VARICEAL BLEEDING

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Disclosures: None

OUTLINE

- Pathophysiology of portal hypertension
  - Splanchnic derangements
  - Systemic derangements

- Initial Management

- Interventions for hemostasis: Pharmacologic & Endoscopic

- Management of refractory bleeding
  - TIPS / BRTO
  - Other therapies: Balloon Tamponade/ Esophageal stents/ hemostatic powders

- Systemic complications

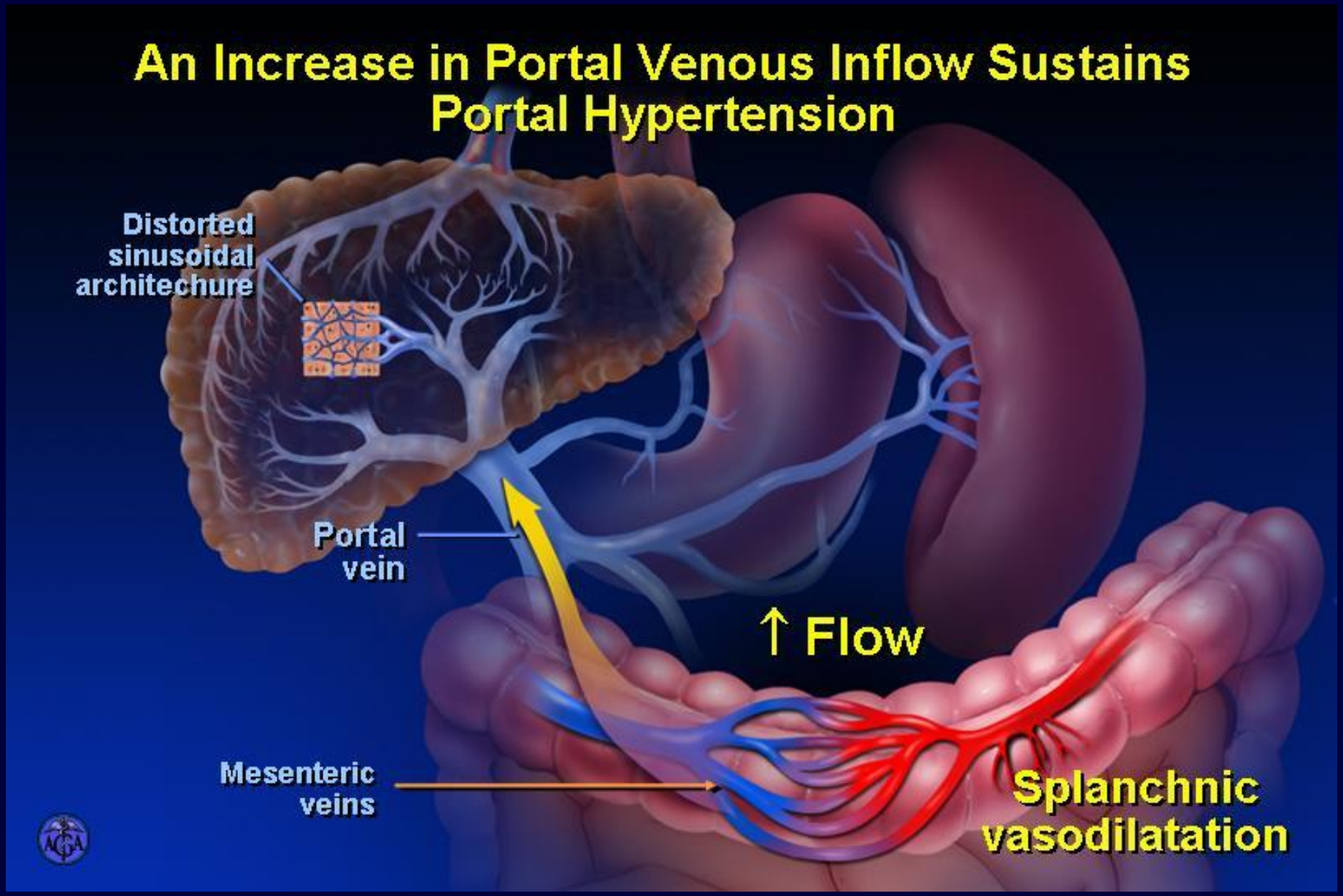
Mechanisms of Portal Hypertension

- Pressure (P) results from the interaction of resistance (R) and flow (F):

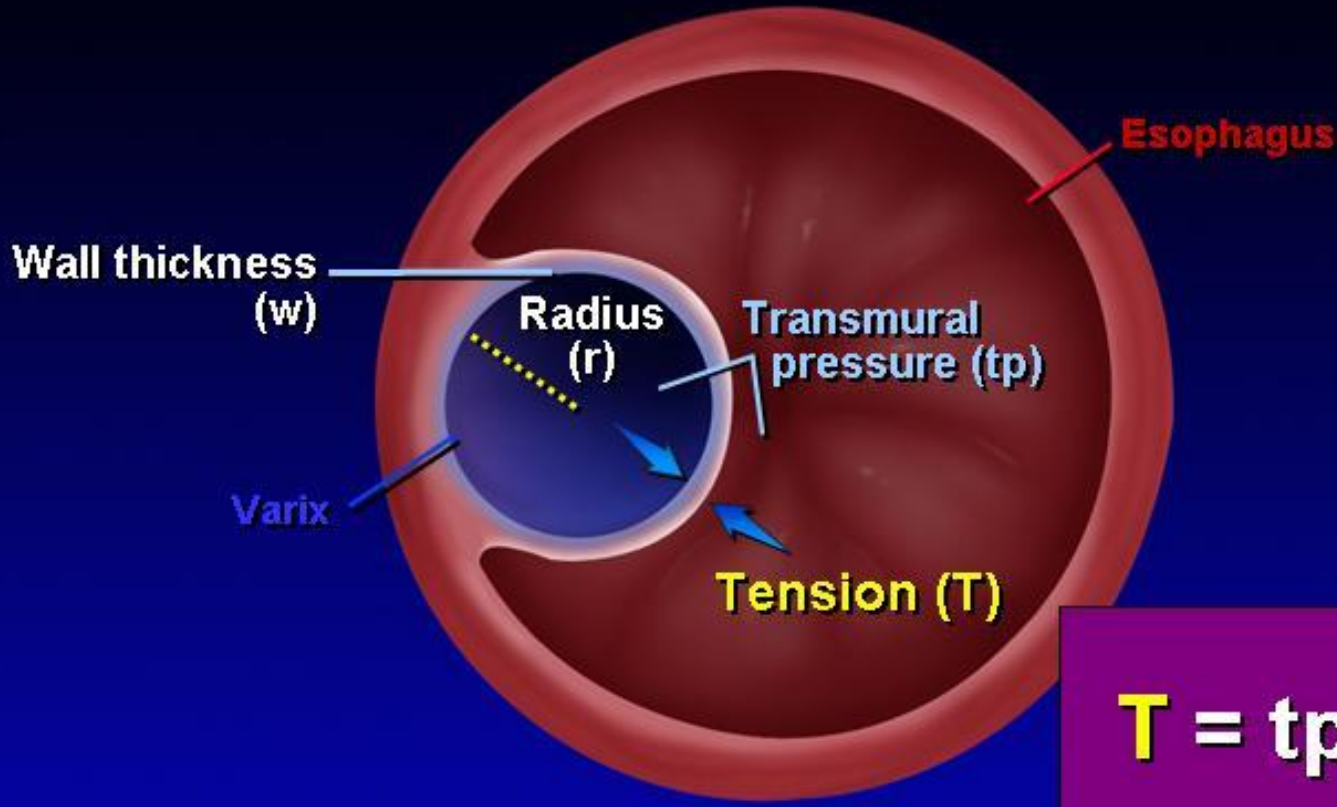
$$P = R \times F$$

- Portal hypertension can result from:
  - **increase in resistance** to portal flow and/or
  - **increase in portal venous inflow**

An Increase in Portal Venous Inflow Sustains Portal Hypertension

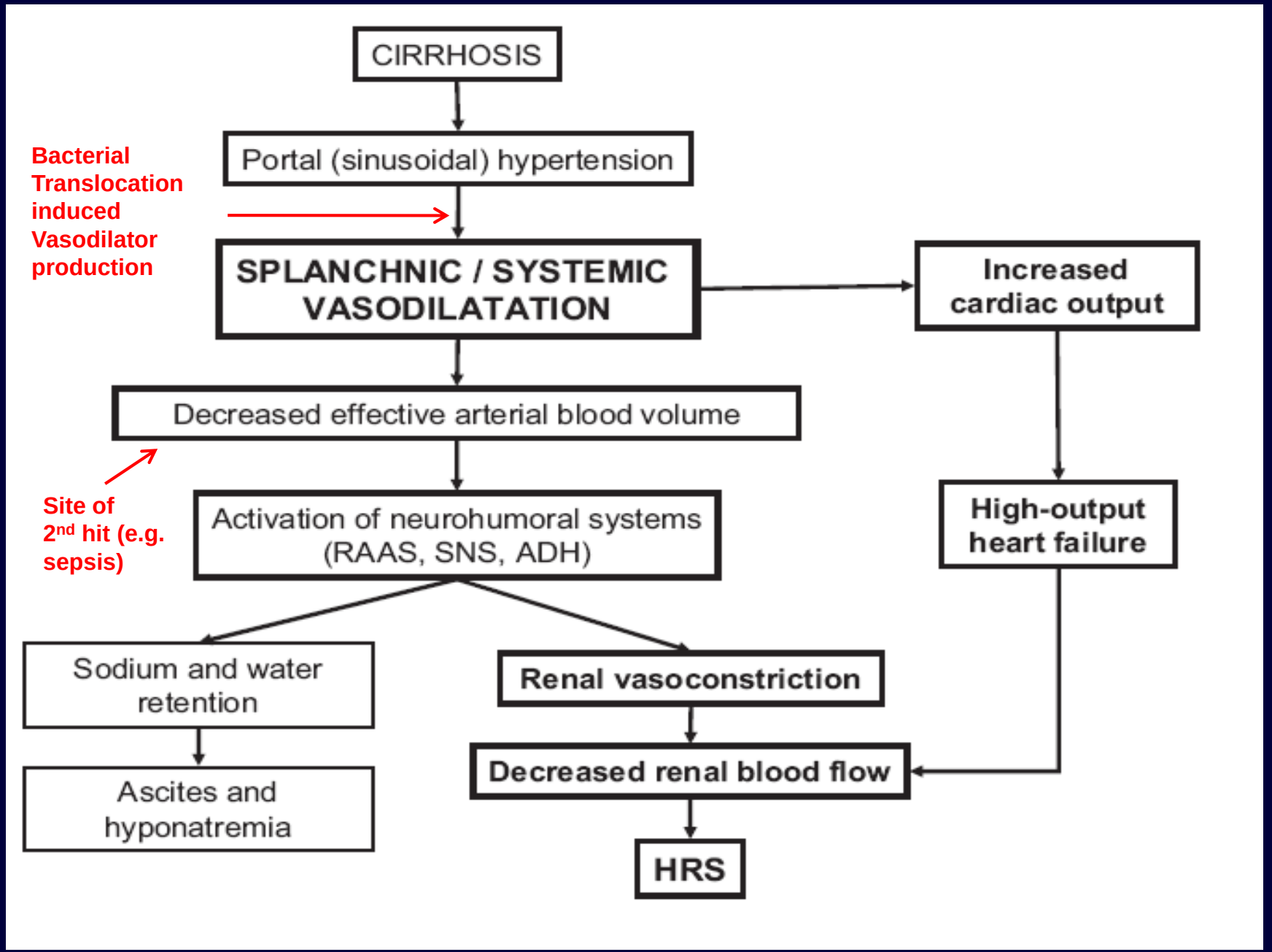


Variceal Wall Tension (T) is a Major Determinant of Variceal Rupture



$$T = tp \times \frac{r}{w}$$

Groszmann, Gastroenterology 1984; 80:1611


CIRRHOSIS
Portal (sinusoidal) hypertension
Bacterial Translocation induced Vasodilator production
SPLANCHNIC / SYSTEMIC VASODILATATION
Increased cardiac output
Decreased effective arterial blood volume
Site of 2nd hit (e.g. sepsis)
Activation of neurohumoral systems (RAAS, SNS, ADH)
High-output heart failure
Sodium and water retention
Renal vasoconstriction
Ascites and hyponatremia
Decreased renal blood flow
HRS

Initial Management

- Large bore IV access. Central line for CVP monitoring and administration of pressors
- Consider Arterial Line for persistent hypotension; MAP target of 65 mm Hg ?
- Intubation for airway protection, advanced HE, and to facilitate EGD.
- Ventilator management: Consider low TV and PEEP strategies to minimize post-sinusoidal portal hypertension
- Cautious volume resuscitation. Restrictive transfusion strategy (target Hgb > 7g/dl) shown to improve survival. (*Villanueva et al. NEJM 2013*)
- No current evidence based guidelines regarding management of coagulopathy and thrombocytopenia. Consider Plt target of 50,000, and TEG / ROTEM to guide correction of coagulopathy.
- Hepatic vascular imaging to assess for PVT

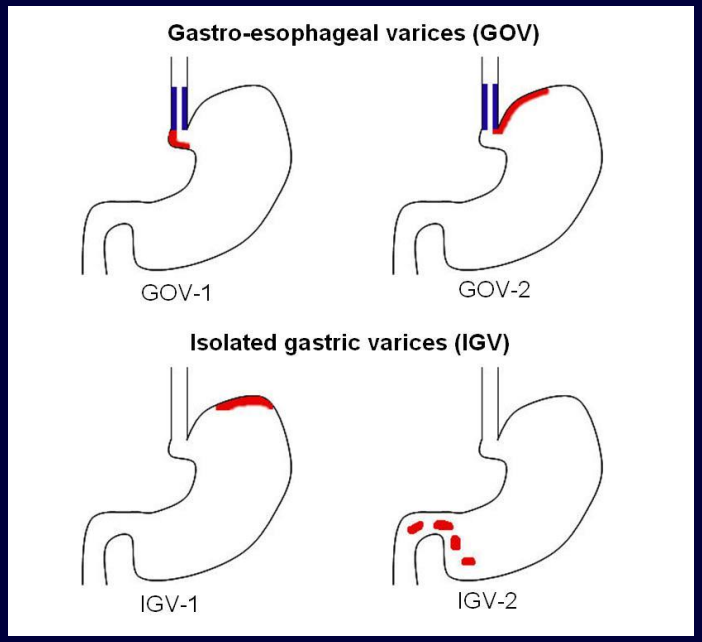
Hemostatic Interventions: Pharmacologic

- **Splanchnic Vasoconstrictors**(Octreotide/Terlipressin):
  - Documented efficacy for hemostasis in multiple trials, with survival benefit documented for terlipressin (*Baveno VI guidelines, J of Hep. 2015*).
  - Duration 5 days
  - Combination therapy with endoscopic therapy superior to either therapy alone

- **Antibiotics:**
  - shown to decrease mortality and rebleeding (*Bernard et al. Hepatology 1999*).
  - Current recommendation: IV Ceftriaxone 1g/ 24h in advanced cirrhosis. (*Baveno VI guidelines, J of Hep. 2015*)

- **PPI:** ? utility in the acute setting. Possible benefit in decreasing post banding ulcers (*Shaheen et al. Hepatology 2005*)

Hemostatic Interventions: Endoscopic



- Pre-endoscopy : Erythromycin (250mg IV) if no prolonged QT
- **Esophageal varices (GOV1)**: Band ligation superior to Sclerotherapy with regard to hemostasis, rebleeding and complications. (*Villanueva et al. J of Hep. 2006*)
- **Gastric varices (IGV and GOV2):** Cyanoacrylate injection superior to EBL with respect to rebleeding (*Tan et al. Hepatology 2006). TIPS treatment of choice in many centers*.

Management of refractory bleeding-IR options

TIPS (Transjugular Intrahepatic Portosystemic Shunt)

- *Indications:*
  - Refractory/ Recurrent EV bleeding (after 2nd failed endoscopic attempt)
  - Initial & Refractory GV bleed
  - 'Pre-emptive' after initial endoscopic hemostasis in 'high risk' patients defined as Childs B with bleeding or Childs C <14 (*Garcia-Pagan et al. NEJM 2010*)

- *Contraindications:*
  - Portal and mesenteric vein thrombosis
  - Heart failure (especially RV dysfunction due to severe POPH)
  - 'High' MELD ?

BRTO (Balloon Retrograde Transvenous Obliteration)

- In the setting of a TIPS contraindication, potential IR option that involves sclerosing the culprit portosystemic collateral derived from a spontaneous splenorenal shunt.

Additional Therapies

Balloon Tamponade:

- Sequential inflation of gastric and esophageal balloons
- Successful hemostasis in up to 80-90% of refractory cases, but > 50% incidence of rebleeding after deflation
- Risk of esophageal perforation and aspiration
- Finite duration of inflation(~ 48 hours),and typically used as bridge to TIPS

Esophageal stents:

- Self expanding metal stent that is increasingly gaining use instead of balloon tamponade
- Initial findings suggest improved efficacy and safety compared to balloon tamponade in the treatment of refractory EV bleeding (*Escorsell et al. Hepatology 2016*)

Hemostatic Powders:

- Non-contact sprayable hemostatic powders that are demonstrating preliminary benefit in AVB prior to EBL and in treatment of band ulcers

Potential Systemic Complications

Neurologic:

- Increased risk of post bleed hepatic encephalopathy
- Risk of septic encephalopathy in the setting of infectious complication

Cardiovascular:

- Hemorrhagic shock due to massive blood loss.
- Superimposed septic shock in the setting of concomitant infection
- Hypocalcemia induced hypotension following massive transfusion

Pulmonary:

(a) Risk of TRALI (b) Aspiration pneumonia

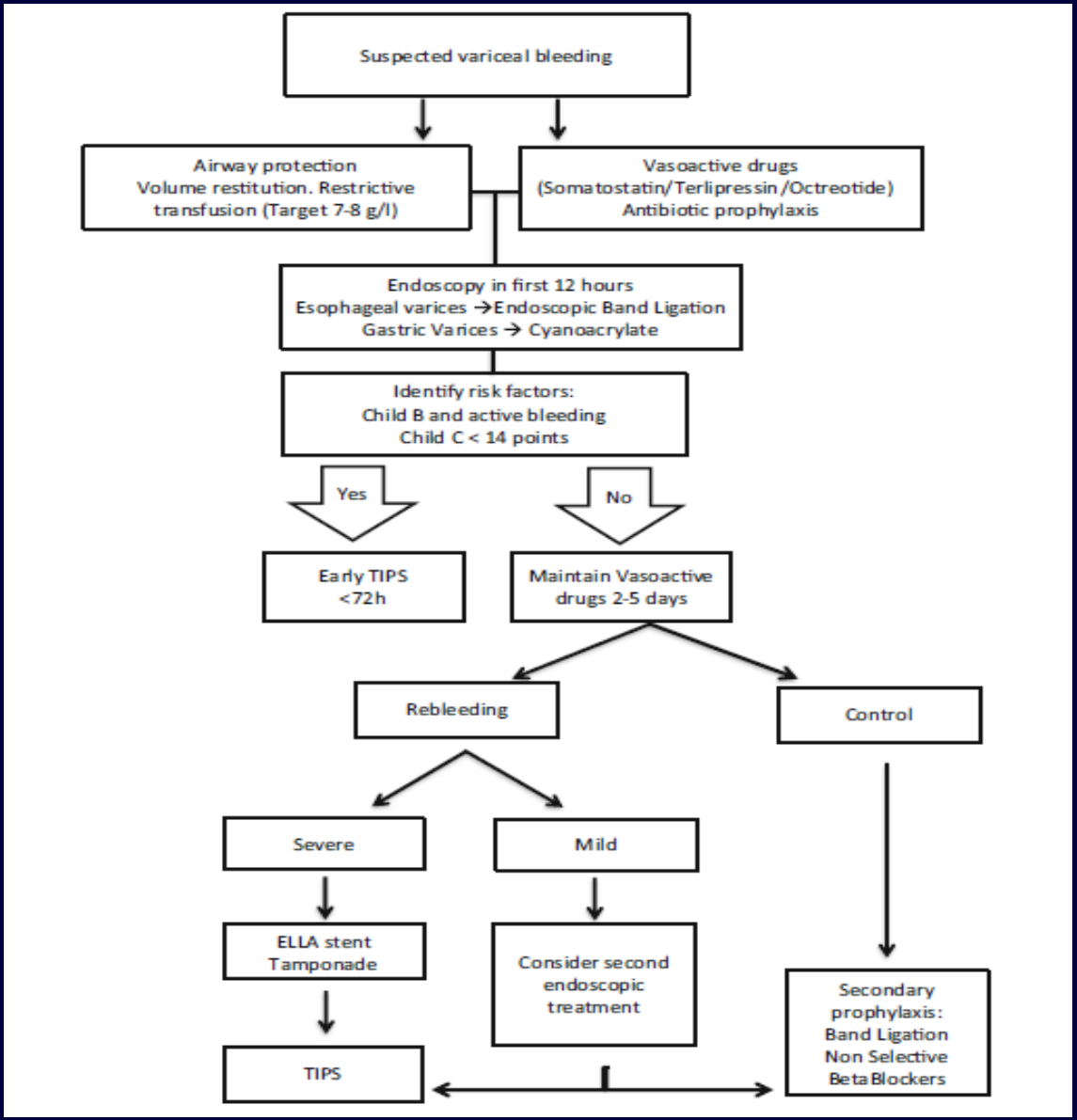
Renal:

  - Hypotension induced acute kidney injury (AKI) (ATN/ T1 HRS)
  - Metabolic acidosis

ID:

  - Increased risk of infections, including SBP and Pneumonia

Summary Algorithm



Hernandez-Gia et al. Hep Int. 2017