

Oedema and Ascites

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Total fluid volume and distribution

- Total body fluid 70% of body mass
- Total body fluid is mainly distributed in intracellular and extracellular compartments
 - Intracellular fluid (ICF) : 50%
 - Extracellular fluid (ECF): 20%
 - Interstitial fluid: 15%
 - Plasma: 5%

Edema

- What is edema?
 - Definition: Edema is a palpable swelling produced by expansion of the interstitial fluid volume



EDEMA can be :

- Local (Pulmonary, cerebral, pharyngeal)
- Disseminated (Increasing of interstitial fluid volume)
- Intraperitoneal - Ascites
- Intrapleural - Hydrothorax

• Causes of oedema

1. Increased total extracellular fluid

- Congestive heart failure
- Renal failure
- Liver disease

2. High local venous pressure

- Deep venous thrombosis or venous insufficiency
- Pregnancy
- Pelvic tumour

3. Low plasma oncotic pressure/serum albumin

- Nephrotic syndrome
- Liver failure
- Malnutrition/malabsorption

4. Increased capillary permeability

- Leakage of proteins into the interstitium, reducing the osmotic pressure gradient that draws fluid into the lymphatics and blood
- Infection/inflammation
- Severe sepsis
- Calcium channel blockers

5. Lymphatic obstruction

- Infection: filariasis, lymphogranuloma venereum (pp. 290 and 341)
- Malignancy
- Radiation injury
- Congenital abnormality

Pitting Edema Scale



Grade	Definition
1+	2mm or less disappears immediately
2+	2-4 mm few second rebound
3+	4-6 mm 10-12 second rebound
4+	6-8 mm > 20 second rebound

Non pitting oedema seen in

- Lymphedema
- Lipedema
- Myxoedema



Consequences of oedema

- Life threatening in some locations, such as brain, larynx, lungs.
- Interfering with movement and limiting joint motion.
- Affect diffusion of oxygen, nutrients and wastes at the tissue level.

Treatment of edema

- Correcting or controlling the cause
- preventing tissue injury
- Diuretic therapy
- Elastic support stockings and sleeves for patients with lymphatic or venous obstruction
- Administering albumin intravenously to raise the colloidal osmotic pressure when edema is caused by hypoalbuminemia

ASCITES

- Def: Abnormal accumulation of fluid in the peritoneal cavity due to the imbalance between the formation & resorption of peritoneal fluid.
- Small amounts of ascites are asymptomatic, but accumulations of fluid (> 1 L) sign and symptoms develop



Clinical features

- Symptoms

- Abdominal distention with fullness of flanks
- Decrease urinary output
- Pressure symptoms – Dyspnoea
- Symptoms according to cause

Signs

Inspection

- Abdominal distention
- Everted umbilicus
- Fullness of flanks

Palpation

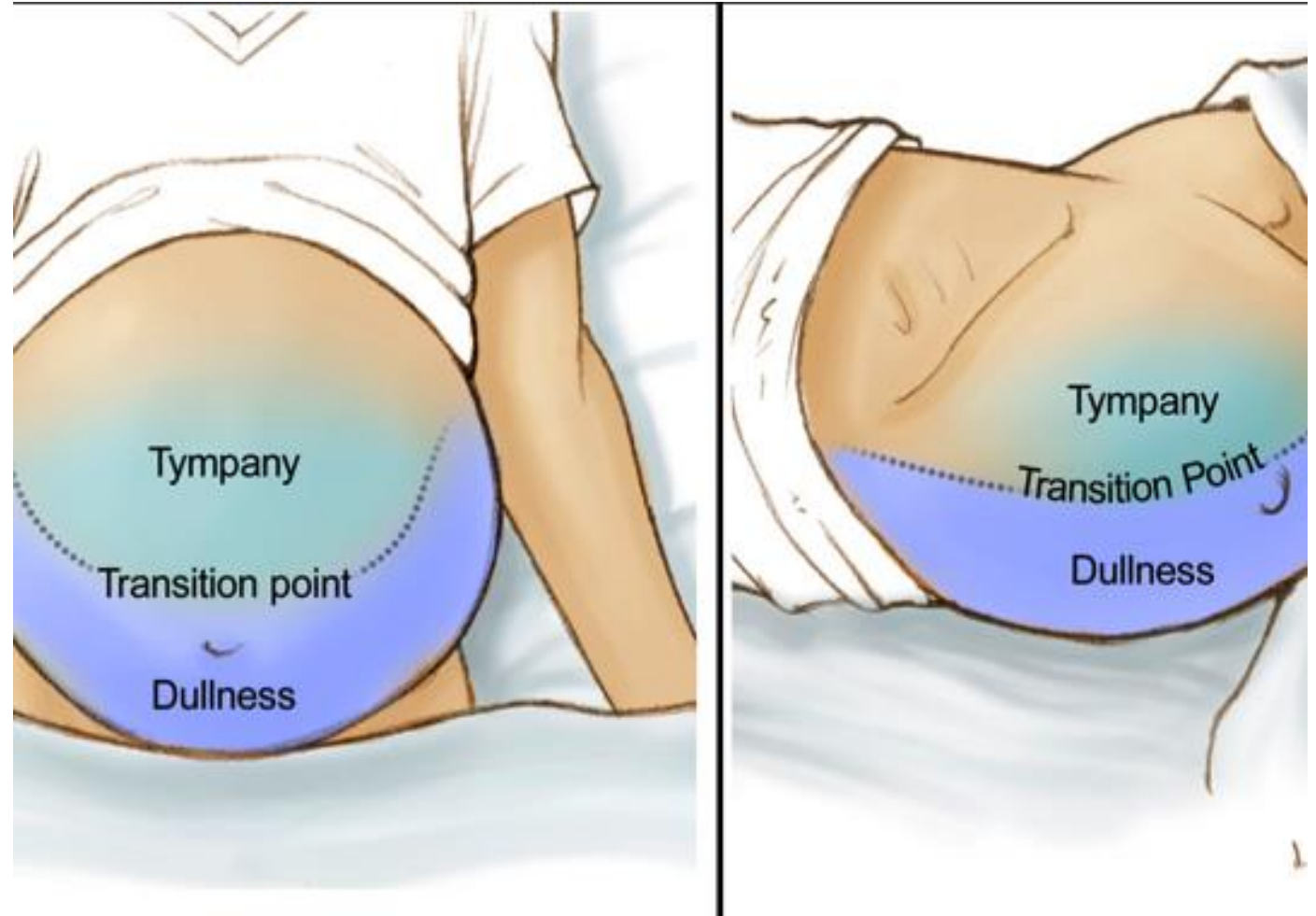
- Difficult organ palpation
- Fluid thrill – present

Percussion

- Shifting dullness – present

Auscultation

- Inaudible/Diminished bowel sound



Pathophysiology of Ascites

Elevated Hydrostatic pressure

- Cirrhosis of liver
- Congestive cardiac failure
- Constrictive pericarditis
- Hepatic venous outflow obstruction
- Acute portal vein thrombosis

Decreased oncotic pressure

- Cirrhosis of liver
- Nephrotic syndrome
- Protein losing enteropathy
- Malnutrition

Peritoneal fluid production > resorption

- infection (bacterial, T.B, Fungal)
- neoplasm

Most common aetiologies

- 1) Cirrhosis – 81%
 - 2) Malignancy – 10%
 - 3) CHF – 3%
- All other aetiologies are $\leq 2\%$

Transudative ascites (protein <2.5g.dl)

- Portal HTN & Cirrhosis
- Fulminant hepatic failure
- Alcoholic hepatitis
- Congestive heart failure
- Constrictive pericarditis
- Hypoalbuminemia
- Nephrotic syndrome
- Protein losing enteropathy
- Severe malnutrition

Exudative (protein >2.5 g/ dl)

- Infections – tuberculosis, bacterial peritonitis
- Malignancy – hepatic or peritoneal

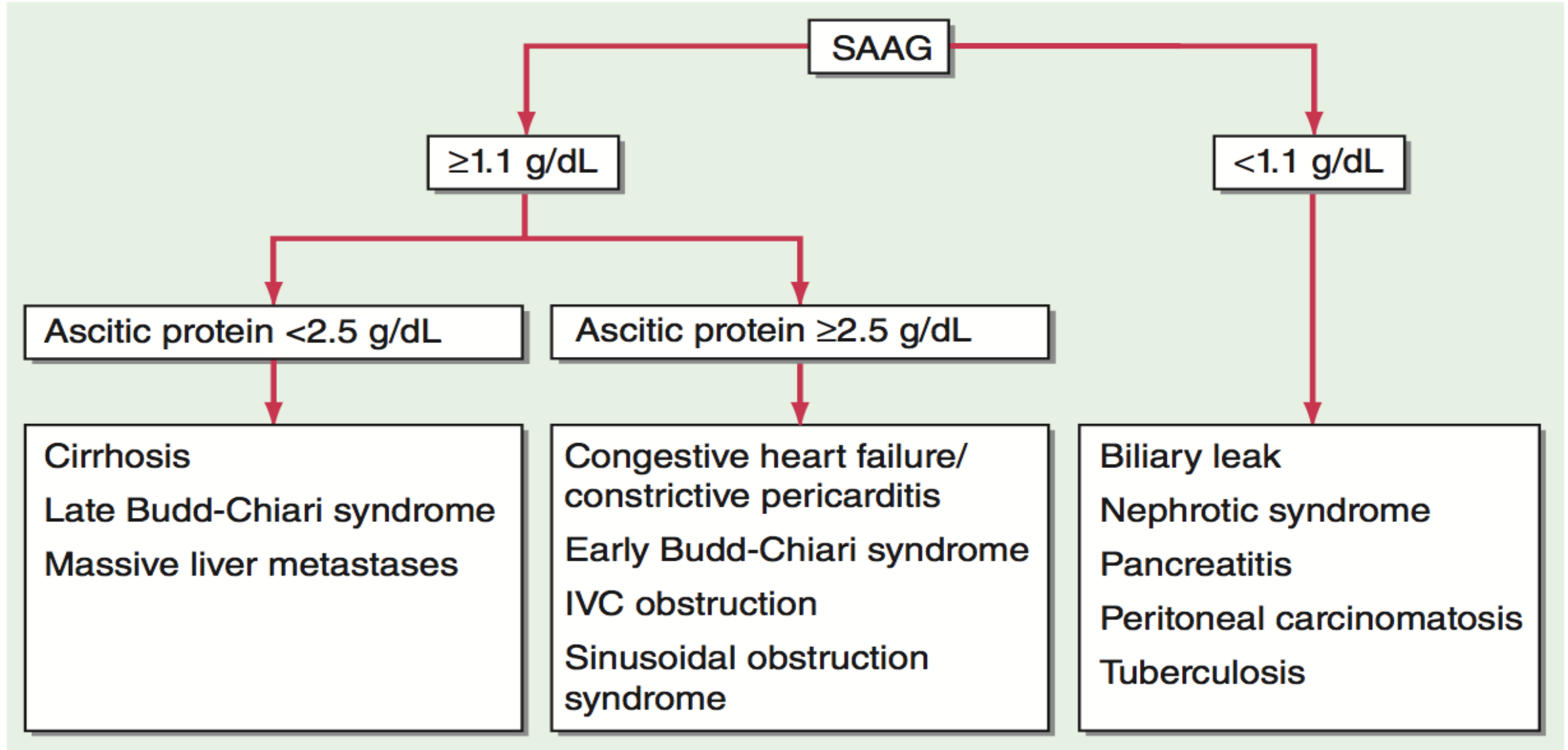
Investigation

- CBC & ESR
- Aspiration and analysis of ascitic fluid
- U/S of Abdomen
- CT of Abdomen
- Investigation according to cause

- **Tests of Ascitic Fluid**

Routine Tests	Optional tests
Total protein	Gram's stain & culture
Albumin	Cytology
Cell count	AFB smear
	Cytology
	Amylase
	Lactate dehydrogenase (LDH) Glucose

Ascites can be categorised by measuring serum-ascitic albumen gradient (SAAG)



Ascitic fluid: appearance and analysis

Cause/appearance

- Cirrhosis: clear, straw-coloured or light green
- Malignant disease: bloody
- Infection: cloudy
- Biliary communication: heavy bile staining
- Lymphatic obstruction: milky-white (chylous)

Useful investigations

- Total albumin (plus serum albumin) and protein*
- Amylase
- Neutrophil count
- Cytology
- Microscopy and culture

Treatment:

- Rx of cause
- Bed rest till ascites subsides
- Diet – Restriction of salt
- Restriction of water (500ml + Previous day urine output)
- Diuretics
 - Spironolactone (100-400mg/day)
- Paracentesis (Therapeutic fluid aspiration) 3-5 liters over 1-2 hr. for immediate relieve of cardio-respiratory distress.

DDx

5F

- Fatty person
- Fetus
- Feces (Intestinal obstruction)
- Neoplastic mass in the abdomen (Fibroid, ovarian cyst)
- Full bladder/chronic Urine retention

Complications:

- Spontaneous bacterial peritonitis
- Hernia
- Cardio-respiratory distress

