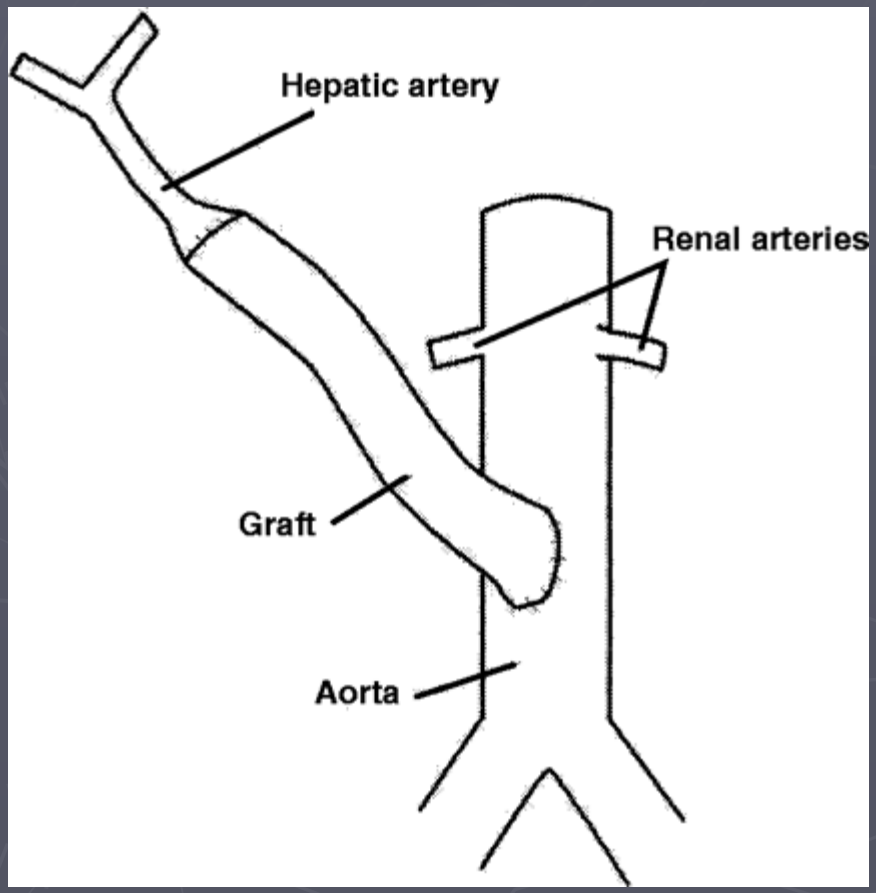
- Hepatectomy goes well
- Sew it in and unclamp
  - Uneventful ..sorta..
- Feel artery and clearly thrombosed with dissection
- Liver now 10 h since donor clamp
- Next choice?

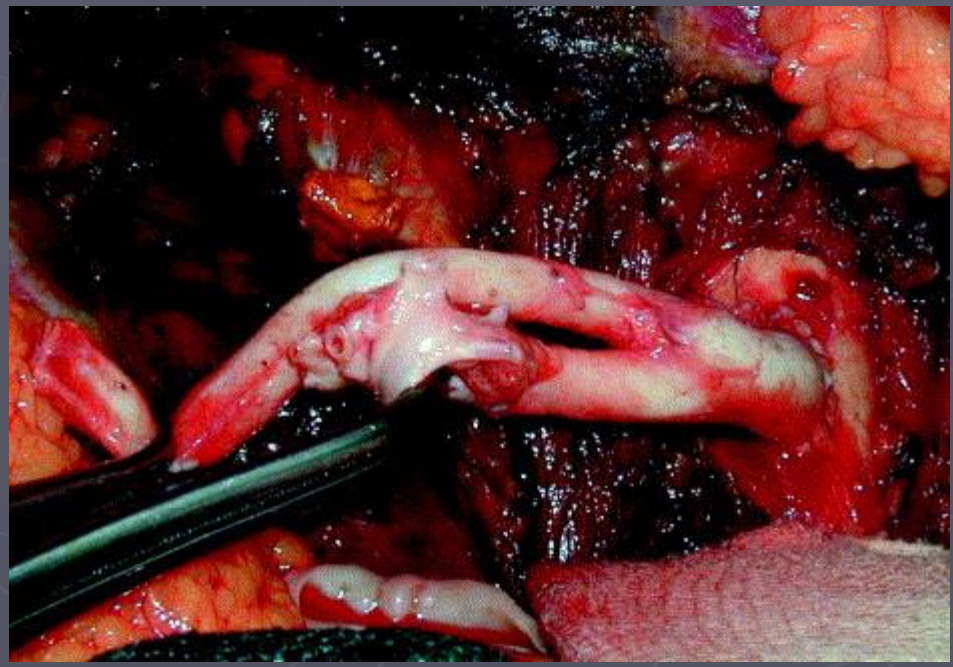
62 yo male Laennec's/Hep C with small HCC. Donor 63 yo CVA, 10% macro, outside team removing, arrives with 4 hours CIT

A. Go directly to conduit infra renal
B. Go directly to conduit supra-celiac?
C. Dissect artery down to splenic and try to use
D. Use vein conduit from donor
E. Stop and relist?

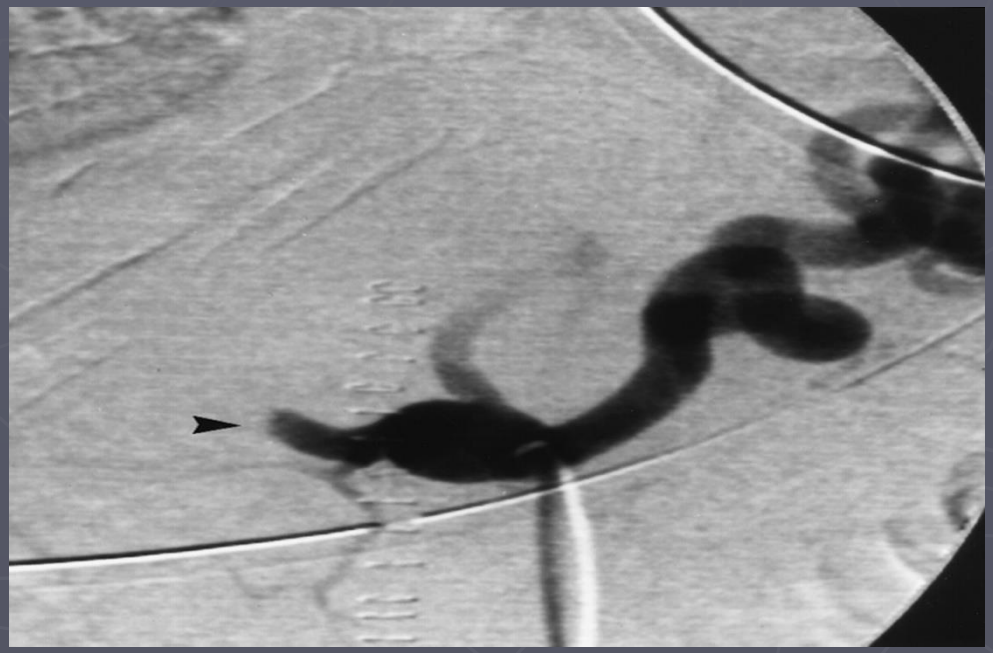


Aortic Conduits



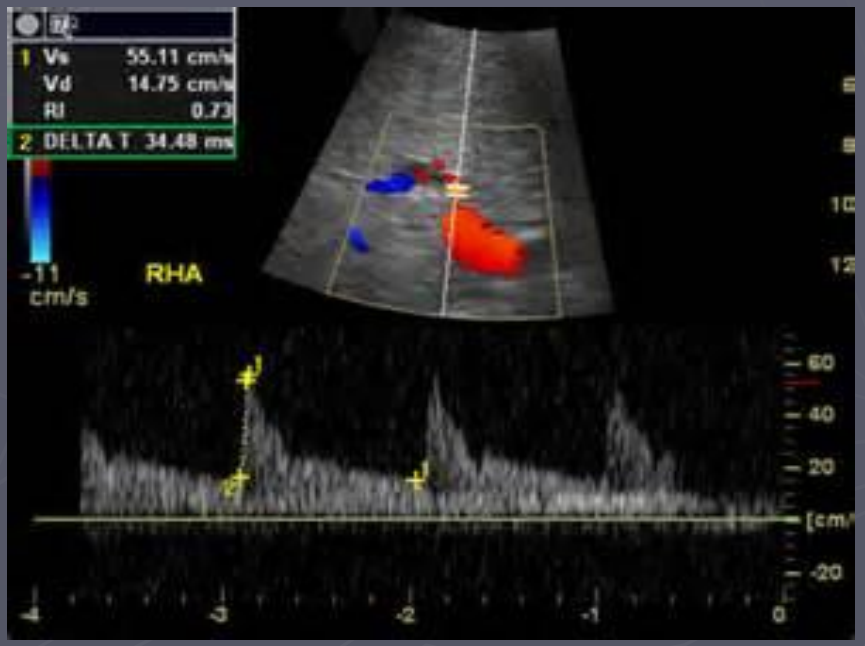


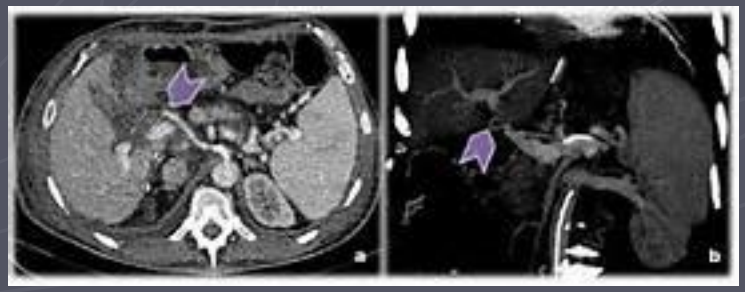
Post Transplant Hepatic Artery thrombosis



Diagnosis

- Lab tests
- Duplex
- CT angio
- MR angio
- Old fashioned angio
- Take to OR
- Relist





35 yo male with PSC undergoes OLT with SCD. POD 1 ultrasound normal. POD 7 slight increase in LFT's..? rejection….US reveals no arterial waveform. Next steps?

- Wait and see?
- Definitive diagnostic test? Angio of some type
- Immediate return to operating room with hopes that its ok and possible to vascularize
- relist

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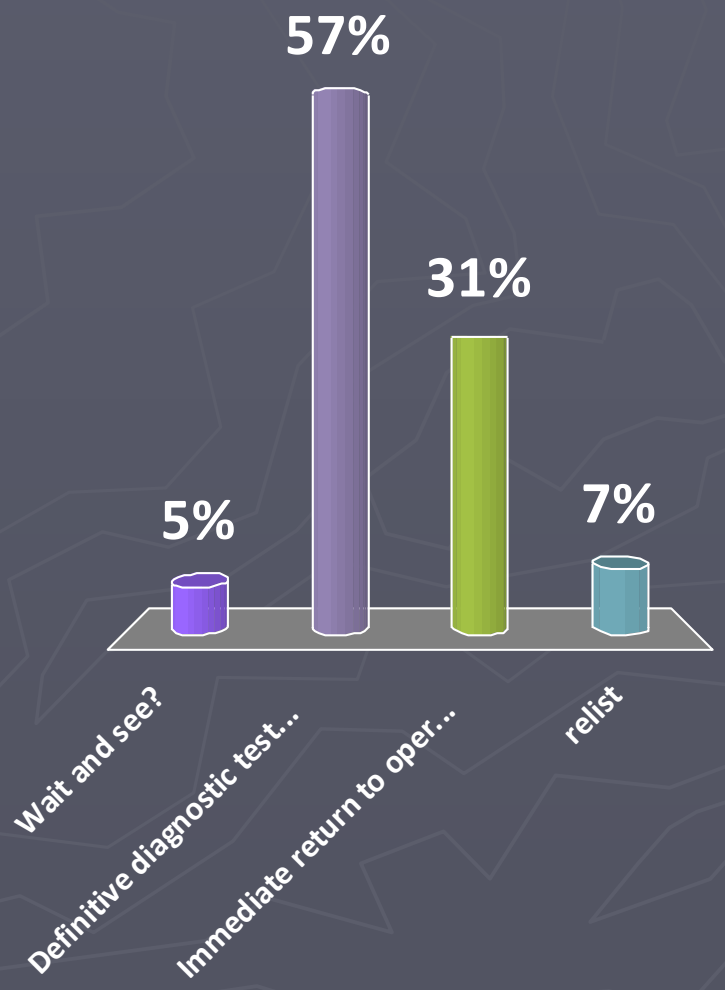
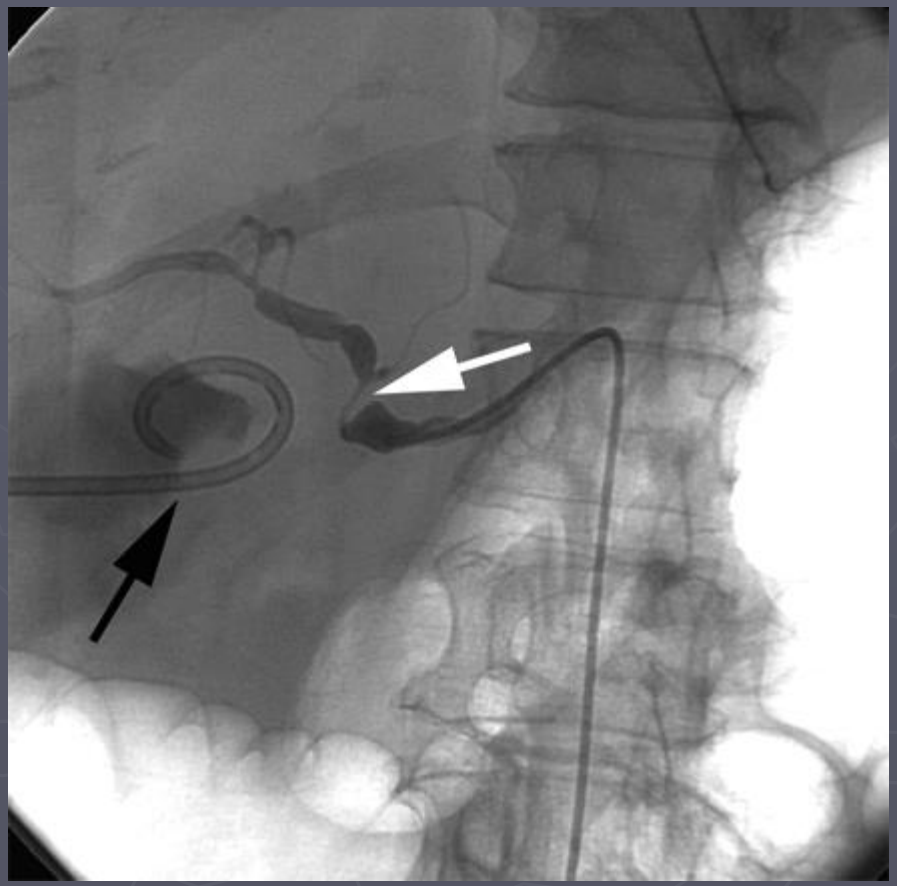


Arterial stenosis

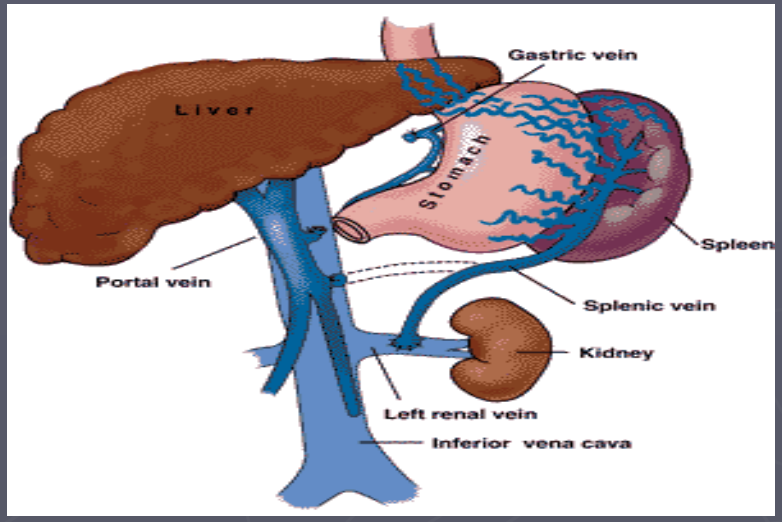


Prevalence and Risk factors of Portal and/or splanchnic venous thrombosis

- In cirrhotic patients 2 to 26%
  - Hospital Beaujon (Gut 2005)
    - 15 of 251 had porto/mesenteric or splenic
    - Multivariate analysis suggested low platelet count and history of variceal bleeding increased risk
  - Birmingham (Transplantation 2000)
    - 16 of 779 had extensive porto/mesenteric disease
  - Cardarelli Hospital (J Hepatology 2004)
    - 32 of 701 had porto/mesenteric/splenic
    - mutation 20210 of the prothrombin gene increases more than fivefold the risk of PVT.

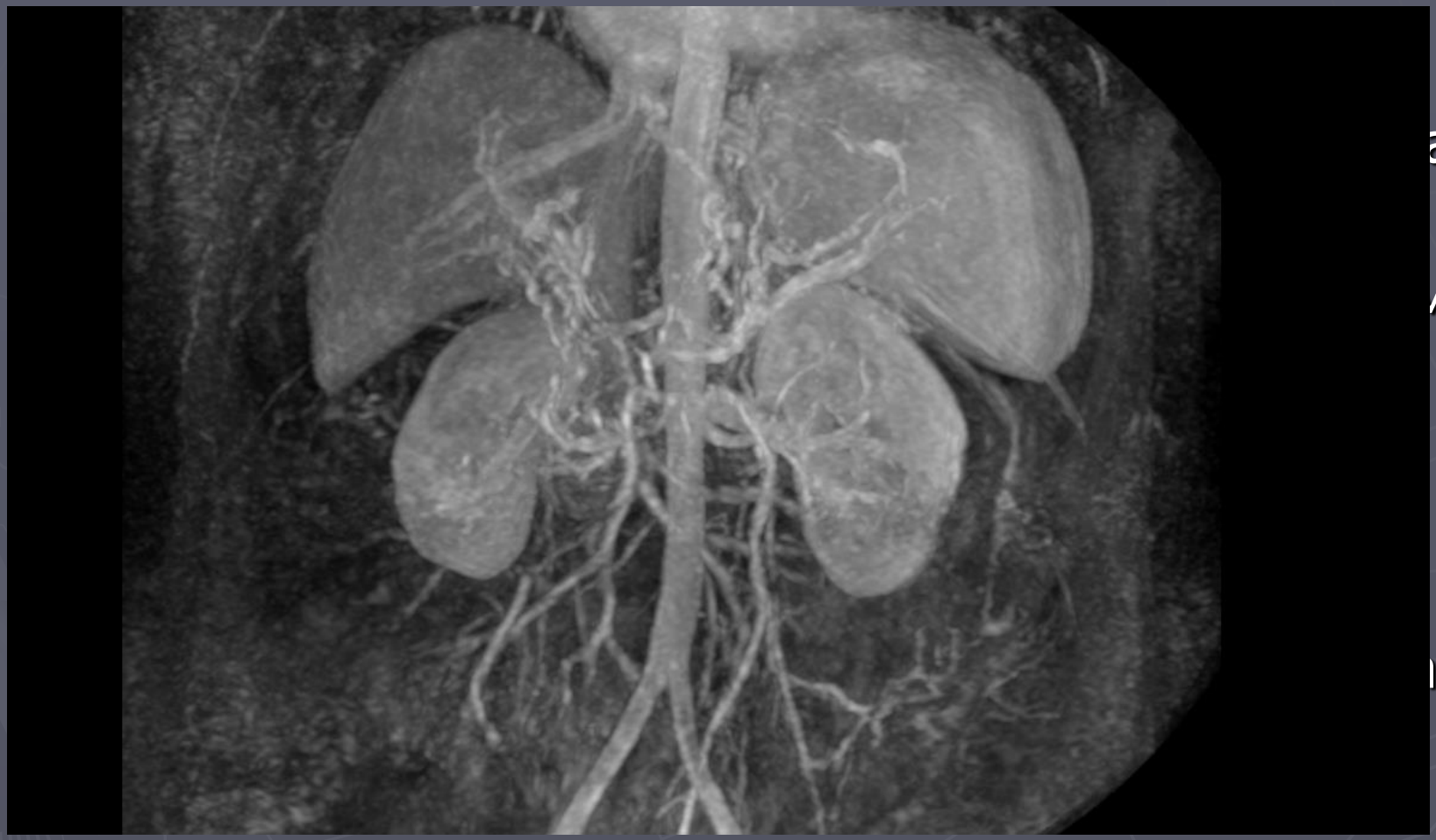
Risk factors

- Hepatocellular carcinoma
  - Typically not tx candidates
- Portosystemic shunt
  - Failed central shunts
  - Distal splenorenal- 10% risk of PVT
- Budd-Chiari syndrome
- Hypercoagulable conditions



Thrombophilic risk factors *n* (%)	PVT	CCG	*P* value
Previous sclerotherapy	25 (31.6)	18 (23.1)	0.23
Abdominal surgery	23 (29.1)	27 (34.6)	0.46
FVL	8 (11.4)	4 (5.1)	0.16
PTHR 20210	15 (21.4)	4 (5.1)	0.003
MTHFR TT677	15 (21.4)	11 (14.1)	0.24
ACA IgG (> 10 U/ml)	25 (43.9)	37 (48.7)	0.58
ACA IgM (> 10 U/ml)	9 (14.0)	13 (17.1)	0.63
Homecysteine (>13 µmol/l)	17 (28.3)	31 (41.9)	0.10

Case Report- Mr. B

- 

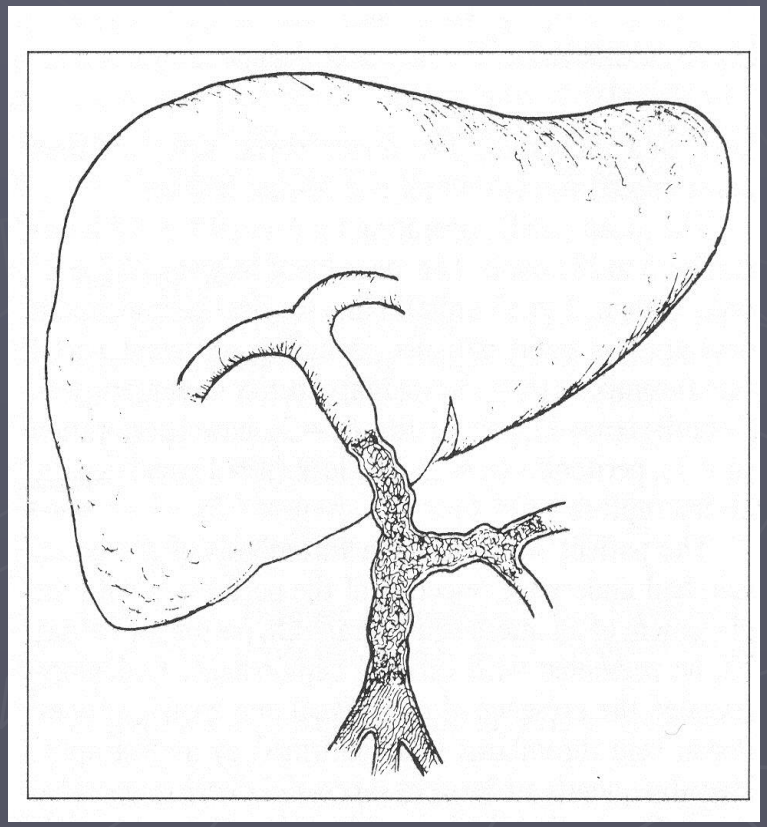
a.

MR

nt

Total Splanchnic Venous Thrombosis

- Prevalence and risk factors
- Imaging studies
- Pre-transplant management
- Operative choices
  - Thrombectomy
  - Mesoportal jump graft
  - Caval-portal hemi transposition
  - Multiviseral transplantation

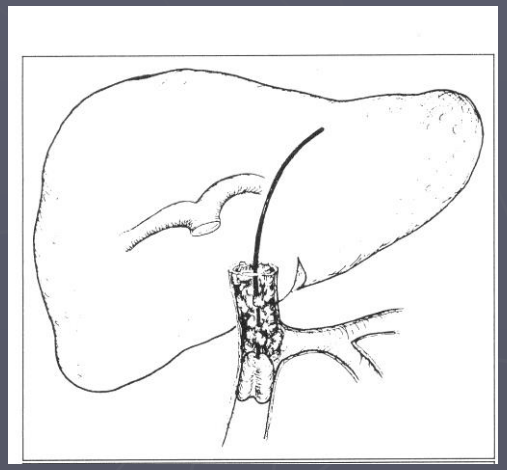


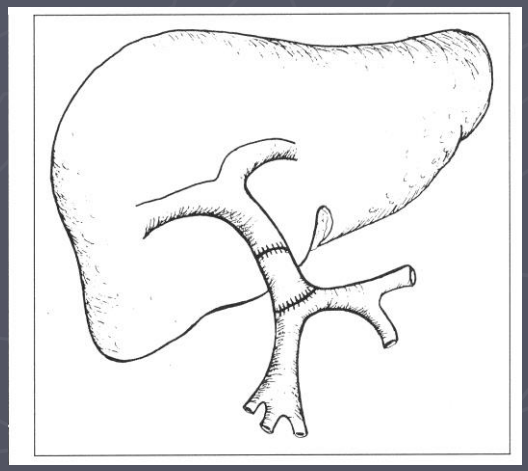
Selecting the best operation

- Thrombectomy or use recanalized portal vein
- Mesoportal graft or other extra-anatomic inflow
- Cavo-portal hemi transposition
- Multiviseral transplant

Thrombectomy, use of recanalized portal vein, or resection of phlebosclerotic portal vein with graft placement

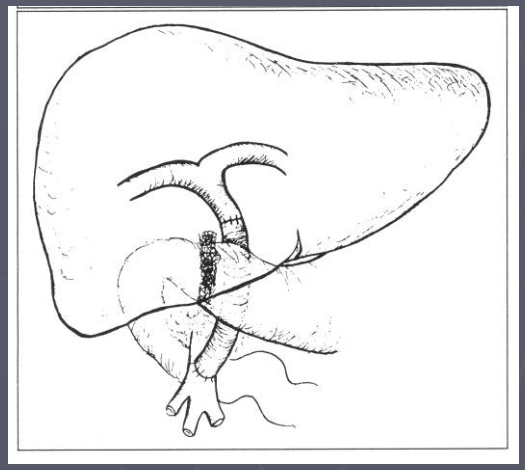
- Good first step
  - Thrombectomy
    -infrequently used
  - Characterize portal flow
- Grafts needed when donor pancreas used
- Avoid extensive peri-pancreatic dissection



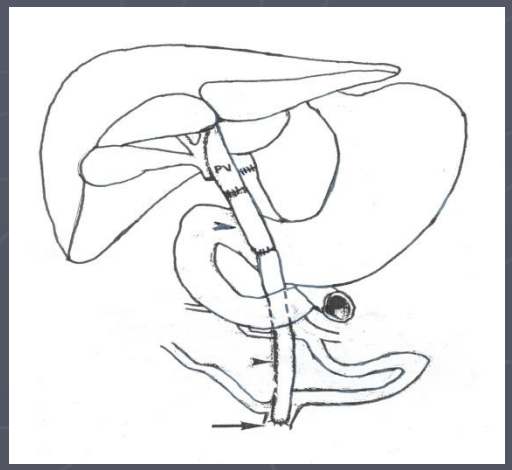


Mesoportal or other extra-anatomic bypass

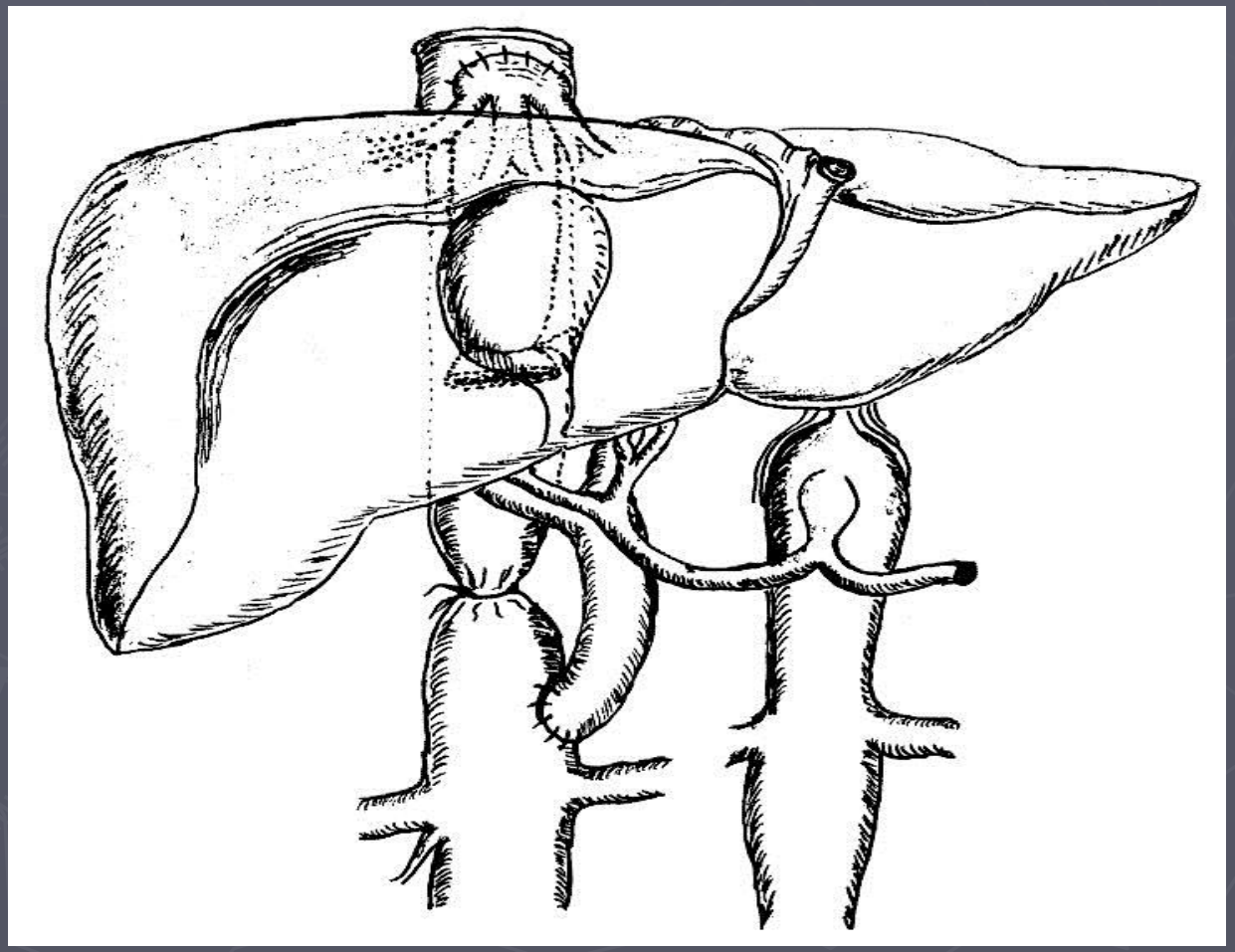
- Safe and effective
- Preferred approach for most patients
- adequate portal inflow and splanchnic decompression



- SMV approached similar to mesocaval shunt (Rex)
- Avoids peri-pancreatic dissection
- Coronary, middle colic biliary collateral



Cavo-portal Hemi transposition

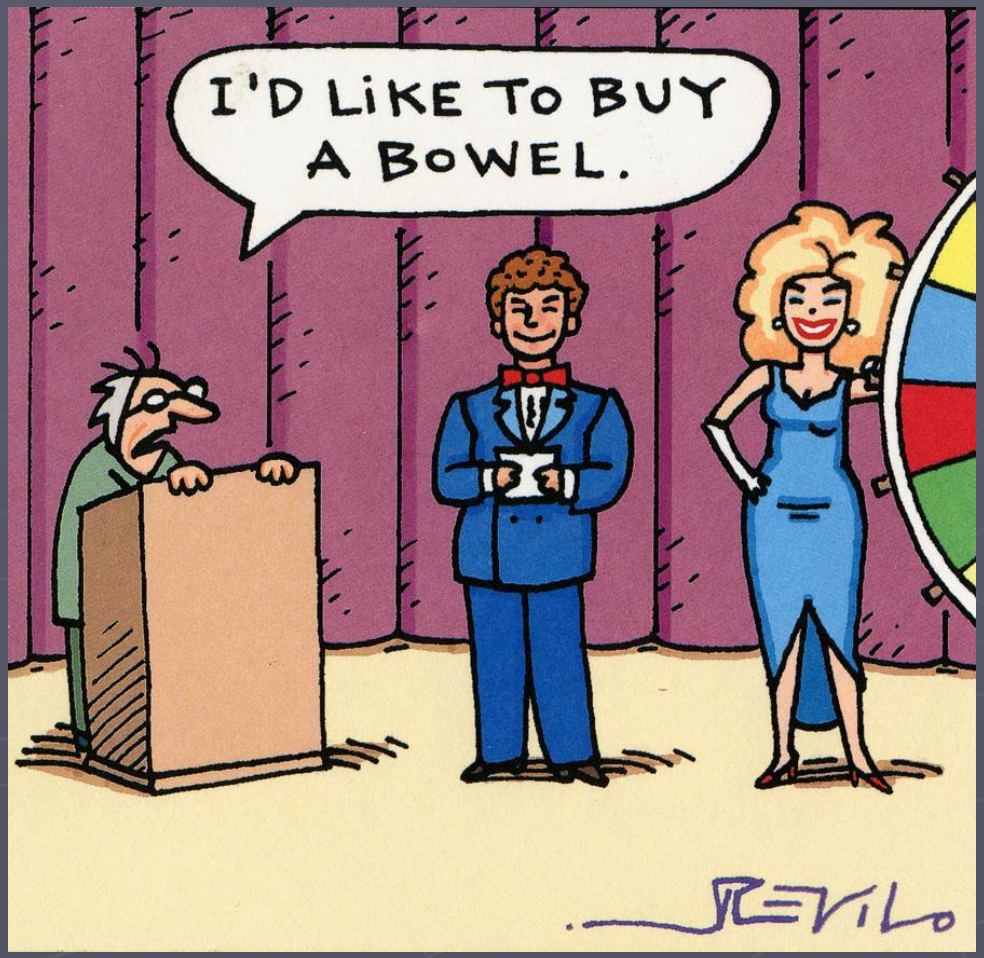


Cavo-portal Hemitransposition

- when hepatopetal flow to the liver graft cannot be established by other techniques
- Satisfactory graft function (early)
- Does not deal with portal hypertension
- Ascites/ GI bleeding

- Miami-23 patients
- 63% 1 year survival with 11/23 currently alive
  - 7/23 post operative GI bleed
  - Postoperative ascites
  - Cases of deaths sepsis /pulmonary embolus

Multiviseral transplant

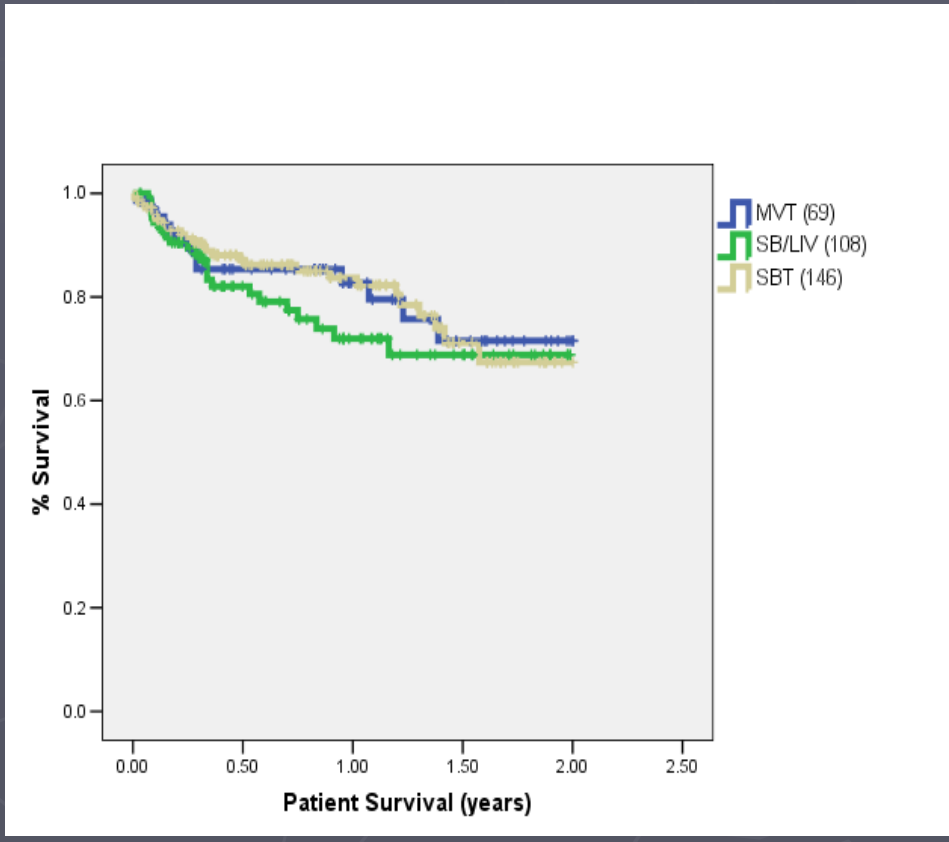


Multiviseral Transplantation

--No Splanchnic venous opportunities

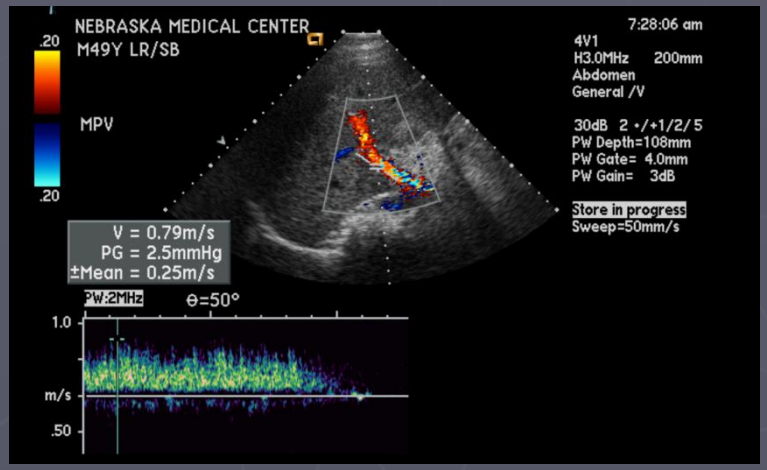
--Very effective

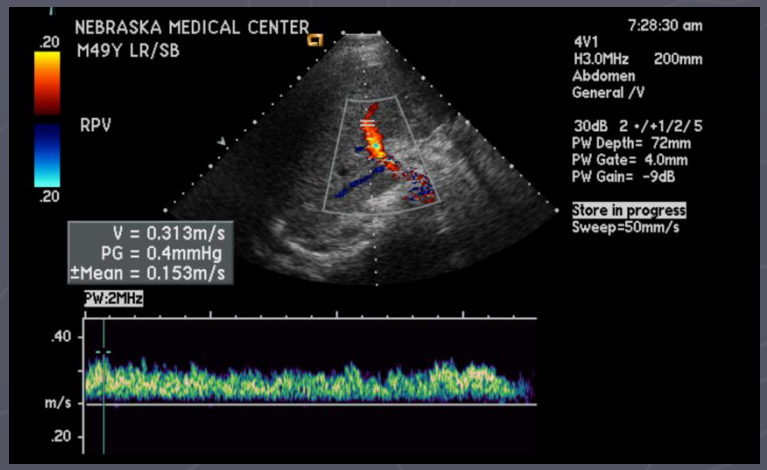
- Pretransplant decision
- Limited donor pool
- Postoperative care specialized
- Decreased survival



Case report—Mr. B

- At transplant SMV not suitable
- Good flow through recanalized portal vein or collateral
- Good PV flow on post-op ultrasound
- Postoperative variceal bleed
  - Stopped anticoagulation
- Done well





Approach to PVT

- Don't transplant too high risk
- Attempt Declot or some type of thrombo/endo-venectomy
- Split pancreas and do anastomosis there
- Go directly to SMV with jump graft
- Multivisceral transplant

Approach to PVT

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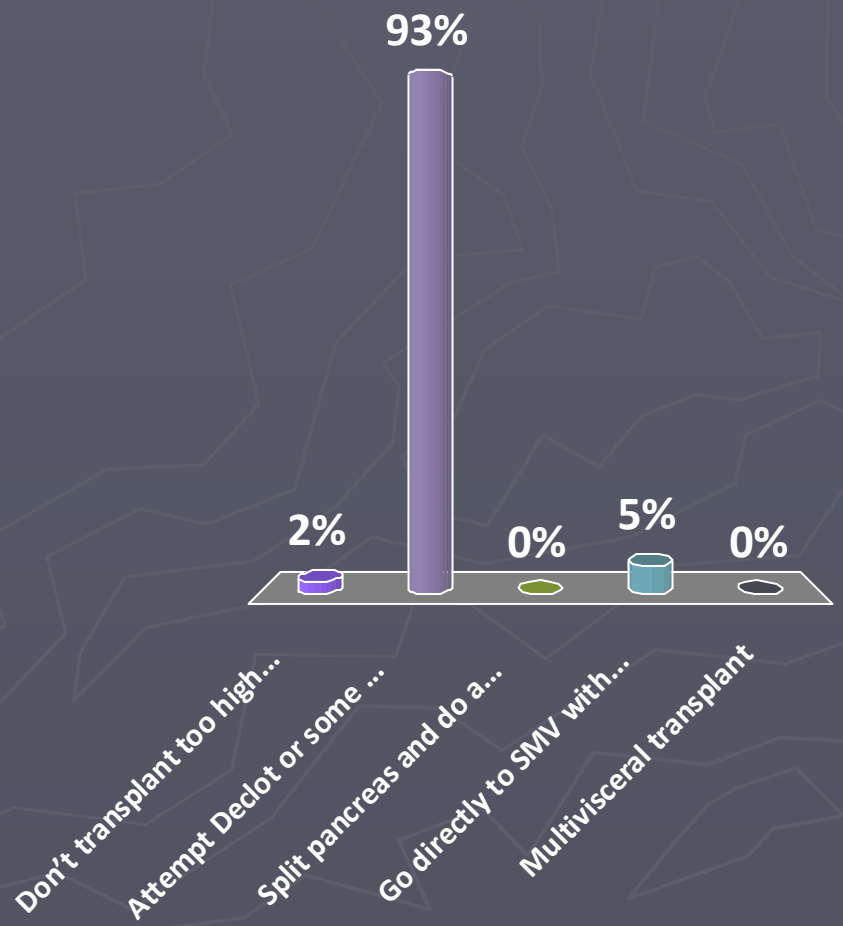
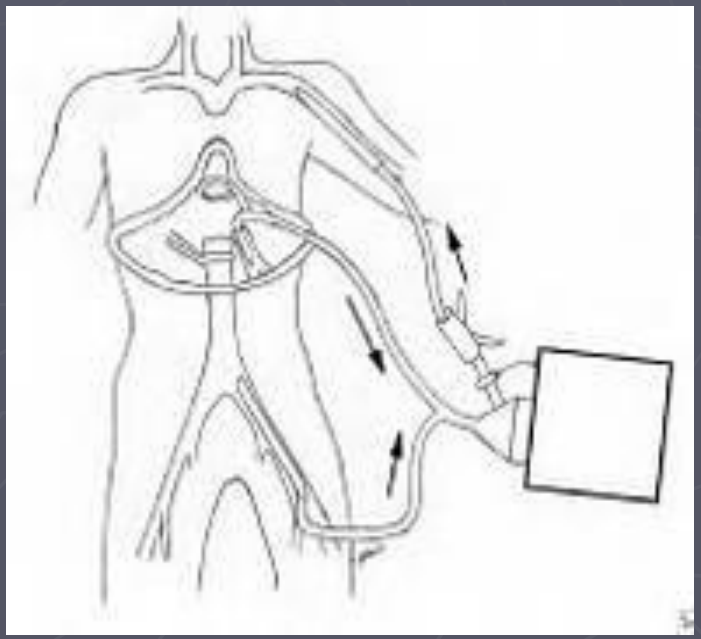


Conclusion

- Pre-transplant imaging critical
- Anti-coagulation
- Select operation to fit anatomy
  - Plan
  - Splanchnic inflow
  - Limited roles of cavo-portal hemi-transposition and multiviseral
- Splanchnic venous thrombosis should not be an obstacle to successful transplantation

Whats up with Venous Bypass?

- Use on every case with or with portal
- Percutaneous technique
- Only on selected cases
  - Retransplant?
  - Fulminants
- Whats venous bypass?



Shaw et al 1985

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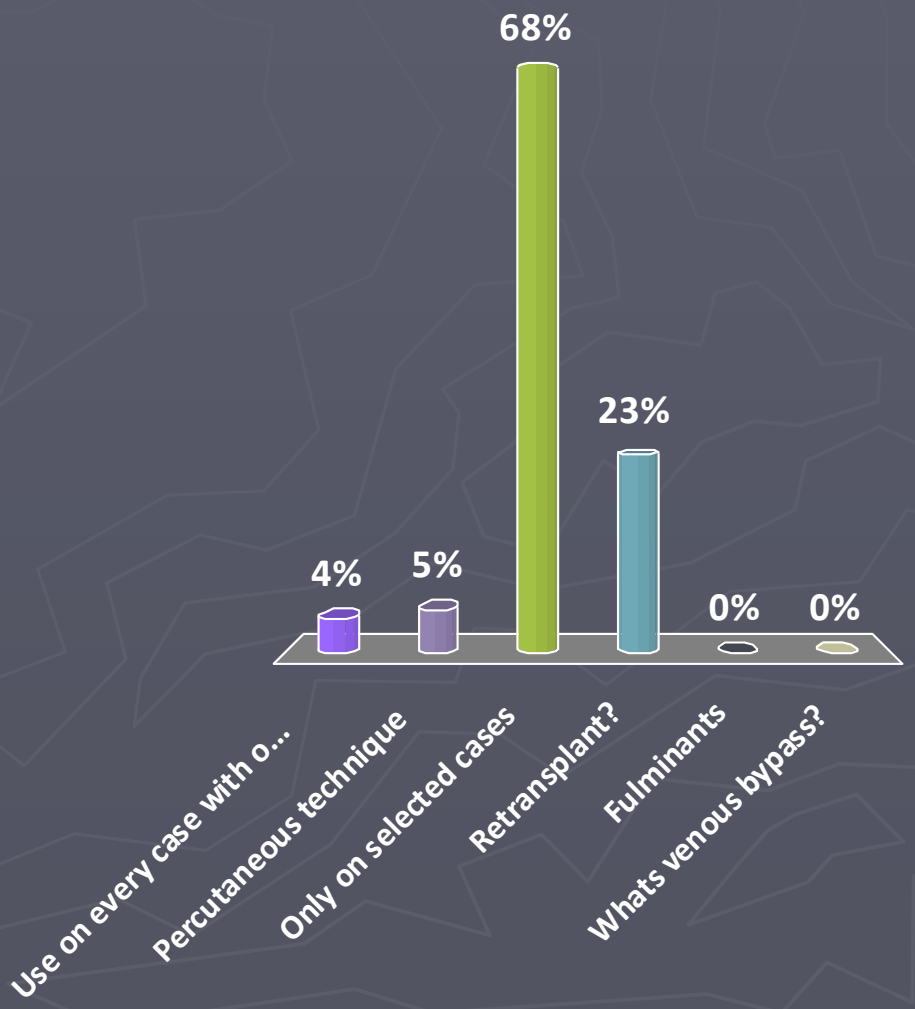
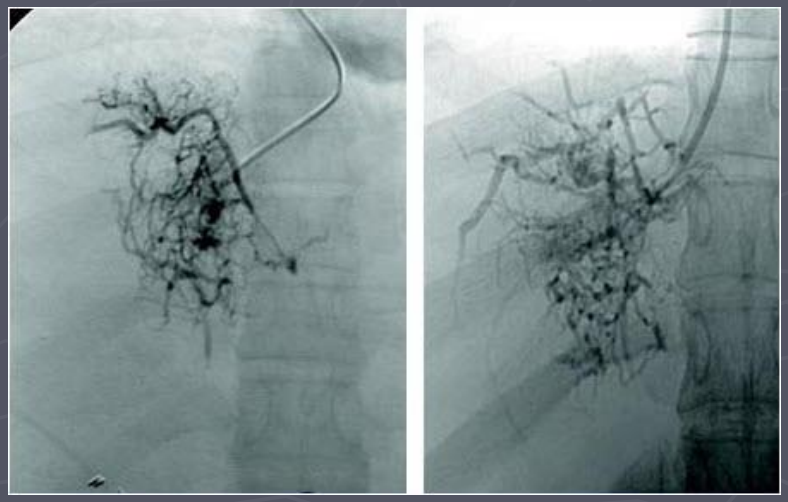


Budd-Chiari Syndrome

Technical Challenges of Budd Chiari

- Liver Huge-
- Caudate lobe hypertrophy with displacement of cava or distorted anatomy
- Previous operations
  - Prior porto-caval shunt
- Venous Thombosis
  - PVT
  - Caval thrombosis
- Nasty Collaterals



Slow is smooth…smooth is fast


Photo 14
< ! >
H
R
A
L
F

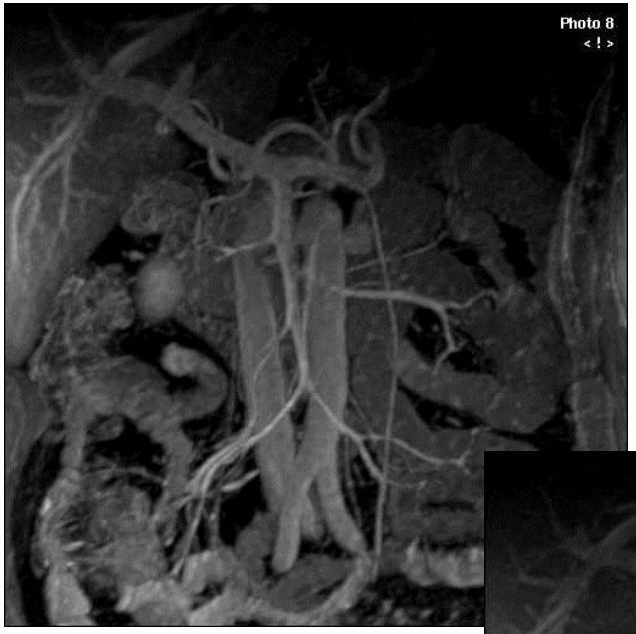


Photo 8
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Photo 12
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A Selective Approach to Managing Total Splanchnic Venous Thrombosis in Liver Transplantation

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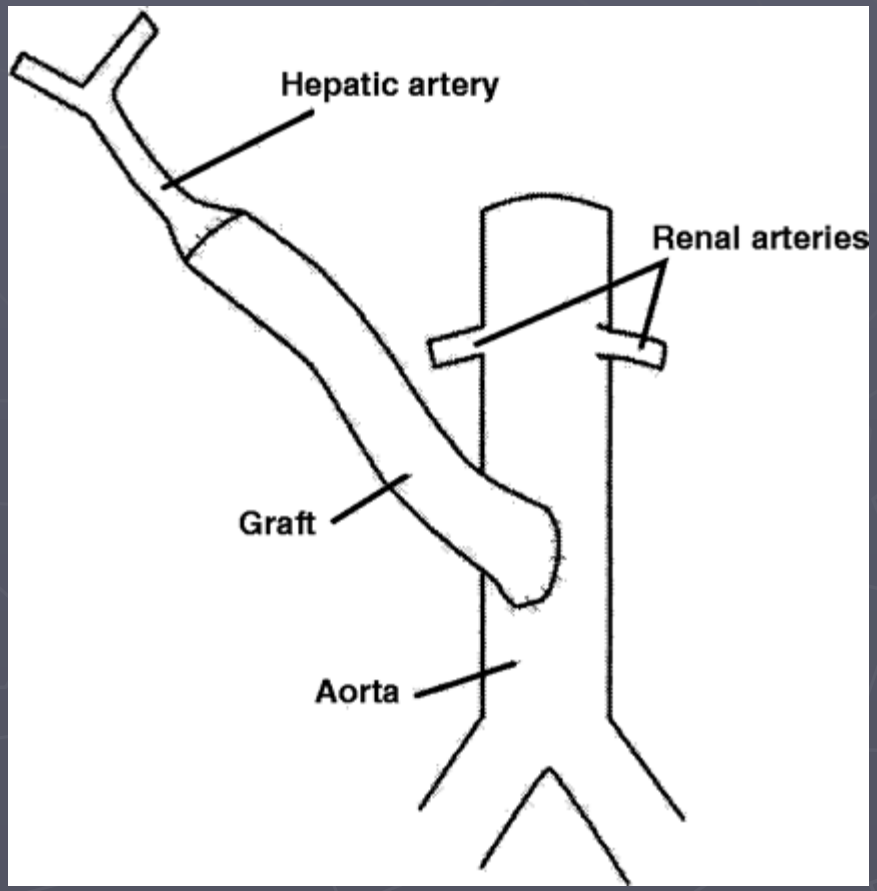
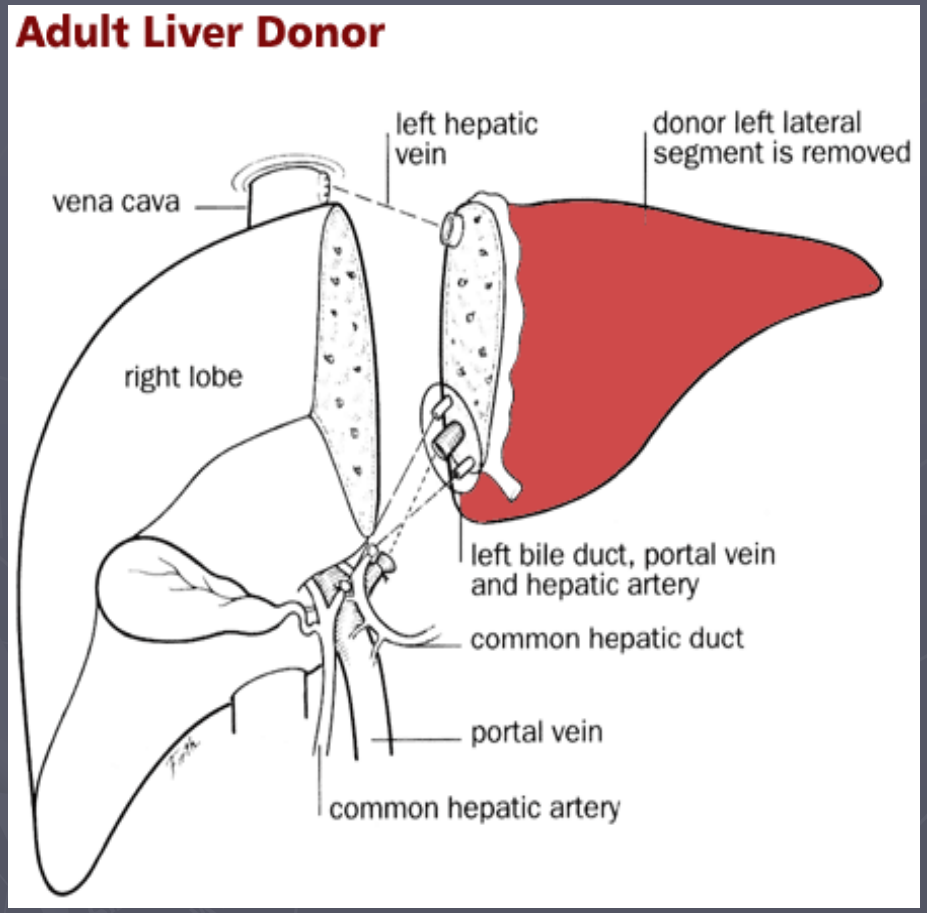
Professor of Surgery
Chief of Transplantation
University of Nebraska Medical Center


Hepatic artery
Renal arteries
Graft
Aorta

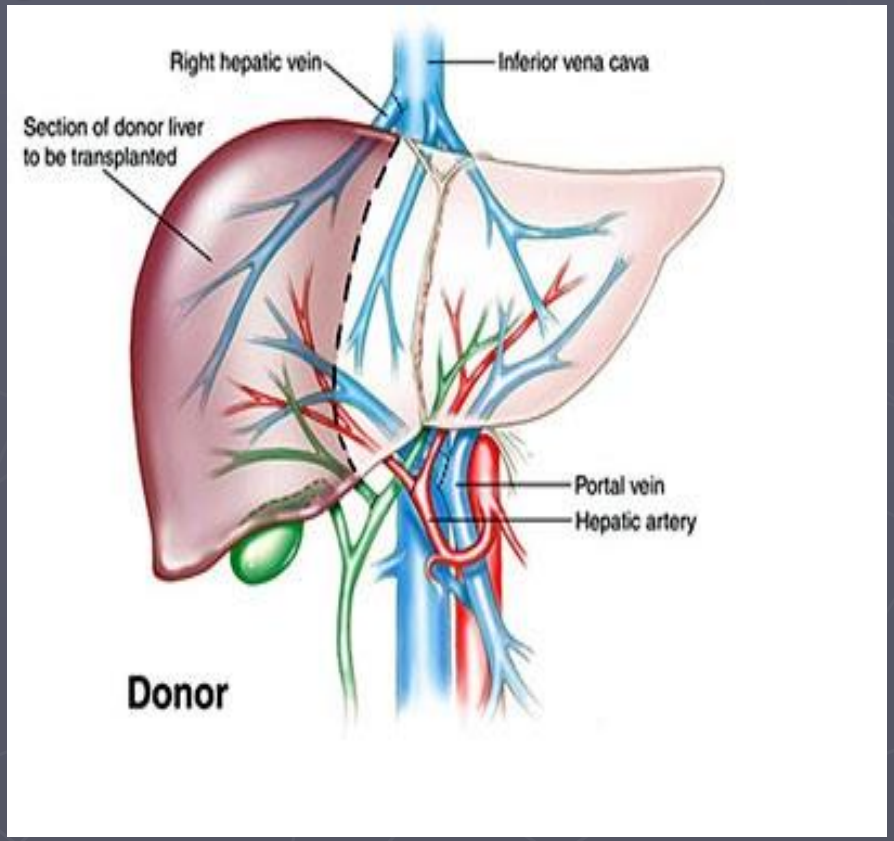
Avoidance the Best approach

Living Donor Liver transplant



Adult Living Donor Liver Transplant

- Donor events
- Complex reconstruction
- how many bile ducts?
- How many hepatic veins?
- Hepatic artery…size matters?



Imaging Studies

- Ultrasound
- CT angiogram
- MR angiography-
  - gadolinium enhanced
- Angiography
- Operating room

Pre-transplant management

- Repeat imaging
  - 3 to 6 months
- Anticoagulation
  - Pro
    - recanalization of venous thrombosis
    - No evidence of increased bleeding
    - Vit K antagonists
  - Con
    - Are you kidding????
    - Worsen variceal bleed
    - Increase bleeding during liver transplant