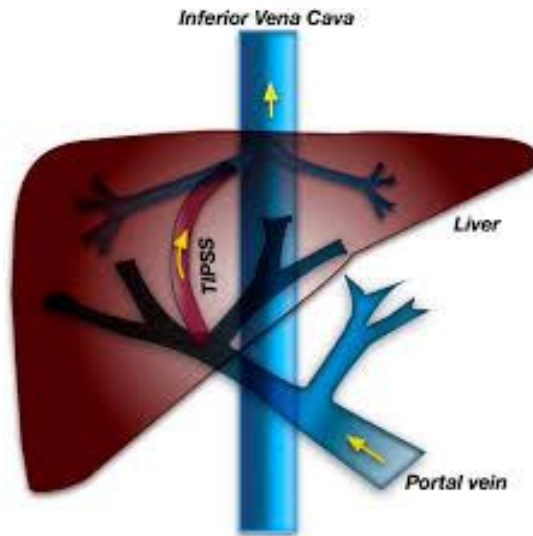


Anaesthesia for TIPSS



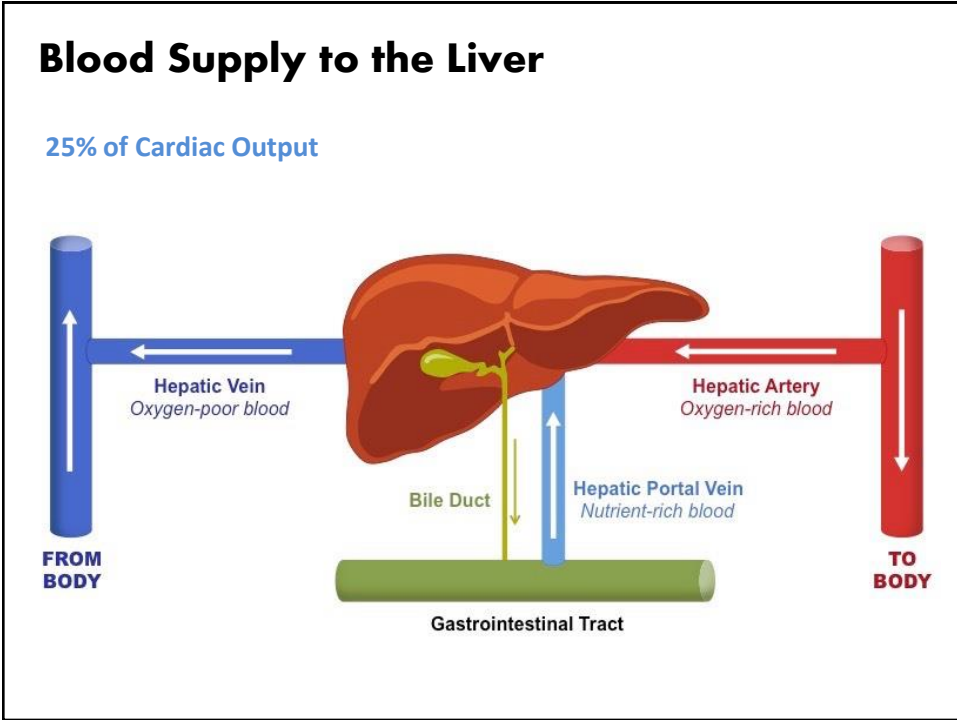
13

Anaesthesia for TIPSS

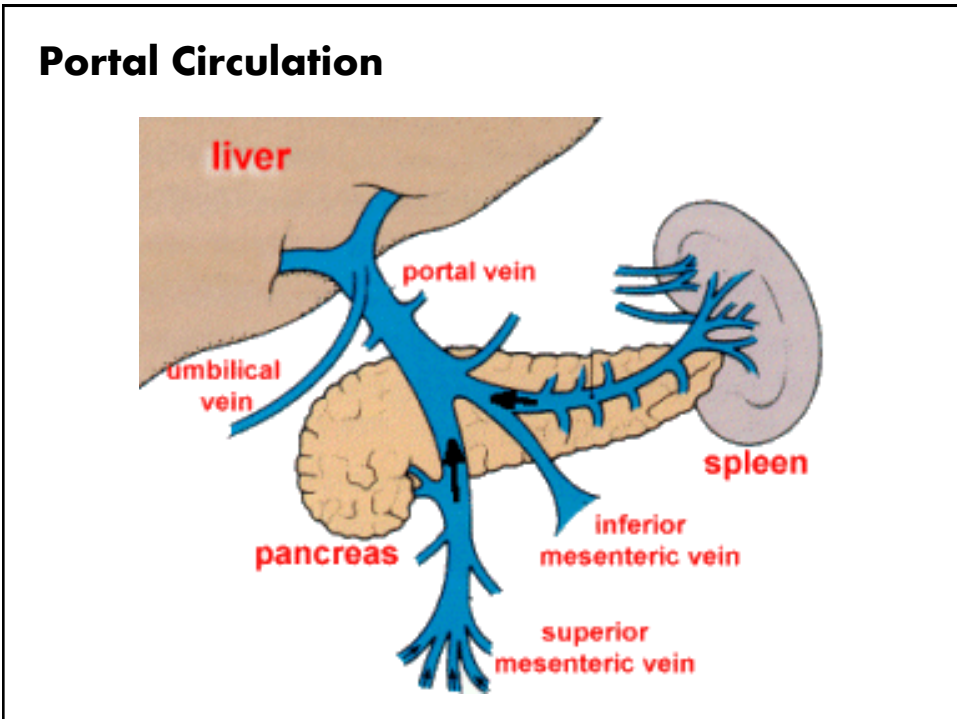
- The Procedure
- Patient Selection
- Conduct of anaesthesia
- Potential Complications

Experience of TIPSS

14



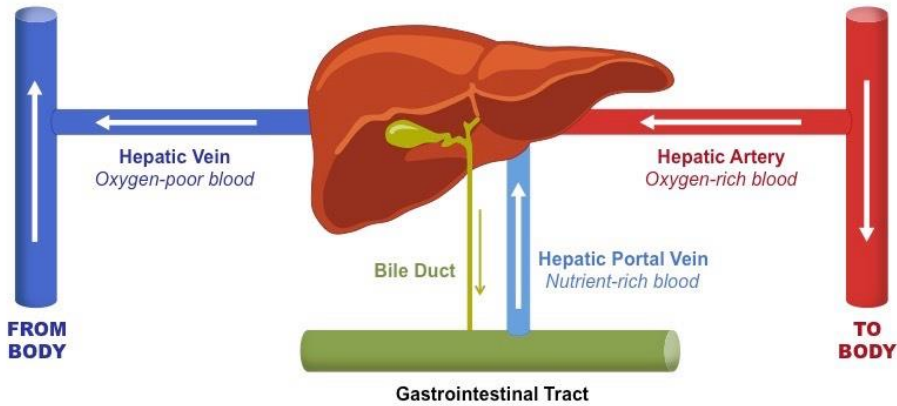
15



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Portal Hypertension

Structural disruption in the liver can increase resistance to portal blood flow



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Portal Hypertension

Pre-hepatic

- Portal vein thrombosis
- Splenic vein thrombosis

Intra-hepatic

- Alcoholic cirrhosis **90% of cases in the Western World**
- Non-alcoholic fatty liver disease (NAFLD)
- Viral hepatitis B and C
- Drugs (e.g. methotrexate)
- Wilson's disease
- Haemochromatosis
- Primary biliary cirrhosis
- Sarcoidosis
- Polycystic liver disease
- Idiopathic fibrosis

Post-hepatic

- Hepatic venous obstruction
- Budd-Chiari syndrome

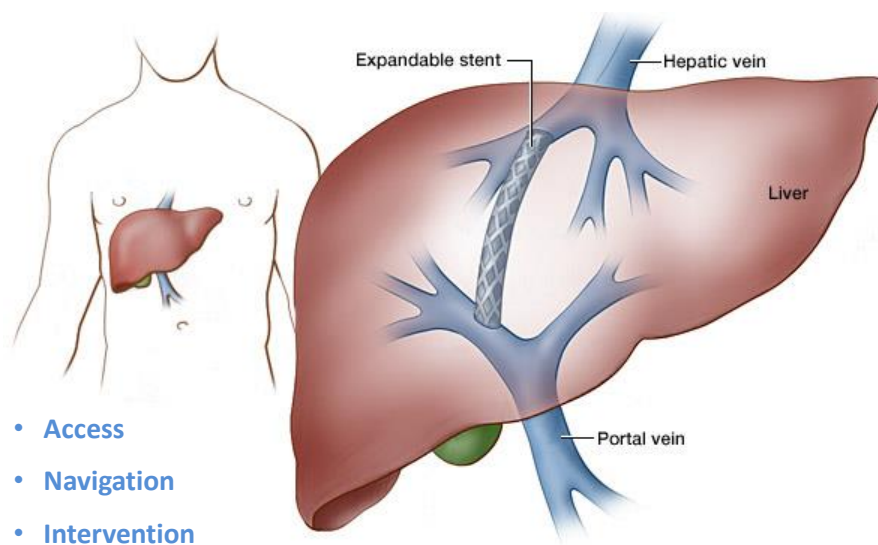
18

Portal Hypertension

- Significant impact on patient outcome and survival
- Clinically challenging and costly to manage
- Recurrent admissions and treatment for complications of portal hypertension
- TIPSS offers the minimally invasive option to lower portal pressure, provide symptom relief and confer survival benefit in selected patients

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Transjugular Intrahepatic Porto-Systemic Shunt



20

Hepatic Venous Pressure Gradient

- Normal HVPG is up to 5 mmHg
- Portal Hypertension is HVPG > 5 mmHg
- Clinical Manifestations occur at HVPG > 10 mmHg as collaterals develop
- Aim of TIPSS is to reduce HVPG to < 12mmHg

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Patient Selection

Significant evidence

Refractory ascites

Variceal bleeding

Limited evidence

Portal hypertensive gastropathy

Gastric antral vascular ectasia

Refractory hepatic hydrothorax

Hepatorenal syndrome

Budd–Chiari syndrome

Hepatic veno-occlusive disease

Hepatopulmonary syndrome

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Conduct of Anaesthesia

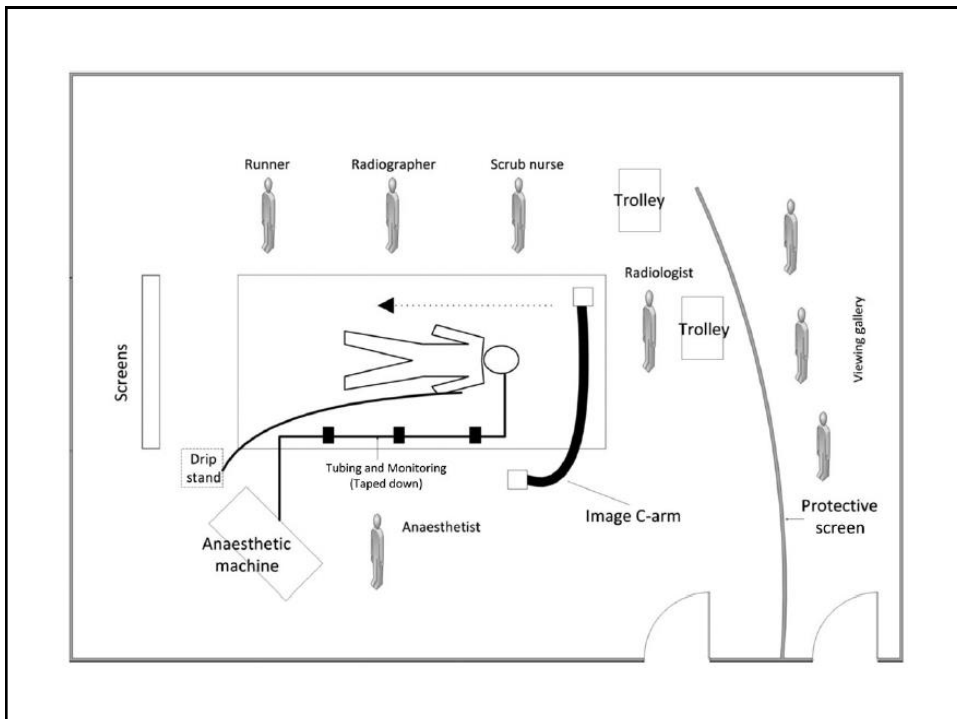
- Pre-procedure workup
- Remote site anaesthesia
- Unfamiliarity amongst anaesthetic and theatre staff
- Complicated patients with multiple comorbidities
- Risk of post-procedure complications

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Anaesthetic Technique

- Sedation or General Anaesthesia
- Likely GA
- Induction in theatre with transfers or in radiology suite
- Difficult IV access
- Tracheal Intubation
- Arterial Line
- Additional Pressure Transducer to measure HVPG
- TIVA or Volatile with muscle relaxant
- Depth of Anaesthesia Monitoring

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Post-Procedure Concerns

- Haemodynamic instability following any blood loss
- Heart Failure in susceptible groups
- Haemolytic anaemia between days 7 and 14
- Encephalopathy in 20% of patients
- Contrast nephropathy
- Gram Negative Sepsis
- Stent occlusion, thrombosis or dislodgement

27

CRQ – Question One

a) List the five components of the Child-Pugh Score (5 marks)

- Serum Albumin
- Ascites
- Bilirubin
- INR / Prothrombin Time
- Hepatic Encephalopathy

Mnemonic ABCDE:

Albumin, Bilirubin, Clotting (INR), Distension (Ascites), Encephalopathy

28

CRQ – Question One

a) List the five components of the Child-Pugh Score (5 marks)

Clinical and Lab Criteria	Points*		
	1	2	3
Encephalopathy	None	Mild to moderate (grade 1 or 2)	Severe (grade 3 or 4)
Ascites	None	Mild to moderate (diuretic responsive)	Severe (diuretic refractory)
Bilirubin (mg/dL)	< 2	2-3	>3
Albumin (g/dL)	> 3.5	2.8-3.5	<2.8
Prothrombin time			
Seconds prolonged	<4	4-6	>6
International normalized ratio	<1.7	1.7-2.3	>2.3
Child-Turcotte-Pugh Class obtained by adding score for each parameter (total points)			
Class A = 5 to 6 points (least severe liver disease)			
Class B = 7 to 9 points (moderately severe liver disease)			
Class C = 10 to 15 points (most severe liver disease)			

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MELD Score

Model for End-stage Liver Disease score = $6.43 + 3.78 \ln(\text{serum total bilirubin [mg per dL]}) + 11.2 \ln(\text{International Normalized Ratio}) + 9.57 \ln(\text{serum creatinine [mg per dL]})$

Score	90-day mortality (%)
≥ 40	71.3
30 to 39	52.6
20 to 29	19.6
10 to 19	6.0
≤ 9	1.9

NOTE: Although originally developed to predict three-month mortality in patients who had undergone transjugular intrahepatic portosystemic shunt procedure, the Model for End-stage Liver Disease score is now used to prioritize patients for liver transplant. Model for End-stage Liver Disease score calculators can be found at <http://www.thedrugmonitor.com/meld.html> and <http://www.mdcalc.com/meld-score-model-for-end-stage-liver-disease-12-and-older>.

30

CRQ – Question One

b) List four common causes of portal hypertension (4 marks)

Pre-hepatic
 Portal vein thrombosis
 Splenic vein thrombosis
 Intra-hepatic
 Alcoholic cirrhosis
 Non-alcoholic fatty liver disease (NAFLD)
 Viral hepatitis B and C
 Drugs (e.g. methotrexate)
 Wilson's disease
 Haemochromatosis
 Primary biliary cirrhosis
 Sarcoidosis
 Polycystic liver disease
 Idiopathic fibrosis
 Post-hepatic
 Hepatic venous obstruction
 Budd-Chiari syndrome

31

CRQ – Question One

c) List the two indications, both consequences of portal hypertension, for TIPS procedure with the most evidence of benefit (2 marks)

- **Refractory Ascites**
Diuretic-resistant ascites which requires frequent paracentesis
- **Variceal Bleeding**
TIPSS can be used to control haemorrhage from oesophageal and gastric varices, and to prevent recurrence once initial control has been established

32

CRQ – Question One

- c) List the two indications, both consequences of portal hypertension, for TIPS procedure with the most evidence of benefit (2 marks)

Indications with limited evidence of benefit following TIPSS:

- Portal hypertensive gastropathy
- Gastric antral vascular ectasia
- Refractory hepatic hydrothorax
- Hepatorenal syndrome
- Budd–Chiari syndrome
- Hepatic veno-occlusive disease
- Hepatopulmonary syndrome

33

CRQ – Question One

- d) Which blood vessel is most frequently punctured percutaneously as part of the TIPS procedure? (1 mark)

- Right Internal Jugular Vein

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CRQ – Question One

e) Between which two vessels is a communication made during the TIPS procedure? (2 marks)

- Hepatic Vein
- Hepatic Portal Vein

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CRQ – Question One

f) What will be the effect on the following immediately following TIPS? (2 marks)

- Preload: Increase
- Pulmonary artery pressure: Increase

36

CRQ – Question One

g) List four contraindications to performing a TIPS procedure (4 marks)

Absolute contraindications

- Heart failure
- Severe tricuspid regurgitation
- Severe pulmonary hypertension (mean pulmonary pressure >45 mm Hg)
- Multiple hepatic cysts
- Sepsis
- Biliary obstruction

37

CRQ – Question One

g) List four contraindications to performing a TIPS procedure (4 marks)

Relative contraindications

- Hepatocellular carcinoma
- Obstruction of all hepatic veins
- Portal vein thrombosis
- Severe coagulopathy
- Thrombocytopenia (platelet count < 20×10^9 litre⁻¹)
- Prior hepatic encephalopathy
- Moderate pulmonary hypertension

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