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A REVIEW ARTICLE ON ASCITES DISEASE

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Abstract:

Ascites is defined as accumulation of more than 25 ml of fluid in the peritoneal cavity. In Western countries, development of ascites is in 75% of cases due to underlying cirrhosis [European Association for the Study of the Lever, 2010], but other less common etiologist ofascites such as malignancy, congestive heart failure, Budd Chiari syndrome, tuberculosis and pancreatitis should be considered – especially if ascites is the first presenting symptom. Ascites is one of the most frequent complications to cirrhosis occurring in approximately 60% of patients within 10 years of diagnosis [genial. 1987a]. The development of ascites in the setting of cirrhosis represents a landmark in the natural history of cirrhosis, predicting a poor prognosis with 50% mortality within 3 years [Fernandez- al. 2001; Guevara et al. 2005]. Consequently, occurrence of ascites signifies the need to consider referral for liver transplantation, which remains the ultimate treatment option of cirrhosis. Ascites formation often develops in cirrhotic patients presenting with acute-on-chronic liver failure (ACLF), which is acute worsening of liver function due to a precipitating event, e.g. infection, upper gastrointestinal bleeding, electrolyte disturbances [2014].Portal hypertension is a prerequisite for development of cirrhotic ascites [Ripoll et al. 2007]. Survival of cirrhosis depends mainly on the degree of portal hypertension, the degree of liver insufficiency and the degree of circulatory dysfunction. The principles behind treatment of ascites include diuretics, paracentesis, insertion of a intrahepatic portosystemic shunt (TIPS), as well as managing complications to ascites such as spontaneous bacterial peritonitis (SBP). SBP occurs in approximately 25% of patients due to bacterial translocation [Wiest and Garcia-Tsao, 2005; Wiest et al. 2014], which is crossing of gut bacteria or bacterial products from the gut lumen to the blood (and ascitic fluid).

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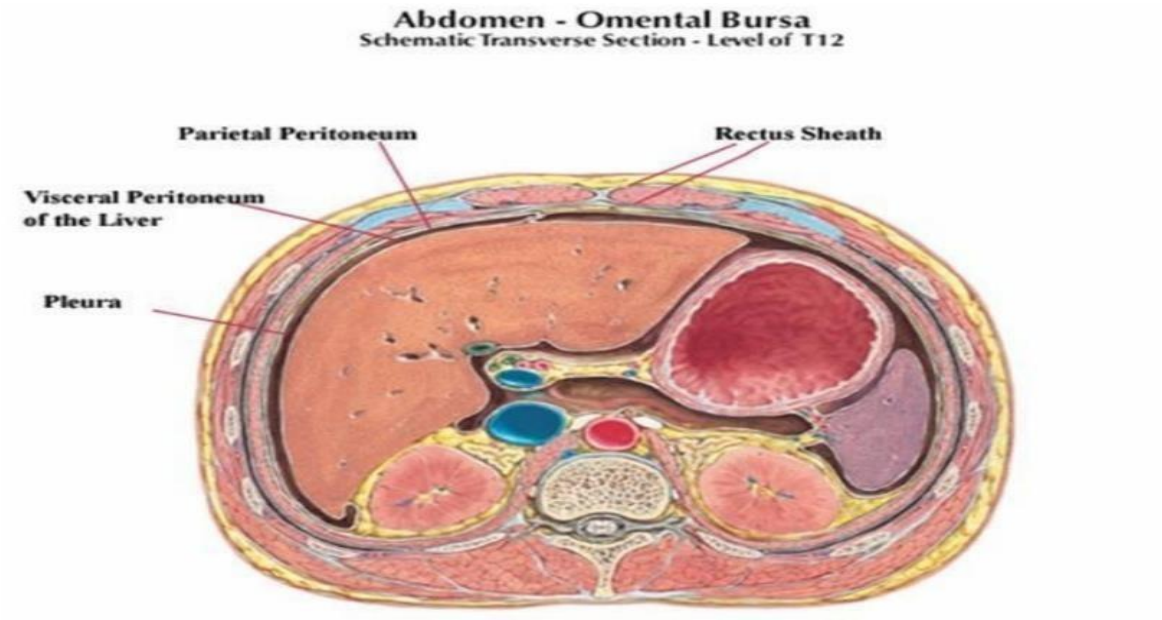
INTRODUCTION:

WHAT IS ASCITES

- Ascites Derived from the Greek word “askos”, meaning bag or sac.
- Defined as the accumulation of fluid in the peritoneal cavity.
- It is a common clinical finding, with many extraperitoneal and peritoneal causes, but most common from liver cirrhosis.

Peritoneal cavity

- It is a potential space between the parietal peritoneum and visceral peritoneum, the two membranes separate the organs in the abdominal cavity from the abdominal wall.
- Derived from the coelomic cavity of the embryo.
- Largest serosal sac in the body and secretes approximately 50 ml of fluid per day.



Types of Ascites

Transudate Ascites

●In this fluid buildup caused by systemic conditions that alter the pressure in blood vessels causing fluid to leave the vascular system

Exudates :-

● In this fluid buildup is caused by leakage due to inflammation or local cellular damage

CAUSES OF ASCITES

ASCITES WITH ANASARCA: -

- congestive cardiac failure
- nephrotic syndrome
- hypoproteinaemia with severe anemia {nutritional}
- pericardial effusion
- Constrictive pericarditis

●Myxedema
●Filariasis
●Protein losing enteropathy.
●Epidemic dropsy

ASCITES WITH OUT ANASARCA:

●Cirrhosis of liver (may lead to anasarca)

Peritonitis –

●acute pyogenic peritonitis
●Tuberculous peritonitis
●Malignant peritonitis
●Spontaneous bacterial peritonitis
●Portal vein thrombosis
●Pancreatic ascites (e.g., from acute pancreatitis0
●Hepatic vein thrombosis (Budd Chiari syndrome)

●Rupture of hollow viscus within abdomen

●Lymphoma or leukemia

●Hemoperitoneum following trauma.

●Rare – Vasculitis, Peritoneal dialysis, IVC obstruction

Most Common causes (90% of cases): -

Portal HTN secondary to chronic liver diseases (cirrhosis)

●Intra-abdominal malignancy
●Congestive Heart Failure
●Mycobacterium tuberculosis

Portal Hypertension: -

●It is a high blood pressure in the portal vein and its tributaries (portal venous system).
●It is defined as a portal pressure gradient (the difference in pressure between the portal vein and the hepatic veins) of 5 mm Hg or greater.

Causes of portal hypertension: -

●Intrahepatic causes: liver cirrhosis and hepatic fibrosis (e.g., due to Wilson's disease, hemochromatosis, or congenital fibrosis).
●Prehepatic causes portal vein thrombosis or congenital atresia.
●Postherpetic obstruction occurs at any level between liver and right heart, including hepatic vein thrombosis, IVC thrombosis, IVC congenital malformation, and constrictive pericarditis.

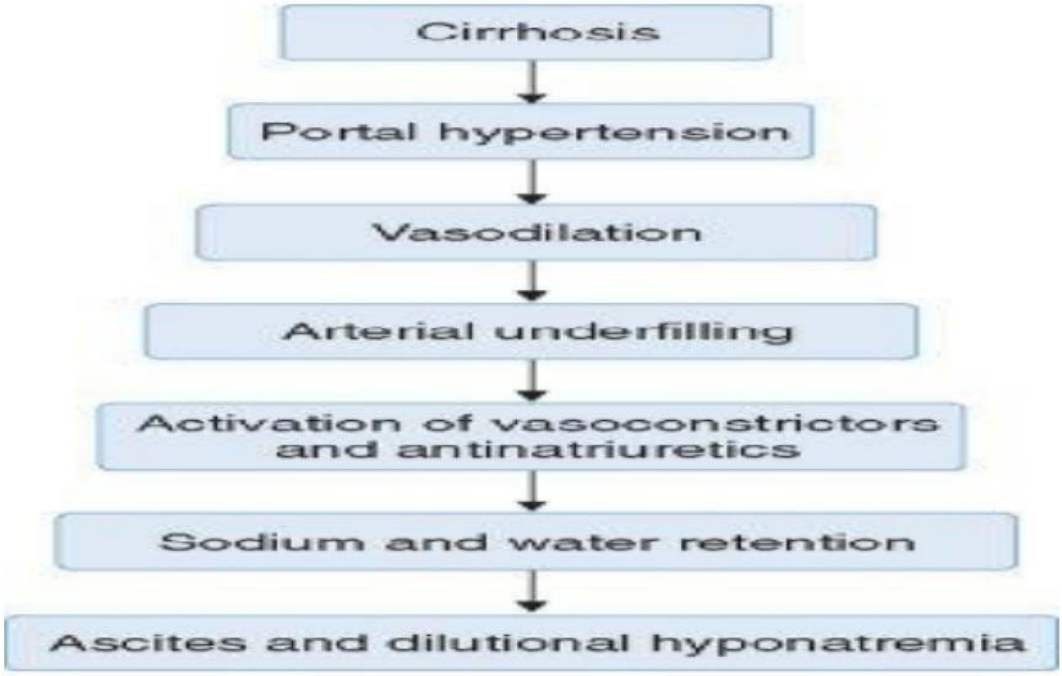
Cirrhosis: -

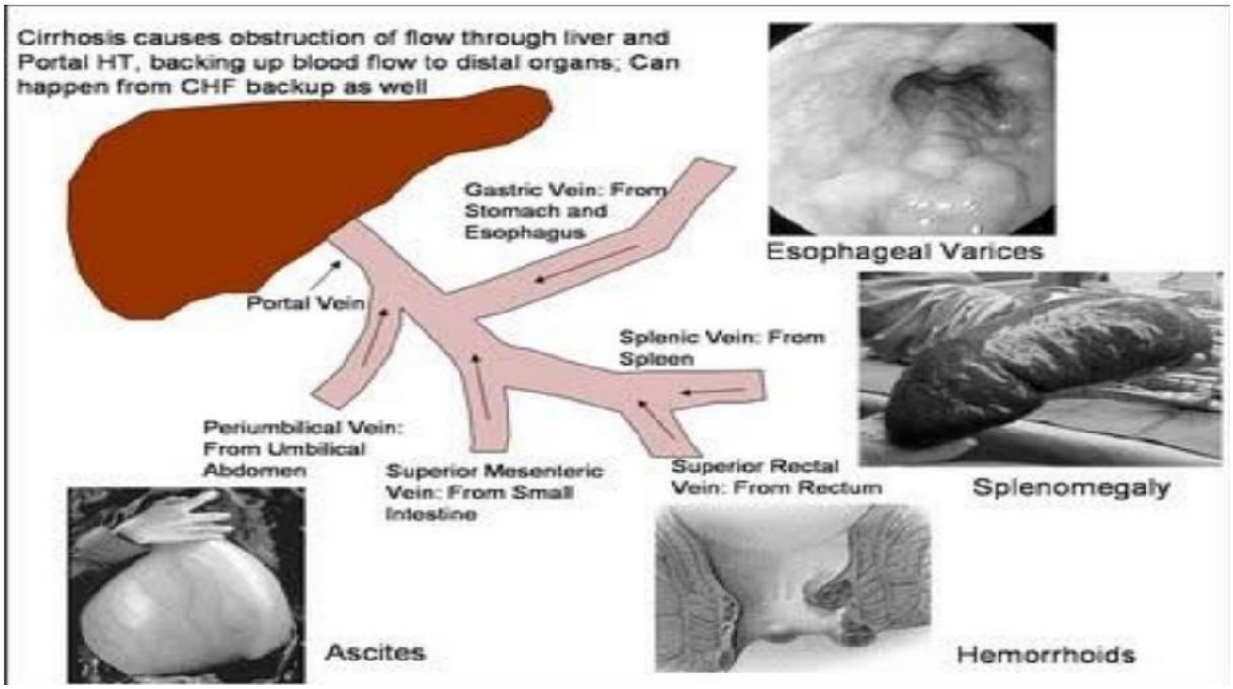
Most common causes of cirrhosis:

●Alcoholic liver disease or alcoholic hepatitis
●viral hepatitis (B or C)
●fatty liver disease

Other causes of ascites: -

Diseased peritoneum (SAAG < 1.1 g/dL):


Cirrhosis
Portal hypertension
Vasodilation
Arterial underfilling
Activation of vasoconstrictors and antinatriuretics
Sodium and water retention
Ascites and dilutional hyponatremia


Cirrhosis causes obstruction of flow through liver and Portal HT, backing up blood flow to distal organs; Can happen from CHF backup as well
Gastric Vein: From Stomach and Esophagus
Portal Vein
Splenic Vein: From Spleen
Periumbilical Vein: From Umbilical Abdomen
Superior Mesenteric Vein: From Small Intestine
Superior Rectal Vein: From Rectum
Esophageal Varices
Splenomegaly
Ascites
Hemorrhoids

Infections
●Bacterial peritonitis ●Tuberculous peritonitis
●Fungal peritonitis
●Human immunodeficiency virus (HIV)-associated peritonitis
Malignant conditions
●Peritoneal carcinomatosis
●Primary mesothelioma
●Pseudomyxoma peritonei
●Hepatocellular carcinoma
Other rare conditions
●Familial Mediterranean fever
●Vasculitis
●Granulomatous peritonitis
●Eosinophilic peritonitis
Normal peritoneum: -
Portal hypertension (serum-ascites albumin gradient [SAAG] >1.1 g/dL) ●Hepatic congestion, congestive heart failure, constrictive pericarditis, tricuspid insufficiency, Budd-Chiari syndrome
●Liver disease, cirrhosis, alcoholic hepatitis, fulminant hepatic failure, massive hepatic metastases
Hypoalbuminemia (SAAG < 1.1 g/dL)
●Nephrotic syndrome
●Severe malnutrition with anasarca
Miscellaneous conditions (SAAG < 1.1 g/dL)
●Pancreatic ascites
●Bile ascites
Nephrogenic ascites
●Urine ascites
●Ovarian disease □ Protein-losing enteropathy
STAGING OF ASCITES: -
Ascites may be semi-quantified using the following system:
●Stage 1+ is detectable only after careful examination.
●Stage 2+ is easily detectable but of relatively small volume.
●Stage 3+ is obvious, but not tense, ascites.
●Stage 4+ is tense ascites.
Nephrogenic ascites
●Urine ascites
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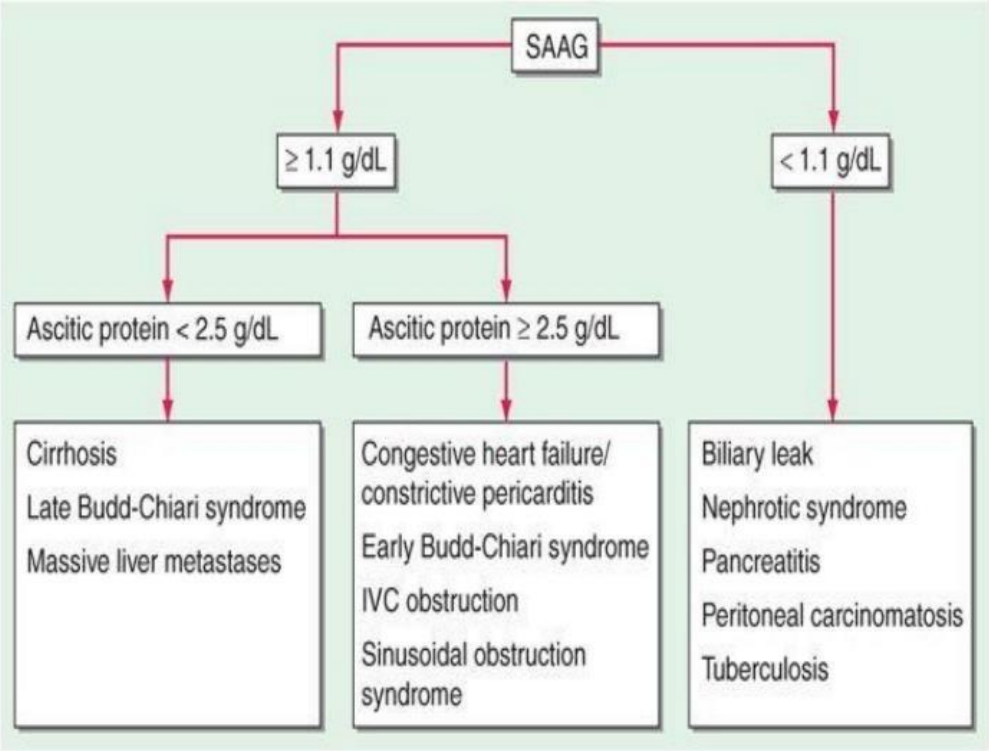
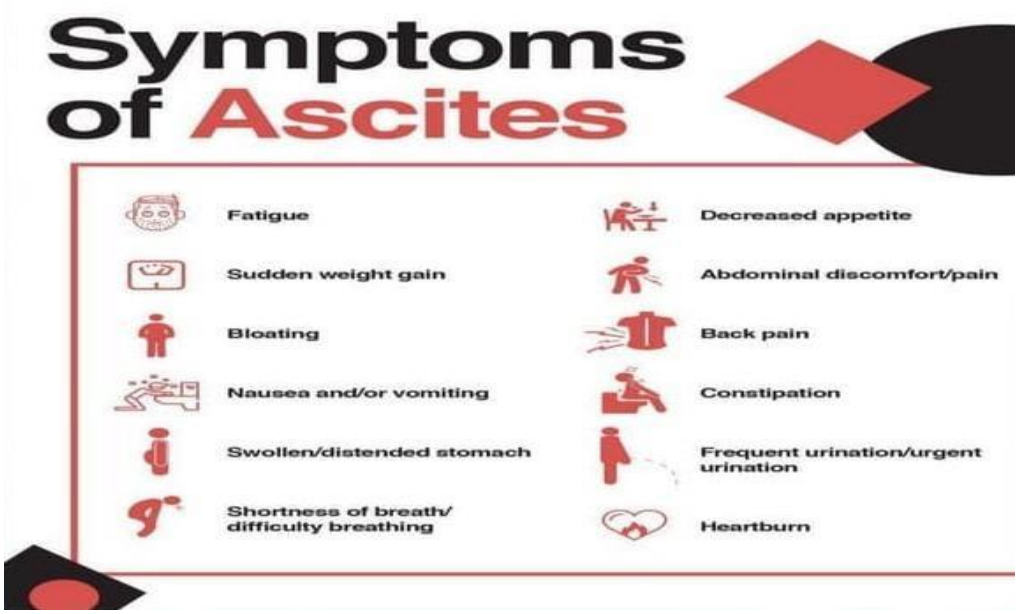


Source: Longo DL, Fauci AS, Kasper DL, Hauser SL, Jameson JL, Loscalzo J: *Harrison's Principles of Internal Medicine, 18th Edition*: www.accessmedicine.com

Algorithm for the diagnosis of ascites according to the serum-ascites albumin gradient (SAAG). IVC, inferior vena cava.



PATHOPHYSIOLOGY

1. Increased hydrostatic pressure.
2. Decreased colloid osmotic pressure.
3. Increase permeability of peritoneal capillaries
4. Leakage of fluid into the peritoneal cavity
5. Miscellaneous causes

●Myxedema

●Ovarian disease (Megi's syndrome)

●Chronic hemodialysis

●The accumulation of ascitic fluid represents a state of total-body sodium and water excess, but the event that initiates the unbalance is unclear.

●Three theories of ascites formation have been proposed: under filling, overflow, and peripheral arterial vasodilation.

●The under filling theory suggests that the primary abnormality is inappropriate sequestration of fluid within the splanchnic vascular bed due to portal hypertension and a consequent decrease in effective circulating blood volume.

●This activates the plasma renin, aldosterone, and sympathetic nervous system, resulting in renal sodium and water retention.

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●The under filling theory suggests that the primary abnormality is inappropriate sequestration of fluid within the splanchnic vascular bed due to portal hypertension and a consequent decrease in effective circulating blood volume. ●This activates the plasma renin, aldosterone, and sympathetic nervous system, resulting in renal sodium and water retention.

Although the sequence of events that occurs between the development of portal hypertension and renal sodium retention is not entirely clear, portal hypertension apparently leads to an increase in nitric oxide levels. Nitric oxide mediates splanchnic and peripheral vasodilation. Hepatic artery nitric oxide synthase activity is greater in patients with ascites than in those without ascites.

●Regardless of the initiating event, a number of factors contribute to the accumulation of fluid in the abdominal cavity:

●Elevated levels of epinephrine and norepinephrine are well-documented factors.

●Hypoalbuminemia and reduced plasma oncotic pressure favor the extravasation of fluid from the plasma to the peritoneal fluid, and, thus, ascites is infrequent in patients with cirrhosis unless both portal hypertension and hypoalbuminemia are present.

DIAGNOSIS

1-History:

Pts should be questioned about:

●Liver diseases

●Risk factors for Hepatitis C (needle sharing, tattoos, cocaine, heroin use and emigration from Egypt or Southeast Asia)

●Risk factors for Hepatitis B (needle sharing, tattoos, acupuncture, and emigration from China, Korea, Taiwan, or Southeast Asia).

●Pts with obesity, diabetes, hyperlipidemia and Nonalcoholic steatohepatitis (NASH) should be ruled out.

●Pts with ascites who lack risk factors for cirrhosis should be questioned about cancer, heart failure, TB, dialysis, and pancreatitis.

●Operative injury to the ureter or bladder can lead to leakage of urine into peritoneal cavity.

●HIV pts may have infections that lead to ascites.

2-Clinical Features:

A- Asymptomatic (fluid <100 - 400ml):

●Mild ascites

B- symptomatic (fluid >400ml):

●Increased abdominal girth, presence of abdominal pain or discomfort, early satiety, pedal edema, weight gain and respiratory distress depending on the amount of fluid accumulated in the abdomen.

SYMPTOMS:
●Progressive swelling of abdomen with gain in weight.

●ching pain all over the abdomen do stretching; bloated feeling of abdomen.
●Dyspnoea & even orthopnoea (in large collection of fluid).

●Swelling of lower limb (due to ccf, nephrotic syndrome, functional ivc obstruction).

●Paraesthesia in the distribution of lateral femoral cutaneous nerve (meralgia paraesthetica).

●Oliguria

●Dyspepsia, heartburn d/t GERD SIGNS:

GENERAL SURVEY
●Bipedal pitting edema.

●Neck veins may engorge (due to hypervolemia)

●Obvious swelling of abdomen.

ABDOMEN:
●Swelling of abdomen & there is fullness in flanks. The skin looks shiny.

●Divarication of recti; there may be presence of abdominal (umbilical) herniation or abdominal striae (striae albic antes) .

●Prominent veins in flanks

●Umbilicus – flushed or everted with transverse slit.

●Fluid thrill present.

●Shifting dullness present.

Measurements:
●The maximum girth of abdomen is at the level of abdomen.

●Spino -umbilical distance (line joining anterior superior iliac spine & umbilicus) **is** equal on both sides.

RESPIRATORY SYSTEM:
●Basal collapse- diminished movements, impaired note on percussion, diminished vesicular breath sound
●The distance between xiphisternum & umbilicus is more than the distance between umbilicus & symphysis pubis.

& crepitations may be heard in the lower part of chest on both sides .
Hydrothorax (commonly right sided; due to defects in diaphragm) may be bilateral.

CVS:
●Apex beat – deviated upwards & outwards.

●There may be diffuse pulsation over precordium.

●Soft systolic murmur in pulmonary area may be present (due to associated severe anemia).

GENITO URINARY SYSTEM:
●scrotal edema or hydrocele may be evident as secondary effects of ascites or as a clue to etiological (e.g., nephrotic syndrome) diagnosis of ascites.

NERVOUS SYSTEM:
●Nothing there may be features of hepatic encephalopathy.

Physical examination findings:

●Umbilicus Eversion (often with umbilical herniation)

●Tympany at the top of the abdomen

●Fluid wave

●Peripheral edema

●Shifting dullness (> 500ml fluid)

- Bulging flanks (>500ml fluid)

WHERE DO YOU GET FLUID THRILL?

Fluid thrill is present in the presence of fluid in the peritoneal cavity whether it is encysted or free.

- Ascites
- Ovarian cyst
- Hydramnios
- Rarely in large hydronephrosis
- Obesity

ESSENTIAL CRITERIA FOR POSITIVE FLUID THRILL:

- Large amount of fluid (at least 2-liter fluid is necessary to elicit fluid thrill).

- Fluid should remain under tension.

- Minimal fluid (½ to 1 liter) is required to demonstrate shifting dullness.

SHIFTING DULLNESS

- While the patient lies supine, the intestine will float in midline & will giv note on percussion. To follow the cardinal rules of percussion, we

- percuss the midline first & then the flanks- I. we percuss from 'more resonant to less resonant' area.

UNILATERAL SHIFTING DULLNESS

- This is found in splenic rupture & is known as Ballance's sign.

- The blood present in left flank becomes clotted (near the spleen) & does not shift to right side in right lateral position but the blood present in the right side (hemoperitoneum) is shifted to the left side

Bulging Flanks and Umbilical Hernia

WHAT IS HORSE SHOE SHAPED DULLNESS IN ASCITES?

In moderate ascites the distribution of fluid in supine of patient is confirmed to the flanks dependent parts & hypogastrium. Thus in supine position epigastrium & umbilicus are tympanitic on percussion (due to floating of intestine) but a horse -shoe shaped dullness with concave upper border is elicited due to dull flanks & dull hypogastrium Percuss the abdomen in various directions from the central area of tympanitic(i.e. the umbilical region) to outwards & demonstrate the horseshoe shaped dullness.

DIFFERENTIAL DIAGNOSIS

●FAT- OBESITY (INVERTD UMBILICUS WITH ABSENT FLUID THRILL AND SHIFTING DULLNESS)

●FAECES- MEGACOLON OR LOW GUT OBSTRUCTION (SYMMETRICAL ENLARGEMENT WITH VISIBLE PERISTALSIS)

FOETUS- PREGNANCY (FOETAL PARTS ARE PALPABLE, CENTRAL DULLNESS)

FLATUS- GASEOUS DISTENTION (FLANKS ARE NOT BULGRD; TYMPANIC NOTE

●ALL OVER ABDOMEN)

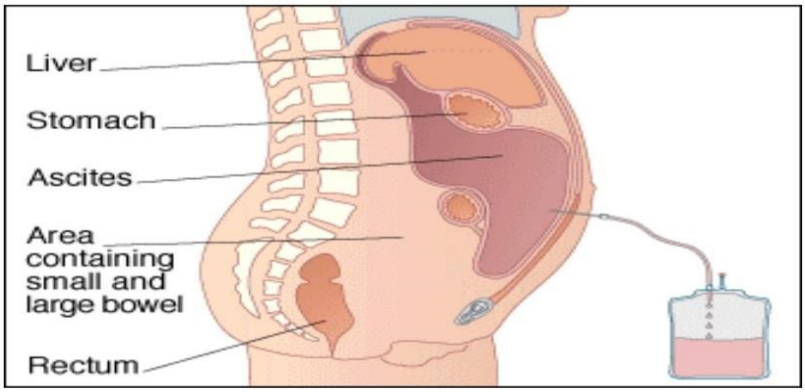
●FLUID- OVARIAN CYST, ACSITIS

FULL BLADDER (FLANKS ARE TYMPANIC. PALPATION CAUSE PAINOR DISCONFORT AND DESIRE TO MICTURITION; USALLY ROUNDED CYSTIC SWELLING IN HYPOGASTRIUM WHICH IS DULL ON PERCUSSION SHIFTING DULLNESS ABSENT)

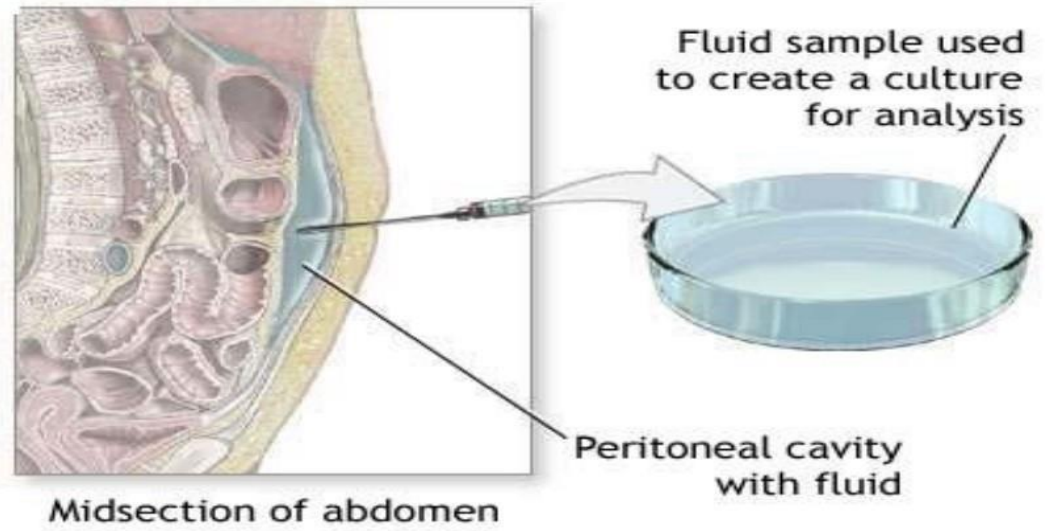
Diagnosis

3-paracentesis:

It is a diagnostic procedure to establish the etiology of new-onset ascites or to rule out spontaneous bacterial peritonitis in patients with preexisting ascites.



Large volume paracentesis is performed in hemodynamically stable patients with tense or refractory ascites to alleviate discomfort or respiratory
compromise.
●For diagnostic purposes, a small amount (20cc) may be enough for adequate
Testing
Ascitic fluid analysis:
Cell count:
●A white blood cell count is the most important.
●A neutrophil > 250 cells/mm3 → spontaneous bacterial peritonitis
●An elevated lymphocyte → tuberculosis or peritoneal carcinomatosis ●Gram
stain and culture:
for bacteria and acid-fast bacilli
●Red cell count
> 50000/microliter →hemorrhagic ascites, which usually is due to malignancy, tuberculosis, or trauma



●Calculated by:
Serum albumin – Ascites albumin= SAAG
SAAG >1.1 g/dL= Portal HTN
SAAG < 1.1 g/dL= non-Portal hypertensive cause
WHAT IS SERUM- ASCITES ALBUMIN GRADIENT(SAAG):
●If the serum albumin minus ascitic fluid albumin is equal to or greater than 1.1g/dl, the patient has portal hypertension. Other than cirrhosis of liver this is a feature of ccf, Budd Chiari syndrome, portal vein thrombosis, myxedema. ●If the gradient is less than 1.1 g/dl, usually it suggests malignancy ascites, tuberculous ascites pancreatic ascites or nephrotic syndrome..
saag is based on oncotic – hydrostatic balance and directly correlates with
portal pressure.
SAAG:

SAAG >1.1
1. Liver Disease
2. Hepatic Congestion
3. CHF
4. Tricuspid Insufficiency
5. Massive Hepatic Metastasis

SAAG <1.1
1. Peritoneal carcinomatosis
2. Peritoneal Infection
(TB, Fungal, CMV)
3. Nephrotic syndrome
4. Pancreatic ascites

Total protein:
Helpful in diagnosing spontaneous bacterial peritonitis. Pts with a value<1 g/dl protein and glucose of <50mg/dl have high risk of SBP.

- **Cytology**:

for malignant cells

- **Amylase:**

to exclude pancreatic ascites.

Ascitic Fluid

Appearance: The gross appearance of the ascitic fluid can be helpful in the differential diagnosis.
Turbid or cloudy: infected fluid.

Milky: Triglyceride concentration of greater than 200mg/dl (often greater than 1000mg/dl), malignancy is usually MC cause, but cirrhosis may present with chylous fluid.

Pink or Bloody: Pink fluid usually traumatic tap. Frankly bloody may occur in hepatocellular carcinoma, or other malignancy related ascites.

Brown: Deeply jaundiced pts may present with brown ascitic fluid, which may represent gallbladder rupture or perforated duodenal ulcer.

Diagnosis 4-imaging Studies:
A- Chest and Plain Abdominal Films

- Elevation of the diaphragm (usually with >500 ml of fluid)
- Abdominal haziness
- Bulging Flanks
- Poor definition of intra-abdominal organs.
- Medial displacement of the cecum and ascending colon.
- Helmer's sign: the lateral liver angle is displaced medially from the thoracoabdominal wall in a patient with a large extraperitoneal fluid collection extending into the flank (Pathologic processes in both the intra- and extraperitoneal spaces).

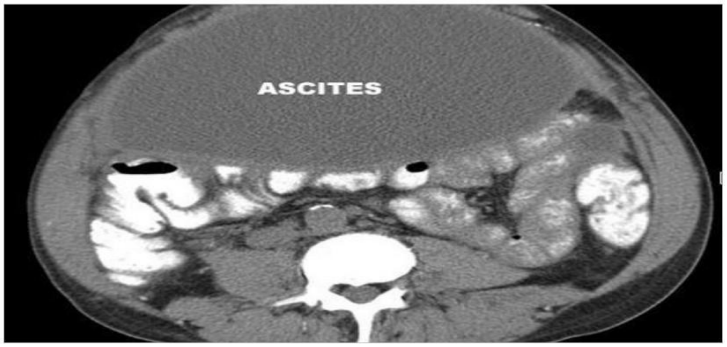
Imaging Studies: **B- CT scan**

- Well visualized
- Fluid may be visualized in the:

Imaging Studies:
Right perihepatic space

- Posterior subhepatic space (Morison pouch)
- Pouch of Douglas.

Large ascites displacing bowel posteriorly:



Perihepatic ascites:

Imaging Studies
C- Ultrasound

- Easiest and most sensitive technique for detection of ascitic fluid.
- Volume as small as 5-10ml can be seen.

Morison's pouch with abnormal fluid collection (red arrows) between the liver and right kidney.

Complications from Ascites
1. Refractory Ascites:

- Fluid overload is unresponsive to Na-restricted diet and high dose anti-diuretic treatment.
- Usually in the setting of chronic or acute liver diseases with associated portal hypertension.

POSSIBLE CAUSES OF REFRACTORY ASCITIS:

●NON-COMPLIANCE (NOT FOLLOWING THE ADEQUATE RESTRICTION OF SODIUM)
●FUNCTIONAL RENAL FAILURE IN CIRRHOSIS OF LIVER
●INFECTION
●SPONTANEOUS BACTERIAL PERITONITIS
●HEPATOMA
●G.I. BLEEDING
●NSAIDS (DEPRESS THE DIURETIC EFFECT OF FRUSEMIDE AND SPIRONOLACTONE)

●PORTAL OR HEPATIC VEIN THROMBOSIS

●SUPERIMPOSED CARDIAC OR RENAL FAILURE

Treatment of Refractory Ascites:

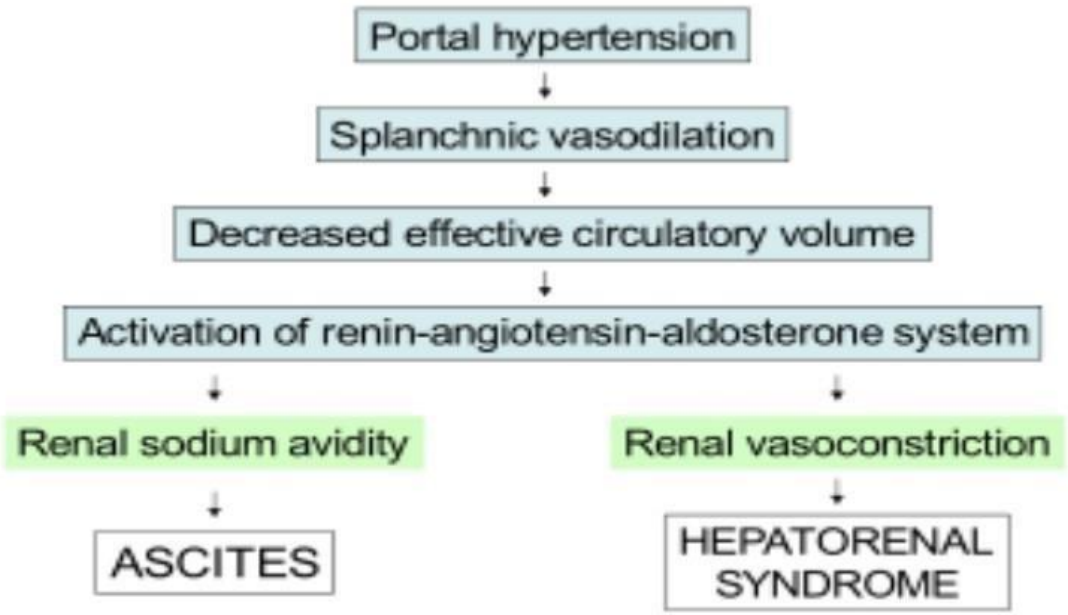
●Liver transplantation is treatment of choice.
If unsuitable, treatment with:

●Serial paracentesis

●Peritoneovenous shunt

Complications of Ascites
Hepatorenal syndrome:

Life-threatening medical condition that consists of rapid deterioration in kidney function in individuals with cirrhosis or fulminant liver failure. HRS is usually fatal unless a liver transplant is performed, although various treatments, such as dialysis, can prevent advancement of the condition. It is a common complication of cirrhosis, occurring in 18% of cirrhotic within one year of their diagnosis, and in39% of cirrhotic within five years of their diagnosis. FF



Type 1 HRS:

- Doubling of initial serum creatinine level to >205mg/dl or a 50% cause decreasing in 24hour creatinine clearance to <20ml/min in < 2 weeks.
- Mortality is >90% without liver transplantation.

Type 2 HRS:

- RF has a slower progressive course.
- Occur in the setting of chronic or acute liver disease with portal hypertension.
- Low GFR (with creatinine >1.5mg/dl)
- No evidence of shock, bacterial infection, or treatment with nephrotoxic agents + absence of GI fluid losses or renal fluid losses.

No improvement in renal function following diuretic withdrawal.

- Proteinuria <500mg/dl and no US evidence of renal disease or obstructive uropathy.

Treatment of hepatorenal syndrome:

- Supportive
- Liver transplantation: Tx of Choice.
- It corrects both liver and kidney disease.
- Is associated with up to 60% survival rate in 3 years.
- Shortage of donor organs leads to a high rate of death in these patients.

Complications of Ascites

3- Spontaneous Bacterial Peritonitis:

●20% of patients with cirrhotic ascites

●Diagnosed with neutrophil count of >250/mm3

●Gram – neg organisms in 60% of cases (E. coli and Klebsiella pneumoniae)x

●Gram + organisms 25% of cases (Strep species)

Symptoms: Abdominal pain, fever, development of hepatic encephalopathy, diarrhea, hypothermia and shock.

●Ascitic Protein level<1 g/dl is a risk for Spontaneous Bacterial Peritonitis.

●**Treatment**: Cefotaxime sodium

PROGNOSIS:

●The prognosis for patients with ascites due to liver disease depends on the underlying disorder, the degree of reversibility of a given disease process, and the response to treatment

TREATMENT FOR ASCITES:

●The goal is to prevent Na loading and increase renal excretion of Na and H2O and produce a net re-absorption of fluid from the ascites back into the circulating volume.

● Dietary Na restriction Diet of 2g sodium per day

●Fluid Restriction:

Only done when serum Na is <128mmol/L

A low sodium diet is one that includes less than 2 grams [2000milligrams] of sodium each day. the main source of

●sodium in the main diet is table salt , which is often added when foods are processed, prepared, or just before eating.

One teaspoon of salt contains about 2300mg of sodium. sodium also occurs naturally in some foods.

●consult a reference book; one suggestion is bobbie Mostyn's pocket Guide to low salt Foods.

On food labels, the amount of sodium in food listed on the nutrition label

American Association for the Study of Liver Diseases (AASLD) recommendations for the management of adult patients with ascites due to cirrhosis

Evaluation and diagnosis
Abdominal paracentesis should be performed and ascitic fluid should be obtained from inpatients and outpatients with clinically apparent new-onset ascites.
Because bleeding is sufficiently uncommon, the routine prophylactic use of fresh frozen plasma or platelets before paracentesis is not recommended.
Differential diagnosis
The initial laboratory investigation of ascitic fluid should include an ascitic fluid cell count and differential, ascitic fluid total protein, and serum-ascites albumin gradient (SAAG).
If ascitic fluid infection is suspected, ascitic fluid should be cultured at the bedside in blood culture bottles prior to initiation of antibiotics.
Other studies of ascitic fluid can be ordered based on pretest probability of disease.
Testing serum for CA125 is not helpful in the differential diagnosis of ascites. Its use is not recommended in patients with ascites of any type.
Treatment of ascites
Patients with ascites who are thought to have an alcohol component to their liver injury should abstain from alcohol consumption.
Firstline treatment of patients with cirrhosis and ascites consists of sodium restriction (88 mmol/day [2000 mg/day]) and diuretics (oral spironolactone with or without oral furosemide).
Fluid restriction is not necessary unless serum sodium is less than 120 to 125 mmol/L.
An initial therapeutic abdominal paracentesis should be performed in patients with tense ascites. Sodium restriction and oral diuretics should then be initiated.
Diuretic-sensitive patients should preferably be treated with sodium restriction and oral diuretics rather than with serial paracenteses.
Liver transplantation should be considered in patients with cirrhosis and ascites.
Refractory ascites
Serial therapeutic paracenteses are a treatment option for patients with refractory ascites.
Postparacentesis albumin infusion may not be necessary for a single paracentesis of less than 4 to 5 L.
For large-volume paracenteses, an albumin infusion of 6 to 8 g/L of fluid removed can be considered.
Referral for liver transplantation should be expedited in patients with refractory ascites.
Transjugular intrahepatic portasystemic stent-shunt (TIPS) may be considered in appropriately selected patients who meet criteria similar to those of published randomized trials.
Peritoneovenous shunt, performed by a surgeon experienced with this technique, should be considered for patients with refractory ascites who are not candidates for paracenteses, transplant, or TIPS.
Hepatorenal syndrome
Albumin infusion plus administration of vasoactive drugs such as octreotide and midodrine should be considered in the treatment of type I hepatorenal syndrome.

Nutrition Facts

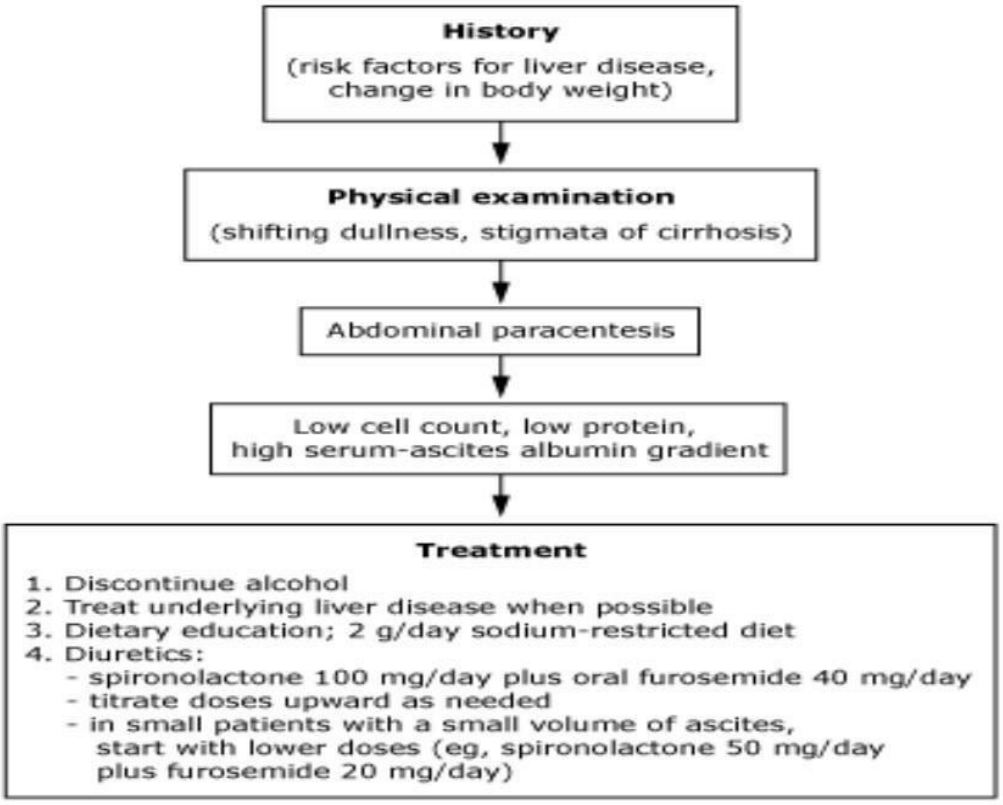
Serving Size 1 Cup (148g/5.3oz)

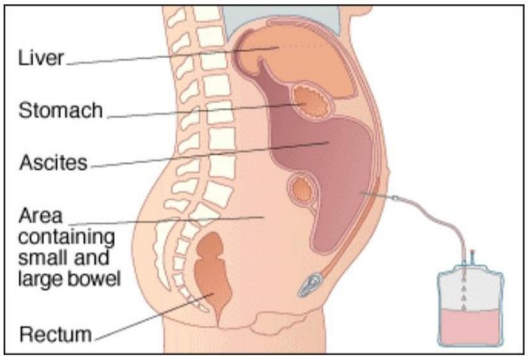
Amount Per Serving	
Calories 100	Calories from Fat 0
	% Daily Value*
Total Fat 0g	0%
Saturated Fat 0g	0%
Cholesterol 0mg	0%
Sodium 280 mg	7%
Potassium 720mg	21%
Total Carbohydrate 26g	9%
Dietary Fiber 3g	12%
Sugars 3g	
Protein 4g	

Vitamin A 0%	• Vitamin C 45%
Calcium 2%	• Iron 6%
Thiamin 8%	• Riboflavin 2%
Niacin 8%	• Vitamin B_6 10%
Folate 6%	• Phosphorous 6%
Zinc 2%	• Magnesium 6%

*Percent Daily Values are based on a 2,000 calorie diet.

Diuretic therapy: Spironolactone: diuretic of choice (25-200mg PO daily or bid) Lasix: (20-80 mg/d PO/IV/IM) Zaroxolyn: (works on Edema of CHF) (5-20 mg/dose PO q24hr) Mannitol: (0.5-2 g/kg IV over 30-60 min, repeat q6-8hrs)





Up to 20L can be removed over 4-6hr.

Removal of 5L or more of ascitic fluid during a single session.

Paracentesis Contraindications

- Acute abdomen (absolute)
- Severe bowel distention
- Previous abdominal surgery (if necessary, perform open procedure)
- Pregnancy (if necessary, perform after first trimester using an open technique above the umbilicus)

- Distended bladder that cannot be relieved by foley catheder
- Infection at site of insertion (cellulitis or abscess)
- Thrombocytopenia (relative)
- Coagulopathy (relative)

Paracentesis Complications:

- Bladder perforation
- Small or large bowel perforation
- Stomach perforation
- Laceration of major vessels (mesenteric, iliac, aorta)
- Laceration of catheter or guide wire and loss in peritoneal cavity (requires laparotomy)

.

- Abdominal wall hematoma
- Incisional hernia.

Wound infection

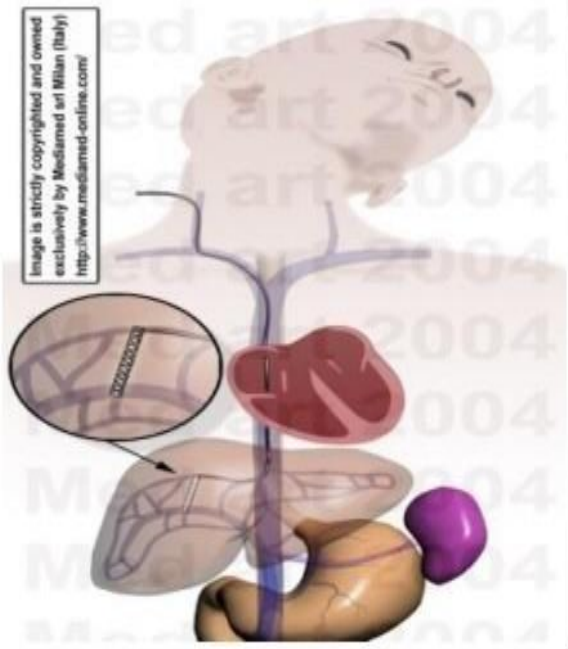
- Wound dehiscence

- **Trans jugular Intrahepatic Portosystemic Shunt:**
- The TIPS procedure is an interventional radiologic technique that reduces portal pressure and may be the most effective treatment for diuretic resistant ascites.

Risks:

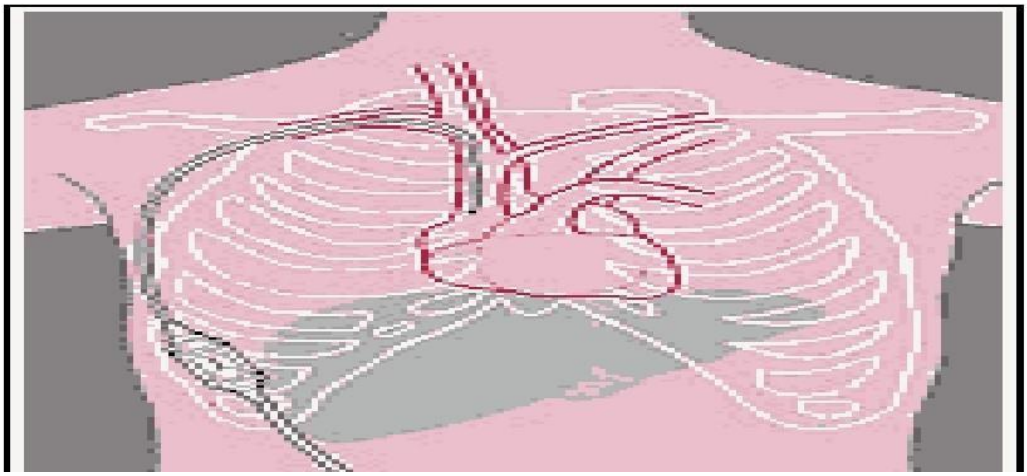
TIPS Procedure:

- side to side portacaval shunt, usually placed through the right internal jugular vein. A needle is placed through the IJV into the hepatic vein



Peritoneovenous shunt:

- Developed to return ascitic fluid from the peritoneal cavity directly to the systemic circulation.
- Consists of an intra-abdominal tube connected through a valve to silicone tube that transverses the subcutaneous tissue up to the neck and enters one of the jugular veins.
- This leads to diuresis and mobilization of ascites.



Risks of Peritoneovenous shunt:

- DIC
- Infection
- Variceal bleeding
- Small bowel obstruction
- Shunt occlusion
- Death

- Due to this risk this procedure is rarely used.
- Peritoneovenous shunts are therapeutic but do not improve survival rates in patients with cirrhosis and ascites.

liver transplantation:

- Tx of choice
- Corrects portal hypertension.
- Changes the natural course of progressive liver failure due to cirrhosis. ● Not all pts are candidates for transplant, and those who may wait for years for a donor.
- Many die from complications of ascites while waiting for transplant donor ●American Association for the Study of Liver Diseases (AASLD) recommendations for the management of adult patients with ascites due to cirrhosis:

Evaluation and diagnosis

- Abdominal paracentesis should be performed and ascitic fluid should be obtained from inpatients and outpatients with clinically apparent new-onset ascites.
- Because bleeding is sufficiently uncommon, the routine prophylactic use of fresh frozen plasma or platelets before paracentesis is not recommended.

Differential diagnosis

- The initial laboratory investigation of ascitic fluid should include an ascitic fluid cell count and differential, ascitic fluid total protein, and serum-ascites albumin gradient (SAAG). If ascitic fluid infection is suspected, ascitic fluid should be cultured at the bedside in blood culture bottles prior to initiation of antibiotics. Other studies of ascitic fluid can be ordered based on pretest probability of disease. Testing serum for CA125 is not helpful in the differential diagnosis of ascites. Its use is not recommended in patients with ascites of any type.

Treatment of ascites

- Patients with ascites who are thought to have an alcohol component to their liver injury should abstain from alcohol consumption. Firstline treatment of patients with cirrhosis and ascites consists of sodium restriction (88 mmol/day [2000 mg/day]) and diuretics (oral spironolactone with or without oral furosemide). Fluid restriction is not necessary unless

serum sodium is less than 120 to 125 mmol/L. An initial therapeutic abdominal paracentesis should be performed in patients with tense ascites. Sodium restriction and oral diuretics should then be initiated. Diuretic-sensitive patients should preferably be treated with sodium restriction and oral diuretics rather than with serial paracenteses. Liver transplantation should be considered in patients with cirrhosis and ascites.

Refractory ascites

●Serial therapeutic paracenteses are a treatment option for patients with refractory ascites. Post paracentesis albumin infusion may not be necessary for a single paracentesis of less than 4 to 5 L. For large-volume paracenteses, an albumin infusion of 6 to 8 g/L of fluid removed can be considered. Referral for liver transplantation should be expedited in patients with refractory ascites. ●Trans jugular intrahepatic portosystemic stent-shunt (TIPS) may be considered in appropriately selected patients who meet criteria similar to those of published randomized trials. Peritoneovenous shunt, performed by a surgeon experienced with this technique, should be considered for patients with refractory ascites who are not candidates for paracenteses, transplant, or TIPS.

HERBAL DRUGS FOR ASCITES

Spectacular Herbs That Manage Ascites Naturally

Punarnava

●Thanks to the abundance of diuretic quality and laxative nature, Punarnava is the ultimate remedy for ascites. It is also sanctified with strong anti-inflammatory properties that relaxes the liver walls and also flushes out toxins from the abdominal cavity by increasing the flow of urine in the body. It is extremely effective in controlling the swelling and fluid retention in the abdomen.

Pippali

●The Tikshna Guna of the powdered fruit of pippali is well-known for promoting agni (digestive fire) within the stomach which in turn improves digestion, stimulates hunger and pacifies the vitiated Kapha doshas that causes ascites. The hepatoprotective activity of the fruit also prevents liver cirrhosis, thus managing accumulation of fluid.

Haritaki

●The mild laxative nature of dried haritaki fruits helps in virechana and expels malas out of the body. It also regulates the bowel movement and relaxes the liver muscles. Not only does it prevent problems pertaining to the liver but also prevents accumulation of fluid throughout the body, thus relieving conditions like oedema.

Gokhru

●Call it Puncture spine or Gokhru, it is one of the best natural remedies for ascites. Blessed with powerful anti-inflammatory properties, it ardently reduces swelling of the abdomen. Additionally, its diuretic nature, increases urine secretion from the body that in turn helps flush out the toxic fluid accumulated in the abdominal cavity.

Shilajit

●This incredible Rasaoushadi is highly beneficial for the management of ascites and restoring the natural immunity of the body all at the same time. It not only balances the vitiated Vata doshas but also prevents fluid accumulation in the abdominal cavity and provides relief from bloating. It is extremely effective in patients who feel fatigue or weakness due to ascites.

Ayurvedic treatment for ascites

Snehana (oleation)

●Oleation therapy is advised only if you are strong and able to tolerate the treatment.

●Generally, in the case of jalodara, snehana is contraindicated as the abdomen is distended and painful.

Neither is it recommended in case of aggravated kapha dosha.

●In case of ascites, snehana makes a pretreatment, to be performed before the actual panchakarma, and involves massaging the body using oils to pacify the vata dosha. Narayana taila and dashmoola taila may be used for snehana for the treatment of ascites.

●Snehana is done for a total period of 15 to 35 minutes at a time.

●Avoid walking in cold weather, abstain from sexual activity and avoid speaking loudly after the treatment.

Swedana

●Swedana is a pretreatment procedure as well.

●In ascites, swedana is done to remove the toxins accumulated due to the blockade of circulatory channels.

●In this procedure, perspiration is induced with the help of steam and vapours of herbal decoctions.

●The process should be done in the presence of an Ayurvedic practitioner, and, after the therapy, blood pressure and pulse rate should be monitored.

Virechana

●Virechana is the process of inducing purgation to remove toxins from the body. Nitya mridu virechana is suggested in case of ascites.
●A mild purgative agent such as castor oil can be given daily to empty the contents of the stomach and, thus, remove the toxins accumulated in the abdomen.
●Oil of danti (wild castor) may also be given with saindhava lavana (rock salt) every night after meals.
●Mild purgation done on a daily basis will take care of constipation and avoid the accumulation of toxins.

Katuki (kutki) is also widely used along with eranda (castor) for purgation.
●In some cases, abhayadi modaka, which contains pippali, mustaka (nutgrass), danti, and trivrit (Indian jalap) as the main ingredients, is used for nitya virechana.

1.Gokhshura Capsule
●Gokhshura capsule is pure and natural diuretic medicine for ascites which is very effective in ascites as it has an anti-inflammatory property that reduces the inflammation.
●These ayurvedic capsules for ascites are formulated with the pure extract of Gokshura (Tribulus terrestris). It also eliminates harmful toxins from the body.
●Recommended Dosage: Take one capsule twice daily with normal water.

2. Detox Premium Powder:
●Detox premium powder contains various herbo-mineral ingredients like Prawal pishti, Akik pishti, Giloy satva, Kamdudha ras, Moti pishti, Jahar mohra, Gandhak rasayan, Shukta pishti, Yavakshaar, Tal sindoor, Sudhyog tab, Shankh bhasm, Sutshekhar ras, Shwet parpati, etc.
●As the name suggests, it helps in the removal of toxins from the whole body. It also provides strengthen to the body, and helps in maintaining the general health of the body.
●Recommended Dosage: Take one sachet twice daily with normal water.

3. Panchsakar Churna:
●It is classical churna which is very effective for constipation patients as it has antioxidant, antiinflammatory and laxative properties.
●This herbal churna comprises of various ingredients like Balaharitaki, Shunthi, Shatapushpa, Swarnapatri, Shatapushpa, and Saindhav lavana. It also provides relief in symptoms of ascites.
●Recommended Dosage: Take one teaspoonful at bedtime with warm water.

4. Liver Care Tablet:
These tablets are 100% safe and purely ayurvedic formulation. It maintains the proper functioning of the liver and stimulates the growth of new liver cells. Liver Care Tablets contains Ingredients like Kalmegh (Andrographis paniculata), Kutaki(Picrorhiza kurroa), Bhumi amla(phyllanthus niruri), Giloy(Tinopora Cordifolia), Yavakshar(Hordeum vulgare), Imli Kshar(Tamarindus indica), Mukta Shukta pisti etc. These herbs balances excess Pitta Dosha and helps in problems like abdominal bloating, flatulence, abdominal pain, loss of appetite and indigestion.
●Recommended Dosage: Take 1 tablet twice daily with normal water.

5. Trikatu Tablet
●Trikatu tablets are a mixture of three Ayurvedic herbs like Marich (Piper nigrum), Saunth (Zingiber officinale), and Pippali (Piper longum).
●These tablets improve the digestion and eliminate the kapha dosha from the body. It also supports respiratory functions and removes ama from the body.
●Recommended Dosage: Take one tablet twice daily with normal water.

6. Kidney Care Tablet:
A healthy working kidney plays an important role in keeping the whole body clean, well-fueled, strong and functioning properly. Kidney failure puts the body at risk, allowing waste to accumulate and damage the kidneys from inside. It is a good idea to do a kidney cleansing and keep a check on the health of the kidneys in your middle and old age. The toxins that buildup results in nausea or feeling sick to the stomach, lack of concentration and blood pressure changes are all symptoms of kidney failure. The herbs used are very effective in treating kidney disorders and revive damaged kidney. It has diuretic, anti-inflammatory, antioxidant and analgesic properties.

Recommended Dosage: Take 1 tablet twice daily with normal water.

Natural Remedies For Ascites
1)Garlic
●The garlic is a natural herb that have many medicinal properties. Regular use of this herb reduces tenderness & bloating related with ascites patients. It also possess anti-cancer properties that reduces the unwanted growth of cells.
How to use:
●Take three to four cloves of garlic & prepare a juice of it.
●On an empty stomach take half teaspoonful of this juice.

●You can also do one thing chop the garlic into fine pieces & take it with a glass of water early in the morning on an empty stomach. **2)**

Ginger

●Ginger is also another medicinal herb that is easily available at home. It is a natural diuretic that remove extra water from the body. This water is removed in the form of urine. Ginger treat the edema naturally.

How to use:

●Prepare herbal ginger tea by crushing fresh ginger.
●Now put two cup of water in it. Boil it until remaining half cup.
●Strain the water, add honey in it for taste. Drink this warm herbal tea once or twice daily.

3) Fenugreek Seeds

●Fenugreek is an ancient herb that is used for all types of abdomen problems. It is also seen that fenugreek show hepatoprotective as well as anti-cancer effects on the body. This herb reduces inflammation, edema, pain, & eliminate free radicals from the body.

How to use:

●Take a teaspoonful of Fenugreek seeds. Put it in a glass of water overnight.
●On the next day strain the mixture, early in the morning drink this water on an empty stomach.
●This water is good for your health. 4) Radish
●Radish is a good vegetable for all types of liver diseases that acts as a natural detoxifier. It is considered as best solution for dealing with your ascites problem.

How to use:

●Prepare fresh juice of radish, if it is too strong that add few amount of water in it.
●Now drink this juice once daily on an empty stomach.
●This juice will provide relief from ascites problem.

5) Onions

●Onions is a herb that is well known for its medicinal properties. It is a natural diuretic that helps in eliminating extra fluid & remove toxins from the body.
●you can prepare fresh juice of onion & take one teaspoonful twice daily on an empty stomach.
●You can also add onions in your meal.
●Eat raw onons as it is good for your health

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