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Diagnostic Approach of Patient with Ascites: A Case Report

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Abstract: ***Ascites is an accumulation of fluid in the peritoneal cavity due to increase of capillary permeability, portal venous pressure, oncotic pressure, or lymphatic obstruction. From all the pathophysiological mechanisms mentioned, about 80% of the cases occur due to increased portal venous pressure (portal hypertension). It has been known that portal hypertension is associated with chronic liver disease (CLD). Nevertheless, ascites can also be found in several diseases such as kidney disease, heart disease, infection, malignancy or others. Determining the underlying disease of ascites is a challenge for the clinician; anamnesis including the course of the disease, risk factors, comorbidities are needed to be done properly. Ascites usually accompanied by other symptoms, for example in liver disease (signs of portal hypertension), kidney disease (anasarca), heart failure (increased jugular venous pressure, murmurs, gallops), and malignancies (mass, lymphadenopathy), thus physical examination should be performed in every patient carefully. In minimal amount of fluid, abdominal ultrasonography (USG) are recommended. Furthermore, it is good at detecting organomegaly or mass. This study will discuss the diagnostic approach of patients with ascites in the form of case report and literature review.***

Keywords: Edema, Shifting Dullness, Portal Hypertension, Chronic Liver Disease

1. Introduction

Under normal circumstances, the amount of fluid in the peritoneum depends on the balance between plasma and lymphatic vessels. The normal amount of fluid in the peritoneal cavity is 5-20 mL, and it can reach up to 50 mL during ovulation.(1)Increased capillary permeability, portal venous pressure, oncotic pressure, or lymphatic obstruction will force the fluid into the peritoneal cavity. This condition is known as ascites.(2)

Ascites can caused by several diseases such as liver disease (chronic liver disease, viral hepatitis, hepatic venous outflow obstruction), kidney (chronic kidney disease, nephrotic syndrome), heart (congestive heart failure, pericarditis, cardiomyopathy), malignancy (ovarian, breast, gastrointestinal, others) infection (tuberculosis, fungal infection, parasitic infection), the ovaries (meig's syndrome, struma ovarii), thyroid dysfunction (myxoedema) or lymphatic leakage.(2–5)

By knowing the primary cause of this condition, the patient's prognosis can be predicted. For example, cirrhotic patients with ascites have a mortality rate of up to 50% in 2-3 years, a higher rate may occur in patients with malignancy.(4,6)

Data from the NHS Hospital London reported 164 new-onset ascites over the past 5 years. The highest underlying disease of this condition were chronic liver disease (CLD) (55%), malignancy (29%), heart failure (6%), chronic kidney disease (3%) and other causes (7%). (5)As the most common cause of ascites, it is important to evaluate risk factors such as alcohol consumption, use of intravenous drugs, tattoos or sexual preferences. Nonetheless, about 5-10% of patients with ascites are have more than 1 underlying disease, so it is necessary to evaluate other causes as already mentioned above.(3,4,7)

Physical examination is need to be done to distinguish ascites from other abdominal distension (obesity, gaseous, obstruction, mass) are puddle sign, flank dullness, shifting dullness or fluid wave test. Abdominal ultrasonography (USG) is recommended in patients with minimal ascitic fluid volume or obesity. The classification of ascites can be determined as follows; Grade 1: mild ascites, can only be diagnosed by ultrasound or CT scan; Grade 2: moderate ascites, can be detected by flank dullness or shifting dullness; and Grade 3: massive ascites, obvious distention, confirmed by a fluid wave test.(3,8)

Blood tests (complete blood count, liver function, kidney function), radiology (USG, X-ray, CT Scan, MRI) and ascitic fluid examination are necessary if anamnesis and physical examination still do not support the diagnosis.(7,9)

Ascites is a manifestation of many underlying disease, thereby anamnesis, physical examination, laboratory or imaging test are needed to be done appropriately.This study will discuss the diagnostic approach of patients with ascites through a case report with brief literature.

2. Case Illustration

A 73-year-old woman came to Emergency Unit with complaints of abdominal distension since 1 month ago and in the last few days it is currently said to be getting bigger and tense. Thereafter, the patient complained of swelling in both legs causing discomfort and difficulty on walking. It is not accompanied by pain or redness and it is not disappear even with rest or elevated positions. Complaints of swelling in eyes or other body were denied. Patient was never complained the same problem before.

Since 3 days before admitted patient also complained of nausea and vomiting almost every day about ½ cup within a

few hours after the patient has eaten. Vomit mixed with blood and abdominal pain was denied. Patient also complained of black stool with soft and sticky consistency since 1 week ago. Stool mixed with blood was denied. Dark colour urine, reduced urine frequency, pain when urinate were denied. Patient denies complaint of yellowing of the eyes or other body, dizziness, headache, fever, palpitations or shortness of breath.

Patient denies the habit of consuming alcohol, using intravenous drugs or habit of taking painkillers. Patient and her family members did not have any history of hypertension, heart disease, kidney disease, diabetes, autoimmune disease or malignancy. None of the members had a similar complaint.

Patient was compos mentis with normal vital signs. On physical examination, there was no jaundice, the conjunctiva looked anemic, no icteric, there was no murmurs or gallop sounds in the heart and there was no rhonchi or wheezing in the lungs. Abdominal examination shows distension with positive results on the flank dullness, shifting dullness and fluid wave test. There were no spider naevi or caput medusa. On examination of the limbs, there was pitting edema in both legs, no palmar erythema was found.

Blood test (complete blood, liver function, kidney function, urine, hepatitis serology, electrolytes) and abdominal ultrasound were done on the patient. The results showed Hemoglobin 8.8 g/dl with morphology of erythrocytes hypochromic microcytic, and present of target cells, burr cells, spherocytes and cigar cells, SGOT 16 U/L, SGPT 4 U/L, hypoalbuminemia (2.5 g/dl), hyperglobulinemia (3.9 g/dl) with Albumin/Globulin (A/G) ratio 0.64, urea 98 mg/dl, creatinine 1.5 mg/dl, urobilinogen 1 IU/dl, HBsAg and anti-HCV negative. Abdominal USG shows the presence of free fluid in the peritoneal cavity, normal liver size with rough homogeneous echo parenchyma, sharp edges, no nodules or mass. There were no calcifications in the kidneys, no enlargement of the spleen, and no masses on the ovaries or other abdominal organs. The results of blood tests and ultrasound can be seen in **Table 1** and **Figure 1**.

From the recent illness history, physical examination, blood test and abdominal USG that has been done, the ascites condition in this case is caused by chronic liver disease. The patient was admitted to the ward with symptomatic, supportive and antibiotic therapy for prophylaxis of spontaneous bacterial peritonitis (SBP).

Table 1: Laboratory Examination

	Result	Normal Value
Complete Blood Count		
Hemoglobin	8.8	12-16 g/dL
MCV	70.8	81-96 fL
MCH	21.3	27-36 pg
White Blood Count	7.8	5 – 10 x 10^6/uL
Platelets	275	140-440 x 10^3/uL
Liver Function Test		
Albumin	2.5	3.5 - 5.0 g/dl
Globulin	3.9	1.5- 3.0 g.dl
SGOT	16	10 – 34 U/L
SGPT	4	9 – 43 U/L
Renal Function Test		
Urea	98	10 – 35 mg/dl
Creatinine	1.5	0.5 – 1.2 mg/dl
Serology		
HbsAG	Negative	
Anti HCV	Negative	
Urine		
Bilirubin	Negative	Negative
Urobilinogen	Positive (1)	0.2 IU/dl
Bacteria	Negative	Negative
Erythrocyte	1	0-1
Protein	Negative	Negative
Electrolyte		
Natrium	128	136-145 mmol/L
Kalium	3.9	3.5 – 5.1 mmol/L
Chloride	90	97 – 111 mmol/L

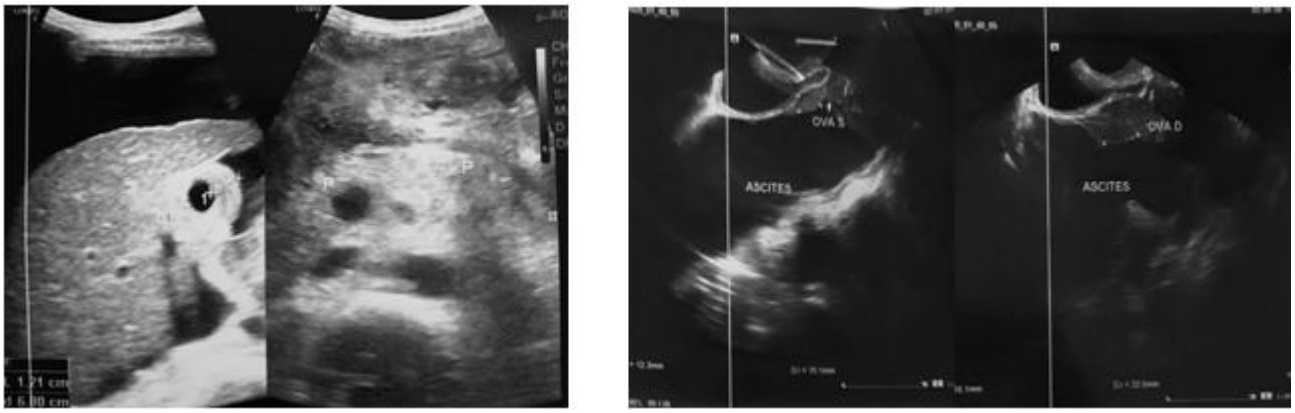

Figure 1: Abdominal USG.**A** shows liver size with rough homogeneous echo parenchyma, sharp edges, no nodules or mass. **B**shows the presence of free fluid in the peritoneal cavity, normal left and right ovarii, no mass

3. Discussion

Most complaint of patient with ascites are distension, nausea, vomiting and breathlessness.(10,11) In this case, the patient complained of distension, nausea and vomiting. Complaints of breathlessness was denied. Patients with ascites usually accompanied by other symptoms, thus it might help us determine the underlying disease. In patients with CLD, it is commonly followed by other signs of portal hypertension such as rupture of esophagus or gastric varices, collateral, splenomegaly, spider nevi, palmar erythema or leg swelling. In severe cases the patient may present with a

loss of consciousness.(1,9) Ascites caused by kidney disease (nefrogenic ascites) generally comes with complaints of anasarca, decreased or no urine production. In heart disease, symptoms that need to be evaluated are chest pain, dyspnea on exertion or palpitations. Patients with malignancy usually present with a condition of weight loss accompanied by mass or enlargement of the lymph nodes.(4) Ascites caused by infection mostly followed by fever or abdominal pain.(1,5) In patient, in addition to ascites the additional symptoms were swelling in both legs and melena.

Approximately 80% of ascites cases occur due to portal hypertension which is a complication of CLD.(12) Consequently it is important to evaluate risk factors such as alcohol consumption, history of hepatitis vaccine, sexual behavior, intravenous drug use and use of hepatotoxic drugs. Another risk factors of heart disease, kidney disease, diabetes, thyroid, autoimmunity and malignancy should not be overlooked.(3,4,7) Patients denies all of the risk factor mentioned.

Complete blood count and peripheral blood analysis indicate chronic disease anemia. This occurs due to upper gastrointestinal bleeding. Excluding the habit of taking painkillers, the possible cause of upper gastrointestinal bleeding and ascites is portal hypertension. About 20% of patients with portal hypertension will develop gastric varices. This condition occurs due to gastric vein dilation due to increased reversed blood flow by the portal vein. The increase of gastric vein pressure will eventually cause rupture of varices.(13,14) In addition, liver also has an important role in regulating iron homeostasis through hepcidin and transferrin, therefore anemia may also occur in patients without ruptures.(15,16)

Liver function tests shows normal SGOT level while the SGPT was below normal level. Study by Gawrieh et al showed prevalence of patients with chronic liver disease due to nonalcoholic fatty liver disease (NAFLD) and nonalcoholic steatohepatitis (NASH) was found to be high in some cases such as grade 1 or 2 degree of liver fibrosis even with normal or decreased SGOT or SGPT level.(11,17) Patient was hypoalbuminemia (2.5 g / dl) and hyperglobulinemia (3.9 g / dl) with an A/G ratio of 0.64. A/G ratio below 1.7 is associated with liver damage.(18) There is minimal increase in kidney function which can occur due to complications from CLD, heart failure, infection or from kidney disease. The diagnosis of nephrogenic ascites was considered after excluding other causes.(19) In addition, urobilinogen is found in the urine, which is a sensitive indicator of hepatocellular dysfunction.(11)

Serological testing for hepatitis was negative. Currently, with the development of vaccines and antiviral treatment, the causes of CLD have shifted towards non-infectious such as non-alcoholic fatty liver disease (NAFLD) or alcohol-related liver disease (ALD).(11,20) Nonetheless, research by Wiegand et al shows that approximately 9% of CLD patients have an unknown etiology.(21) Electrolyte test is recommended to monitor sodium levels. There is hyponatremia (128 mmol / L) in patient. About 50% of patients with ascites develop hyponatremia due to sodium and fluid retention.(22) Sodium correction is recommended in conditions of severe hyponatremia (<125 mmol / L) or in symptomatic patients.(23)

As well as ensuring the presence of fluid in the peritoneal cavity, USG is also used to detect organomegaly or mass, such as ovarian tumors (meigs syndrome).(11,24)Abdominal USG shows the presence of free fluid in the peritoneal cavity, normal liver size with rough homogeneous echo parenchyma, sharp edges, no nodules or mass indicates chronic parenchymal liver disease, no kidney calcifications, no splenomegaly and no mass on the ovaries or other organs.

4. Conclusion

Ascites is a pathological condition of fluid accumulation in the peritoneal cavity due to increase capillary permeability, portal venous pressure, oncotic pressure or lymphatic obstruction. Patients are said ascites if the fluid in the peritoneal cavity is more than 20 mL or 50 mL in women during ovulation. This condition is found in several diseases such as liver disease, kidney disease, heart disease, infection, malignancy or others. By knowing that the cause of ascites is broad and it can have more than one underlying disease, it is necessary to have an appropriate diagnostic approach to determine therapy and improve the patient's quality of life.

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